Course Description Form					
Course Code and Name	ETM230 PERSPECTIVE				
Course Semester	4				
Catalog Content	Aksonometric, isometric, dimetric, and trimetric perspective types and application skills Various types of inclined, cavalier, cabinet, and bird's-eye perspectives and application skills Different types of conic perspective and application skills Ability to create shadows in perspective				
Textbook	 Çetinkaya, S., Teknik Perspektif, Ankara, 1995. Çaylak, A., Bilgi ve Uygulama Yaprakları-I, Ankara, 2005. 				
Supplementary Textbooks	 Ali Pancarcı - M.Emin Öcal Yapı Teknik Resmi Harbi Hotan - Mimari Perspektif ve Gölge, YEM Yayın, İstanbul, 3.Baskı, 1999 Esen Onat - Perspektif ve Perspektifde Gölge Çizimi Francis D.K.Ching - Mimarlık ve SanattaYaratıcı Bir Süreç Çizim, Çev.: Çelen Birkan, YEM Yayın Francis D.K. Ching with Steven P. Juroszek - Desing Drawing, John Wiley&Sons, Inc. New York, 1998 Jose M. Parramon - Çizim ve Resim Sanatı, Remzi Kitabevi , İstanbul, 2.Baskı , 1995 				
Credit	3 ECTS				
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements				
Type of the Course	Elective				
Instruction Language	Turkish				
Course Objectives	Learning to make drawings more realistic and dimensional Learning to draw objects correctly from different angles Developing creative thinking skills by experimenting with different perspectives Learning different perspective techniques to determine when to use which technique Learning to convey ideas and designs more effectively by understanding the visual impact of perspective				
Course Learning Outcomes	 Drawing skills are enhanced, gaining the ability to make drawings more realistic and dimensional. Drawing abilities in perspective are developed, improving the skill to draw objects accurately from different angles. Experimenting with drawing in various perspectives fosters creative thinking skills. Acquiring analytical thinking skills, learning different perspective techniques, and determining when to use each technique. 				
Instruction Methods	Face to face				

	1. Week	Introduction (Introdu- Drawing)	ction and Impo	ortance of Perspective		
	2. Week	2. Week Axonometric perspective and its types				
	3. Week	Isometric perspective	and its applic	ations		
	4. Week	Dimetric perspective	and its applica	ations		
	5. Week	Trimetric perspective	and its applic	ations		
	6. Week	Oblique perspective a	and its types			
Weekly Schedule	7. Week	Cavalier perspective	and its applica	tions		
	8. Week	Cabinet perspective a	nd its applicat	ions		
	9. Week	Bird's-eye view persp	ective and its	applications		
	10. Week	Conic perspective and	d its types			
	11. Week	One-point conic pers	pective and its	applications		
	12. Week	Two-point conic pers	pective and its	applications		
	13. Week	Three-point conic per	spective and i	ts applications		
	14. Week	Shadow in perspectiv	e			
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: Final Exam and	Veekly theoretical course hours: 2 Veekly tutorial hours: 0 Reading Activities: 3 nternet browsing, library work: 2 Designing and implementing materials: 3 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4				
			Numbers	Total Weighting (%)		
	Midterm Exar	ns	1	40		
	Assignment		1	20		
	Application					
Assessment Criteria	Projects					
	Ouiz					
	Percent of In-1	term Studies		60		
	(%)					
	Percentage of Score (%)	Final Exam to Total		40		
	Attendance					

		Activity	Total Numbe r of Weeks	Dur (wee hou	ation ekly r)	l	T Pe W Lo	otal criod ork oad
	Weekly Hours	Theoretical Course	14		2			28
	Weekly	Tutorial Hours						
	Reading	g Tasks	5		3			15
	Studies		5		2			10
Workload	Materia Implem	l Design and entation	2		3			6
	Report	Preparing						
	Prepari	ng a Presentation						
	Present	ations	2		1			0
	Prepera Exam	tion for Midterm	Z		4			0
	Final E for Fina	xam and Preperation	2		4			8
	Other (emphas	should be ized)						
	Total W	/orkload	-		_			75
	Total W	/orkload / 25					7:	5/25
	Course	Credit (ECTS)						3
	No	Program Outcom	ies	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applic information in these model and solve eng	e in e and vant use ed areas to ineering		X			
	2	and solve complex en problems; ability to s apply proper analysis modeling methods fo purpose.	ngineering select and s and or this					
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply						
	4	Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer applications; ability to information technolo effectively.	elect and es and nalysis blex ting to use ogies				X	
	5	Ability to design and experiments, gather of analyze and interpret for examination of er problems or disciplin research topics.	l conduct data, results ngineering ne-specific	X				

	6 Ability to work efficiently in x intra-disciplinary teams.	
	7 Ability to work efficiently in multi-disciplinary teams. x	
	8 Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	
	9 Ability to write effective x reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.	
	10 Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to x	
	11 Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.	
The Course's Lecturer(s) and Contact Informations	Prof. Dr. İsmail Şahin isahin@gazi.edu.tr	

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome 6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
TOTAL	2		1	4	1	1	3		1	3	
Learning outcome 1	1			1			1			1	
Learning outcome 2	1			1			1			1	
Learning outcome 3			1	1			1			1	
Learning outcome 4				1	1	1			1		

Course Description Form				
Course Code and Name	ETM232 ENGINEERING MATERIALS			
Course Semester	4			
Catalog Content	Classification of engineering materials Steel, cast iron types and uses. Heat treatments of metals and alloys. Non-ferrous metals and their use. Types, properties and manufacturing methods of ceramics, polymers and composite materials. Material selection in engineering design.			
Textbook	 Wadhwa, A. S., Dhaliwal, E. H.S. (2008). A textbook of engineering material and metallurgy. India: Firewall Media. Rajput, R. K. (2008). Engineering material. New Delhi: S. Chand & Company. 			
Supplementary Textbooks	1. Callister, W. (2018). Material science and engineering. USA: Wiley.			
Credit	3 ECTS			
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements			
Type of the Course	Elective			
Instruction Language	Turkish			
Course Objectives	Introducing the basic properties of engineering materials and the material properties of atomic size, Teaching the relationships between physical, metallurgical and mechanical properties of materials, Ensuring understanding of the basic principles in material selection. Contributing to the material selection methodology and correct material selection in the design process of an industrial product.			
Course Learning Outcomes	 Students taking this course will be introduced to the physical and mechanical properties of materials, heat treatment, phase diagrams, etc. learns the subjects. Gains information about the general properties of engineering materials. Can create the function-purpose and constraints cycle in product design and determine the general properties of the required material. Knows the material selection methodology and can select materials using the necessary data sources. Can observe the behavior of the selected material according to the product and environment. 			
Instruction Method	Face to face			

	1. Week	Materials and Designand Material Select	gn, Developr tion	nent of Engin	eering Ma	terials, Ind		
	2. Week	Engineering Materi Hybrid Materials, H	ial Family, M Functional Cl	letals, Ceram	ics, Polyn f Materia	1		
	3. Week	Material Design an components, Produ	d Selection, I ct Function I	Design Princi Definition and	ples and S l Loading	election Cr States.		
	4. Week	Material Properties Selection and Data	and Manufa Sources	, Reverse E				
	5. Week	Properties of metal	s and alloys					
	6. Week	Effect of alloying e	lements on the	he properties	of steels			
Weekly Schedule	7. Week	Usage, types and co	oding of steel	l and cast iror	1.			
	8. Week	Non-ferrous metal	and alloys					
	9. Week	Ceramic materials,	production a	nd application	ns			
	10. Week	Polymers production	on and applic	ations				
	11. Week	Composite materia	ls production	and application	ions			
	12. Week	Damage to materia	ls. Damage s	ources and pr	revention	fracture, fa		
	13. Week	Damage in materia adhesion wear)	Damage in materials, their sources and prevention (oxida adhesion wear)					
	14. Week	Case studies on ma	terial selection	on in industria	al product	s		
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 1 Internet browsing, library work: 2 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2							
			Numbers	Total				
				Weighting (%)				
	Midterm Exan	ns	1	40				
	Assignment		1	20				
	Application Projects							
Assessment Criteria	Practice							
	Quiz							
	Percent of In-t	term Studies		60	1			
	(%)							
	Percentage of Score (%)	Final Exam to Total		40				
	Attendance]		

		Activity	Total Numbe r of	Dur (wee hou	ation ekly r)	l	T Pe W Le	otal eriod /ork oad
	Weekly	y Theoretical Course	14		2			28
	Weekly	v Tutorial Hours					-	
	Readin	g Tasks	7		1			7
	Studies	;	14		2			28
	Materia	al Design and						
	Implen	nentation Properting					-	
Workload	Prepari	ng a Presentation						
	Present	tations						
	Midter	m Exam and	3		2			6
	Prepera	ation for Midterm						
	Final E for Fina	xam and Preperation al Exam	3		2			6
	Other (should be						
	Total V	Vorkload	-		-		-	75
	Total V	Vorkload / 25	<u> </u>				7:	5/25
	Course	Credit (ECTS)						3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effecti solving complex engin problems.	f basic computer- specific lity to use ively in neering					
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	rmulate using ience, neering, nt the UN nent Goals.			x		
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet ds; design cesses, nder nd					X
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, inclu- estimation and modell the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.			X		
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre results, to investigate engineering problems	n methods, arch, ting g data, eting complex	X				

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity. x
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and x
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Bölüm Yönetimi tasarim@gazi.edu.tr

Program	Program	Program	Program	Program Outcomo5	Program	Program	Program	Program	Program	Program
Outcome	Outcomez	Outcomes	Outcome	Outcomes	Outcomeo	Outcome	ÇIKLISI Ö	Outcome	Outcomero	Outcomerr
1			4			7		9		
	3	5	3	1	4	1	2		3	1
	1	1	1	1						
	1	1	1		1				1	
		1	1		1				1	
		1			1	1	1			
	1	1			1		1		1	1
	Program Outcome 1	Program Outcome Program Outcome2 3 1 1 1 1 1 1 1 1 1	Program Outcome1Program Outcome2Program Outcome3351111111111111111111111	Program Outcome1Program Outcome2Program Outcome3Program Outcome43531111111111111111111111111111111111	Program Outcome1Program Outcome2Program Outcome3Program Outcome4Program Outcome5353111	Program Outcome1Program Outcome2Program Outcome3Program Outcome 4Program Outcome5Program Outcome635314111	Program Outcome1Program Outcome2Program Outcome3Program Outcome4Program Outcome5Program Outcome6Program Outcome635314111	Program Outcome1Program Outcome2Program Outcome3Program Outcome4Program Outcome5Program Outcome6Program Outcome 7Program cktisi 8353141211	Program Outcome1Program Outcome2Program Outcome3Program Outcome4Program Outcome5Program Outcome6Program Outcome6Program outcome6Program outcome7Program ciktis18Program Outcome93531412-111111111111111111111111111111-1111-11-1111-11-1111111-111-1111111-11	Program Outcome1Program Outcome2Program Outcome3Program Outcome4Program Outcome5Program Outcome6Program Outcome6Program Outcome7Program cktss 8Program Outcome9Program Outcome10353141231111112311

Course Description Form				
Course Code and Name	ETM234 SEMIOLOGY AND SEMANTICS IN DESIGN			
Course Semester	4			

Catalog Content	Interpretation skills of the symbolic qualities of design objects. Ability to apply the semiotic analysis process to products. Recognition of basic concepts and understanding the meaning of products. Ability to understand the relationship between the mental representations of products and the real world. Understanding the relationship between the representation and use of products. Ability to understand user and culture relationships. Understanding the cultural role of products. Application skills of design behaviors based on semantics. Ability to analyze different design movements.
Textbook	 Hjelm, S.I., Semiotics in Product Design, Technical Report, Royal Institute of Technology, Stockhom, Sweden, 2002. Krippendorff, K. (2005). The semantic turn: A new foundation for design. crc Press.
Supplementary Textbooks	 Silverman, K., The subject of Semiotics, New York: Oxford University Press, 1983
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Learning about signs and semantics in design, and gaining the ability to apply them. Understanding the impact of signs on users and understanding the methodology of semiotics. Gaining the ability to implement design.
Course Learning Outcomes	 Developing the ability to understand basic concepts in semantics and perform semiotic analysis. Providing the ability to understand and interpret the interaction between mental processes and the real world. Acquiring the ability to understand and evaluate user behaviors along with cultural interactions. Developing a general understanding of the evolutionary processes of design and different design movements.
Instruction Methods	Face to face

	1. Week	Introduction and basic	c concepts				
	2. Week	Semiotic nature of de	sign objects				
	3. Week	Semiotic analysis pro	cess of industr	rial products			
	4. Week	Conceptual prerequisi	ites for produc	t semiotics			
	5. Week	Mental-real world relation of proc	ationship in pr luct types	oduct semioti	cs and		
	6. Week	Concept of product, p	roduct appear	ance			
	7. Week	Product image conten product meaning	t, information	related to the	product,		
	8. Week	Functional and seman society system	tic structure o	f the human-o	bject-		
Weekly Schedule	9. Week	Specific contents of in terms, product meaning	nformation, m ng profile	eaning, and ex	pression		
	10. Week	Semantic structure of culture group relation	product imageship	e, company im	age, user		
	11. Week	Expressiveness and exproduct context and c	xpression forn ategorization	ns in the desig	n process,		
	12. Week	Readability and condibased on product sem	itions of objec iotics	ts, design beha	aviors		
	13. Week	Semantic resolution of form elements, semantic resolution of product appearance					
	14. Week	Design behaviors, movements, trends, and styles explaine semiotically					
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 3 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4						
			Numbers	Veighting			
	Midterm Exan	ns	1	40	1		
	Assignment		1	20			
	Application						
Assessment Criteria	Projects						
	Ouiz						
	Percent of In-1	erm Studies		60			
	(%)	States					
	Percentage of Score (%)	Final Exam to Total		40			
	Attendance				<u> </u>		

		Activity	Total Numbe r of Weeks	Dur (we hou	ration ekly r)	I	T Pe W Lo	otal riod ork oad
	Weekly Hours	7 Theoretical Course	14		2			28
	Weekly	Tutorial Hours						
	Readin	g Tasks	5		3		15	
	Studies		5		2		10	
Workload	Materia Implem	al Design and mentation	2	3				6
	Prepari	rreparing						
	Present	ations						
	Midtern Prepera	m Exam and tion for Midterm	2		4			8
	Exam Final E for Fina	xam and Preperation al Exam	2		4			8
	Other (should be emphasized) Total Workload						ļ ,	75
	Total W	-		-		74	5/25	
	Course	Credit (ECTS)					/-	3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	2	Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applie information in these model and solve eng Ability to identify, fo and solve complex en problems; ability to s	e in e and vant use ed areas to ineering ormulate, ngineering select and	x				
		apply proper analysis modeling methods for purpose.	s and or this					
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho	omplex ice or ic itions, in et the v to apply ods for		X			
	4	Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer applications; ability to information technolo effectively.	elect and es and nalysis blex ring to use ogies	X				

	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.		X		
	6	Ability to work efficiently in intra-disciplinary teams.	X			
	7	Ability to work efficiently in multi-disciplinary teams.	X			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.				
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.				
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to				
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.				
The Course's Lecturer(s) and Contact Informations	Prof	. Dr. İsmail Şahin				
Contact Informations	isah	in@gazi.edu.tr				

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome 6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
TOTAL	1	1	2	1	2	1	1				
Learning outcome 1	1				1						
Learning outcome 2		1	1								
Learning outcome 3						1	1				
Learning outcome 4			1	1	1						

		Course Description Form							
Course Code and Name	ETM236 FO	RM MATERIAL AND FUNCTION							
Course Semester	4								
Catalog Content	To be able to function and to To be able to process To be able to methods and a	b have knowledge about basic issues such as material properties, design user needs, factors affecting product design and creative design process to comprehend the relationship between material selection and design to understand various types of materials, forming techniques, joining application examples							
Textbook	 Grillo, P.J. Ashby, M. materail set 	(2010). Form, function and design. New York: Dover Pub. and Johnson, K. (2010). <i>Materials and design – The art and science of</i> election in product design. USA: B-H Pub.							
Supplementary Textbooks	1. Elder, W CRC Pres	E. ve Hosnedl, S., Design Engineering: A Manual for Enhanced Creativity, ss, Int. Edition, 2008.							
Credit	3 ECTS								
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70							
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	To be able to production mo Creating com Developing io To gain the al	To be able to analyze the relationship between form, function, material selection and production methods in design Creating composition using formal elements of design Developing ideas and manual skills to solve basic design problems To gain the ability to provide balance in material selection and design process							
Course Learning Outcomes	 To be able application To gain a constraint of a second second second second and a second second second second design produce in 	to produce creative solutions to design problems by examining sample as in industrial design different perspective on the problems encountered in the design process understand the role of innovative materials in the design process and to innovation in design. develop harmonious designs by balancing form, material and function in the cess. ding how materials and design processes affect each other and the ability to novative solutions using this relationship.							
Instruction Methods	Face to face								
	1. Week	Design engineering profession and professional ethics							
	2. Week	The meaning and importance of design							
	3. Week	Historical development of design							
	4. Week	The place of design in industry and country development							
	5. Week	Problem solving and communication skills							
	o. week	Design methodology and rules							
	7. Week	Principles of design							
Weekly Schedule	8. Week	Analyze simple part designs							
	10 Week	Part-level design							
	10. Week	Simple part design applications							
	12. Week	Analyzing simple system designs							
	13. Week	System-level design							
	14. Week	Simple system design applications							

Teaching and Learning Methods	Weekly theoretical course hours: 2Weekly tutorial hours: 0Reading Activities: 6Internet browsing, library work: 4Designing and implementing materials: 4Report preparing: 3Preparing a Presentation: 0Presentations: 0Preparation of Midterm and Midterm Exam: 3Final Exam and Preparation for Final Exam: 3Other:0Midterm Exams140Assignment120										
Assessment Criteria	Projects Practice Quiz Percent of In-term Studies (%) Percentage of Final Exam Score (%)	to Total	1				60)			
	Attendance		A	Activity	Total Number of Week	Durat r (week s hour)	ion ly		P V I	Fot Peri Vor Joa	al od 'k d
			7 The	coretical Course	14		2			28	3
			v Tut	orial Hours							
		Reading	g Tas	sks	2		6			12	
		Studies			2		4			8	
		Material De Implement		sign and tion	3		4			12	2
		Report Prer		aring	2		3			6	
Workload		Preparing a		a Presentation							
		Presentations		15							
		Midterm Ex Preperation Exam		am and for Midterm	2	3			6		
		Final E: for Fina	xam al Ex	and Preperation am	1		3			3	
		Other (shou	ıld be							
		Total W	Vorkl	, load					-	75	;
		Total W	Vorkl	load / 25					,	75/2	25
		Course	Crec	lit (ECTS)						3	
		No		Program Outcom	es		1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes			In-d scie com engi kno	lepth knowledge o nce, basic enginee uputer-aided comp ineering areas; abi wledge effectively	f mathem ring conc uting and lity to use in solvin	atics, epts, specific this g complex		x			
			engineering problems.2Ability to identify, formulate						x		\neg
			com kno	plex engineering p wledge of basic se	problems	using thematics					
			and	engineering, and t	aking into	o account					
		2	the Abi	UN Sustainable Delity to generate cre	evelopme	ent Goals.	_		$\left \right $		
		3	com	iplex engineering	problems	to meet					`

		current and future needs; design complex						
		systems, processes, devices or products						
		A hility to select and use appropriate		_		-	-	
	4	techniques, resources and modern		2	X			
		engineering and information technology						
		tools including estimation and modelling						
		for the analysis and solution of complex						
		engineering problems, recognising their						
		limitations.						
	5	Ability to use research methods, including						
		literature search, designing and conducting						
		experiments, collecting data, analysing and						
		interpreting results, to investigate complex						
		engineering problems.		_			-	
	6	Knowledge of the effects of engineering		2	K			
		economy sustainability and environment						
		within the framework of the UN						
		Sustainable Development Goals: awareness						
		of the legal consequences of engineering						
		solutions.						
	7	Acting in accordance with the ethical	x					
		principles of the engineering profession,						
		awareness of ethical responsibilities;						
		awareness of non-discrimination,						
		impartiality and embracing diversity.				_	_	
	8	Ability to work effectively as a team						
		within interdisciplinary teams (face to						
		face distance or hybrid)						
	9	Ability to communicate effectively on						
		technical issues, both orally and in writing,						
		taking into account the various differences						
		of the target audience (e.g. education,						
		language, profession).						
	10	Knowledge of business life practices such	2	ĸ				
		as project management and economic						
		teasibility analysis; awareness of						
	11	A hility to loom independently and	\vdash	\dashv			-	
		continuously to adapt to new and emorging			x			
		technologies and to think inquisitively						
		about technological changes.						
			<u> </u>				───	
	Нея	d of Department						
The Course's Lecturer(s) and Contact	tosorim@cogi odu tr							
Informations	1888	IIII(@gazi.cuu.u						

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	2	4	5	3		3	1			2	3
Learning outcome 1	1	1	1	1							1
Learning outcome 2	1	1	1			1				1	1
Learning outcome 3		1	1								
Learning outcome 4		1	1	1		1					
Learning outcome 5			1	1		1	1			1	1

Course Description Form

Course Code and Name	ETM238 COMPUTER GRAPHICS						
Course Semester	4						
Catalog Content	Application areas of computer graphics include line and curve drawing, polygon drawing, polygon painting, transformations (translation, rotation, scaling, reflection, shifting), 2-D view, line clipping, polygon cropping, 3-D view, parallel and perspective projection, 3D clipping, visible surface detection, lighting, ray tracing, parametric curves and surfaces, animation.						
Textbook	 Fleet, D. and Hertzman, A., Computer Graphics Lecture Not Computer Science Dept., University of Toronto, Canada, 2006. Shirley, P. and Marschner, S., Fundementals of Computer Graphics, Taylor & Francis Group, Int. Ed., 2010. 						
Supplementary Textbooks	Journal of Computer Graphics Techniques Computer & Graphics - Journal						
Credit	3 ECTS						
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements						
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	To teach introductory level the theory and application of computer graphics To gain application skills To be able to design various graphic design applications and finalize them in a computer environment ready for printing						
Course Learning Outcomes	 Knowledge of computer graphics (drawing, transformations, view, lighting, rendering). Ability to design computer graphics software under realistic constraints and conditions, using theoretical and applied knowledge in these fields. Ability to find, select and use modern tools and techniques necessary to design and implement computer graphics environments. Gaining application skills on the practical aspects of the subjects. Ability to work effectively individually and in interdisciplinary teams. 						
Instruction Methods	Face to face						

1. Week	Introduction to char	rting					
2. Week	Curves						
3. Week	Conversions						
4. Week	Coordinate indepen	dent geomet	ry				
5. Week	3D objects						
6. Week Camera models							
7. Week	Basic lighting and r	reflection					
8. Week Shading							
9. Week	Texture overlay						
10. Week	Basic ray tracing, ra	ay metering a	and projection				
11. WeekDiffused ray tracing, interpolation12. WeekParametric curves and surfaces							
						13. Week	Animation
14. Week	Animation						
Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2							
NumbersTotal Weightin (%)Midterm Exams1Assignment1120Application1Projects9Practice9Quiz1Percent of In-term Studies60(%)60Percentage of Final Exam to Total40Score (%)40							
	1. Week 2. Week 3. Week 4. Week 5. Week 6. Week 7. Week 8. Week 9. Week 10. Week 11. Week 12. Week 13. Week 14. Week Veekly theore Weekly theore Weekly theore Preparing a Preparing a Preparing and Report preparing Preparation of Final Exam and Midterm Exar Assignment Application Projects Practice Quiz Percent of In-(%) Attendance	1. WeekIntroduction to chan2. WeekCurves3. WeekConversions4. WeekCoordinate independence5. Week3D objects6. WeekCamera models7. WeekBasic lighting and rest8. WeekShading9. WeekTexture overlay10. WeekBasic ray tracing, radius11. WeekDiffused ray tracing12. WeekParametric curves a13. WeekAnimation14. WeekAnimationWeekly theoretical course hours: 2Weekly theoretical course hours: 1Designing and implementing materialsReport preparing: 0Preparation of Midterm and MidtermFinal Exam and Preparation for FinalMidterm ExamsAssignmentApplicationProjectsPracticeQuizPercent of In-term Studies(%)Attendance	1. Week Introduction to charting 2. Week Curves 3. Week Conversions 4. Week Coordinate independent geomether 5. Week 3D objects 6. Week Camera models 7. Week Basic lighting and reflection 8. Week Shading 9. Week Texture overlay 10. Week Basic ray tracing, ray metering at tracing, interpolation 11. Week Diffused ray tracing, interpolation 12. Week Parametric curves and surfaces 13. Week Animation 14. Week Animation Weekly theoretical course hours: 2 Weekly turial hours: 0 Reading Activities: 0 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2 Midterm Exams 1 Assignment 1 Application Projects Practice Quiz Percentage of Final Exam to Total Score (%) Attendance	1. Week Introduction to charting 2. Week Curves 3. Week Conversions 4. Week Coordinate independent geometry 5. Week 3D objects 6. Week Camera models 7. Week Basic lighting and reflection 8. Week Shading 9. Week Texture overlay 10. Week Basic ray tracing, ray metering and projection 11. Week Diffused ray tracing, interpolation 12. Week Parametric curves and surfaces 13. Week Animation 14. Week Animation 14. Week Animation 14. Week Animation 15. Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2 Final Exam and Preparation for Final Exam: 2 Total Weighting (%) Midterm Exams 1 40 Assignment 1 20			

		Activity	Total Numbe r of	Dui (we hou	ratior ekly r)	1	T Pe W Lo	otal criod ork oad	
	Weekly	y Theoretical Course	14		2		28		
	Weekly	y Tutorial Hours							
		g Tasks							
	Studies	5	9		1		9		
	Materia	al Design and	10	2				20	
	Report	Preparing							
Workload	Prepari	ng a Presentation							
	Present	tations							
	Midtern Prepera Exam	m Exam and ation for Midterm	5		2			10	
	Final E for Fina	xam and Preperation al Exam	4		2			8	
	emphas	sized)							
	Total V	Vorkload	-		-			75	
	Total V	Vorkload / 25					7:	5/25	
	Course	Credit (ECTS)	nes					3 	
	No		105	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering		X				
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	x						
	3	Ability to generate crossolutions to complex engineering problems current and future need complex systems, pro- devices or products un realistic constraints ar			x				
	4	Ability to select and u appropriate technique resources and modern engineering and infor technology tools, incl estimation and model the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.			x			
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting g data, eting complex						

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the x ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and x
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr

	Program Outcome	Program Outcome2	Program Outcome3	Program Outcome	Program Outcome5	Program Outcome6	Program Outcome	Program çıktısı 8	Program Outcome	Program Outcome10	Program Outcome11
	1			4			7		9		
TOTAL	2	1	3	3		1	1	3		2	2
Learning	1		1	1			1				
outcome											
1											
Learning	1	1	1	1				1			
outcome											
2											
Learning			1	1		1					
outcome											
3											
Learning								1	1	1	1
outcome											
4											
Learning								1	1	1	1
outcome											
5										1	

Course Description Form					
Course Code and Name	ETM240 DESIGN CULTURE				
Course Semester	4				

Catalog Content	Ability to comprehend the visual language and differences of art and design and aesthetic sensitivity and reflect them on their designs Ability to focus on the cultural relationship between design and consumption Ability to understand and convey the cultural context of design Ability to evaluate consumption products as part of the culture created in society
Textbook	1. Barnard, M., Sanat, Tasarım ve Görsel Kültür, 2002, Ütopya Yayınları
Supplementary Textbooks	1. Julier, G., The Culture of Design, SAGE Publications, 2013.
Credit	3 AKT8
Prerequisites of the Course (Attendance Requirements)	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Understanding the cultural context of design from past to present To have knowledge about the development of cultural elements To learn the ability to comprehend the visual language and differences of art and design and aesthetic sensitivity and to reflect them on their designs To learn the steps in the development process of culture and design
Course Learning Outcomes	 Have knowledge about the basic concepts, elements and principles of visual communication design and communication To have knowledge about the visual language and differences of art and design and aesthetic sensitivity and reflection on design. Steps in the development process of culture and design, analysis of production and technical processes are learned. Comprehension of national and universal values; understanding of design from national to universal is learned. To be able to adapt to new and emerging technologies and to have knowledge about the process of questioning thinking about technological changes.
Instruction Methods	Face to face

	1. Week	The concept and theorem	ry of culture	2					
	2. Week	2. Week Cultural content, relations and processes, biological evolution							
	3. Week	Renaissance and enlig	ghtenment p	hilosophy					
	4. Week	4. Week Democratization Movements, French Revolution a effects							
	5. Week	Traditions and innova	ations of the	early modern po	eriod				
	6. Week	From image to image	in the mode	ern period					
	7. Week	Participation in mode	rn art and d	esign					
	8. Week	From equality to plura	alism in the	modern era					
Weekly Schedule	9. Week	Modern period spaced	craft aesthet	ics					
	10. Week	Postmodern era indiv	idualism						
	11. Week	Postmodern design ar	nd technolog	gy					
	12. Week	Economic, social, ind developments	ustrial and t	technological					
	13. Week	The impact of new modesign and economic	odes of proc relations	luction on socie	ty, art,				
	14. Week	The contribution of an the cultural cycle	rt and design	n to urban cultur	e and				
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library work: 3 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 2 Presentations: 2 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3								
			Numbers	5 Total Weighting					
	Milton D		1	(%)	-				
	Assignment	IIIS	1	30	-				
	Application		1	50	-				
	Projects				-				
Assessment Uriteria	Practice]				
	Quiz								
	Percent of In- (%)	-term Studies		60					
	Percentage of	f Final Exam to Total		40	-				
	0	I I IIIai Exam to Totai							
	Score (%)				-				
	Score (%) Attendance				Totol				
	Score (%) Attendance	Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load				
	Score (%) Attendance Wea	Activity ekly Theoretical Course	Total Number of Weeks 14	Duration (weekly hour) 2	Total Period Work Load 28				
	Score (%) Attendance Wea Hou Wea	Activity ekly Theoretical Course <u>urs</u> ekly Tutorial Hours	Total Number of Weeks 14	Duration (weekly hour) 2	Total Period Work Load 28				

	Studie	S	5			3			15	٦
	Materi	al Design		1						-
	and			<u> </u>						_
	Report	Preparing							1.0	_
Workload	Prepar	ing a Presentation	5			2			10	_
	Presen	tations	3			2			6	
	Midter	m Exam and	1			3			3	
	Midter	m Exam	I			5			5	
	Final F	Exam and	_			_			_	
	Preper	ation for Final	1			3			3	
	Other	(should								-
	be emp	phasized)								
	Total V	Workload							75	-
	Total V	Workload / 25							75/25	-
	Course	Credit (ECTS)							3	-
	Course	Program Outcom	les	-				_		
	No			1	2	3	4	5		
	1	In-depth knowledge	of							
		mathematics, science	e, basic							
		computer-aided com	s, nuting and							
Contribution Level Between Course Learning		specific engineering	areas;							
Outcomes and Program Outcomes		ability to use this know	owledge							
		g complex								
		engineering problem	s.							
	2	Ability to identify, fo	ormulate							
		and analyse complex	e ucino							
		knowledge of basic s	s using science.							
		mathematics and eng	gineering,							
		and taking into accou	ant the UN							
		Sustainable Develop	ment							
	3	Ability to generate c	reative	x						
		solutions to complex	-							
		engineering problem	s to meet							
		complex systems, pro-	ocesses.							
		devices or products u	under							
		realistic constraints a	ind							
		conditions.								
		Ability to select and	1150							
	4	appropriate techniqu	es,							
		resources and moder	n							
		engineering and info	rmation							
		estimation and mode	luding lling for							
		the analysis and solu	tion of							
		complex engineering	, problems,							
		recognising their lim	itations.							
	5	Ability to use researc	ch methods.	, x						
	∥ ້	including literature s	earch,							
		designing and condu	cting							
		experiments, collection	ng data,							
		results, to investigate	e complex							
		engineering problem	S.							

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession). x
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Head of Department tasarim@gazi.edu.tr

TOTAL	Program outcome1	Program outcome2	Program outcome3 1	Program outcome4	Program outcome5 1	Program outcome6	Program outcome7	Program outcome8	Program outcome9 3	Program outcome10	Program outcome11 1
Learning outcome 1			1						1		
Learning outcome 2									1		
Learning outcome 3					1						
Learning outcome 4									1		
Learning outcome 5											1

Course Description Form					
Course Code and Name	ETM242 DESCRIPTIVE GEOMETRY				

Course Semester	4					
Catalog Content	Introduction (Introduction and Importance of Descriptive Geometry) Traces - Traces of Lines, Traces of Planes Piercing Points Sections of Planes Parallelism and Perpendicularity Transformations - Reflection, Rotation, Translation Tangents Vector Operations Shading and Shadowing General Applications					
Textbook	 Bayvas, Ş., Dericioğlu, N. ve Özgönül, O., Tasarı Geometri Temel Metot ve Uygulamalar I-II, Ankara, 1969. Hawk, M. C., Schaum's Outline of Theory And Problems Of Descriptive Geometry, 1962 by McGraw-Hill, Inc. 					
Supplementary Textbooks	1. Smith, J. K. (2020). Mühendislik Çizim ve Tasarımı. Örnek Yayıncılık.					
Credit	3 ECTS					
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements					
Type of the Course	Elective					
Instruction Language	Turkish					
Course Objectives	Understanding the fundamental concepts of descriptive geometry and how these concepts are applied to geometric modeling. Providing information about projection and explaining projection methods. Drawing developments of three-dimensional geometric shapes such as prisms, pyramids, cylinders, cones, spheres, and creating their sectional views. Generating cross-sectional views of objects formed by cutting them with a plane. Applying the concepts learned in descriptive geometry to examples.					
Course Learning Outcomes	 They will be able to use basic design geometry concepts to model complex systems. They will be able to use projection techniques to analyze and model objects from different perspectives. They will be able to integrate three-dimensional geometric shapes into engineering designs to develop suitable solutions for real-world problems. They will be able to optimize their designs by examining the internal structures of objects. They will be able to plan their projects by applying design geometry principles, considering environmental, economic, and social impacts. 					
Instruction Methods	Face to face					

	1. Week	Introduction (Introdu	uction and ir	nportance of descriptiv	e Geometry	
	2. Week	Traces				
	3. Week	Traces of lines				
	4. Week	Traces of planes				
	5. Week	Piercing points				
	6. Week	Sections of planes				
	7. Week	7. Week Parallelism and perpendicularity				
Weekly Schedule	8. Week	Transformations - R	eflection, Ro	otation		
	9. Week	Transformations - T	ranslation			
	10. Week	Tangents				
	11. Week	Vector operations				
	12. Week	Inclined projection				
	13. Week	Shading and shadow	ving			
	14. Week	General applications	5			
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1					
			Numbers	Total Weighting (%)		
	Midterm Exar	ns	1	40		
	Assignment		1	20		
	Application					
Assessment Criteria	Projects					
	Ouiz					
	Percent of In-	term Studies		60		
	(%)					
	Percentage of	Final Exam to Total		40		
	Score (%)					
	Attendance					

		Activity	Total Numbe r of	Dur (wee hou	ation ekly r)	l	T Pe W Le	otal criod ork oad
	Weekly	Theoretical Course	14	2			28	
	Hours Weekly	v Tutorial Hours						
	Readin	g Tasks						
	Studies	;	5		2			10
	Materia	al Design and	14		2			28
	Implen Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	tations						
	Midter	m Exam and	3		2			6
	Prepera Exam	ation for Midterm						
	Final E for Fina	xam and Preperation al Exam	3		1			3
	Other (emphas	should be sized)						
	Total V	Vorkload	-		-			75
	Total V	Vorkload / 25					7:	5/25
	Course	Credit (ECTS)						3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering				x	
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	rmulate using cience, neering, nt the UN nent Goals.	X				
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	eative to meet eds; design cesses, nder nd			X		
		Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, inclu- estimation and modell the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.		x			
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting g data, eting complex	X				

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the x ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and
	11Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.x
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr

	Program Outcome	Program Outcome2	Program Outcome3	Program Outcome	Program Outcome5	Program Outcome6	Program Outcome	Program çıktısı 8	Program Outcome	Program Outcome10	Program Outcome11
	1			4			7		9		
TOTAL	4	1	3	2	1	1	1				1
Learning outcome 1			1	1			1				1
Learning outcome 2	1	1	1								
Learning outcome 3	1			1							
Learning outcome 4	1		1								
Learning outcome 5	1				1	1					

COURSE DESCRIPTION FORM							
Course Code and Name	ETM244 DESIGN METHODOLOGIES						
Course Semester	4						

Catalog Content	Problem solving skills Creativity and innovation skills Design methodology and usage skills Design thinking skills Skills in the use of biomimicry and biomimetic concepts TRIZ method and application skills Skills in the use of contradiction matrix and 40 principles						
Textbook	 Birkhofer, H., The Future of Design Methodology, Springer, 2021. Karen Gatt, TRIZ for Engineers: Enabling Inventive Problem Solving, Wiley, 2011 Yoram Reich Biomimetic Design Method for Innovation and Sustainability, Springer International Publishing, e-Book 						
Supplementary Textbooks	 Blessing, L.T.M and Chakrabarti, A., DRM, a Design Research Methodology, Springer, 2009. 						
Credit	3 ECTS						
Prerequisites of the Course	No Prerequisites Attendance Requirements %70						
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	Problem solving concept learning Understanding and learning traditional and innovative problem-solvin methodologies Learning the concept of design inspired by nature and understandin application examples Learning the theory of innovative and creative problem solving (TRIZ and understanding application examples						
Course Learning Outcomes	 Learning the advantages and disadvantages of design methodologies. Learning the ability to systematically follow the design process. Learning to understand engineering design stages and determine appropriate methods to optimize design. Learning to identify fundamental problems in the design process and utilize various problem-solving techniques. 						
Instruction Methods	Face to face						
Weekly Schedule	Week Subjects 1 Problem concept 2 Traditional Problem solving techniques 3 Traditional Problem solving techniques 4 Innovative Problem solving techniques 5 Innovative Problem solving techniques 6 Innovation and creativity 7 TRIZ 8 The contradiction matrix and the 40 principles 9 Contradiction matrix and application examples in 40 principle design problems 10 General principles of Bio-inspired Design 11 General principles of Bio-inspired Design 12 Use of biomimicry in design and application examples in design problems 12 Draign thinking						
	14 Design thinking application examples						

Teaching and Learning Methods	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 4 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4										
			ers Total Weighting (%)								
							0				
	Midter	m Exams	1			$\frac{40}{20}$					
	Assign	ment	1		· · ·	20					
	Project										
Assessment Criteria	Practic	s e									
	Ouiz	c									
	Quiz										
	Percen	t of In-term			(60					
	Studies	s (%)									
	Percent	tage of Final Exam				40	D				
	to 1 ota	l Score (%)									
	Attend										
		Activity	Total Number of Weeks	Total Dur Number r of (wee Weeks hou			n Pe reekly W our) L				
	Weekly	Theoretical Course Ho	14	2	2						
	Weekly	Tutorial Hours									
	Reading	Tasks	5	3		-		15			
	Studies	Tubhb	5	4		-		20			
	Matarial	Design and Implement	5				20				
Workload	Material	Design and Implement	itation				_				
	Report F	reparing									
	Preparin	g a Presentation									
	Presenta	tions									
	Midterm	Exam and Preperation	n for	1	4 4			4			
	Final Ex	am and Preperation fo	r Final	2	4	ŀ			8		
	Other (s	should be emphasized)		-	-				-		
	Total W	orkload		-	-				75		
	Total W	orkload / 25						7	5/25	5	
	Course (Credit (ECTS)							3		
	No	Program Outcon	mes		I	1	2	3	4	5	
Contribution Level Between Course Learning	1	In-depth knowledge basic engineering co computing and spec ability to use this kr solving complex en	of mathem oncepts, con ific engined nowledge ef gineering p	natics, scier nputer-aide ering areas; fectively in roblems.	nce, ed ; n						
outcomes and riogram outcomes	2	Ability to identify, t complex engineerin of basic science, ma and taking into acco Development Goals	nd analyse using know and enginee Sustainabl	wledge ering, le		X					

	3	Ability to generate creative solutions to complex engineering problems to meet current and future needs; design complex systems, processes, devices or products under realistic constraints and conditions.		2	C I	
	4	Ability to select and use appropriate techniques, resources and modern engineering and information technology tools, including estimation and modelling, for the analysis and solution of complex engineering problems, recognising their limitations.		2	<u>x</u>	
	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.	x			
	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions				
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non- discrimination, impartiality and embracing diversity.				
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid)				
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	х			
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.				
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.	х			
The Course's Lecturer(s) and Contact Informations		Head of Department tasarim@gazi.edu.tr				

	Program Outcome 1	Program Outcome 2	Program Outcome	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7	Progra m ciktisi 8	Program Outcome 9	Program Outcome1	Program Outcome1 1
TOTAL	1	2	3	3	2	0	,	1	2	0	2
Learnin			1								1
g											
outcom											
e 1											
Learnin		1	1	1					1		
g											
outcom											
e 2											
Learnin		1	1	1	1				1		1
g											
outcom											
e 3											
Learnin				1	1			1			
g											
outcom											
e 4											

	Course Description Form
Course Code and Name	ETM246 MATERIAL SELECTION IN DESIGN
Course Semester	4
Catalog Content	 The importance of material selection in design AND the basics of material selection are explained Learning material selection and material selection diagrams in terms of mechanical and physical properties Selection of materials (metals, polymers, ceramics, composites) in terms of application Understanding the relationship between material selection and process
Textbook	 Materials Selection in Mechanical Design, 3E, M.F. ASHBY, Elsevier Butterworth-Heinemann, 2005. Malzeme Seçimi ve Uygulamaları, F. Fındık, Seçkin Yayıncılık, 2018
Supplementary Textbooks	1. Selection and Use of Engineering Materials, Butterworth J.A. Charles, Crane, FAA Heinemann, 1992.
Credit	3
Prerequisites of the Course	There is no prerequisite for the course.
Type of the Course	Selective
Instruction Language	Turkish
Course Objectives	To ensure that they acquire basic knowledge about material selection and design and apply this knowledge to possible situations.

Course Learning Outcomes	 Can classify materials and knows their advantages and disadvantages. Understands the material selection characteristics in terms of mechanical and physical properties. Knows and applies material selection criteria. It establishes criteria for special applications. Selects suitable materials for design applications, taking into account working conditions. 									
Instruction Methods	Face to face									
	1. Week	The importance of	material in des	sign						
	2. Week	The importance of classification of en	basic factors is gineering mate	n material sel erials	ection and					
	3. Week	Types of metallic r properties	naterials, chen	nical and phys	sical					
	4. Week	Mechanical proper	ties of metallic	e materials						
	5. Week	Application areas	of metallic mat	erials						
	6. Week	Ceramic material t	Ceramic material types, properties and application areas							
Weekly Schedule	7. Week	Polymer material t	ypes, propertie	es and applica	tion areas					
	8. Week	ties and appli	cation areas							
	9. Week	erties and app	lication areas							
	10. Week	Material selection	based on mater	rial properties						
	11. Week	Ashby diagrams								
	12. Week	Sample material se	election applica	applications						
	13. Week	Sample material se	election applica	ations						
	14. Week	Assignment preser	ntations							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoreti Weekly tutorial Reading Activit Internet browsir Designing and i Report preparin Preparing a Pres Presentations: Preparation of N Final Exam and	cal course hours: 2 hours: 0 ies: 1 ng, library work: 1 mplementing material g: 2 sentation: Aidterm and Midterm Preparation for Final	s: Exam: 8 Exam: 14							
			Number s	Total Weight						
	Midtern Even	.e	1	ing (%)						
	Assignment		1	20						
	Application				j					
Assessment Criteria	Projects									
	Practice									

Quiz		
Percent of In-term Studies	60	
(%)		
Percentage of Final Exam to Total	40	
Score (%)		
Attendance		

			Activity	Total Numb er of Week s	Durati on (weekl y hour)				Tot al Peri od Wo rk Loa d		
	V L	Veekly]	Theoretical Course	14			2			28	_
	V	Veekly 7	Futorial Hours								
	F	Reading	Tasks	10			1			10	
Workload	S	Studies		5			1			5	
	N a	Aaterial .nd Impl	Design ementation								
	F	Report P	reparing	5			2			10	
	P	Preparing	g a Presentation						_		
		Presentat	ions								_
	P	Preparati	on for	1			8			8	
	N F	Aidterm Final Exa	Exam am and	1			1.4			14	-
	P	Preparati	on for Final Exam	1			14			14	_
	b	otner (sl e empha	nould asized)								
	Т	Total Wo	orkload								
	Т	Total Wo							75/25	_	
	0	Course C	credit (ECTS)							3	
		N	Program Outco	omes	1	2	3	4	5		
Contribution Level Between Course Learning Outcomes and Program Outcomes		0 1 2 3 4	In-depth knowledge mathematics, science engineering concept computer-aided com and specific engineer areas; ability to use knowledge effective solving complex eng problems. Ability to identify, f and analyse compler engineering problem knowledge of basic mathematics and en and taking into accor UN Sustainable Dev Goals. Ability to generate of solutions to complex engineering problem current and future n design complex syst processes, devices of under realistic const conditions. Ability to select and appropriate techniqu resources and mode engineering and infor	of e, basic s, puting pring this ely in gineering formulate x ns using science, gineering, ount the velopment creative x ns to meet eeds; terms, or products traints and use les, rn ormation eluding	x	x	x	x			
			estimation and mode the analysis and solu- complex engineerin problems, recognisi	elling, for ution of g ng their							

		limitations.				
	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems		x		-
	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	x			
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.				_
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face- to-face, distance or hybrid).		х		
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).				-
	1 0	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.				
	1	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			x	
The Course's Lecturer(s) and Contact Informations						

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL	4	2	3	1	2			2			3
Learning outcome 1	1	1	1								
Learning outcome 2			1		1						1
Learning outcome	1		1					1			

3								
Learning outcome 4	1			1		1		1
Learning outcome 5	1	1	1					1

Course Description Form						
Course Code and Name	ETM330 USER CENTERED DESIGN					
Course Semester	6					
Catalog Content	User-centered design skills Ability to apply scenario-based design approach Understanding and ability to apply human-centered design principles Acquiring knowledge and skills in user experience design Ability to apply iterative user-centered design methodology Ability to identify user requirements and usage scenarios Capability to generate and visualize design ideas based on user needs Ability to analyze user feedback and reshape the design Concept creation and prototyping skills Ability to evaluate created concepts and prototypes					
Textbook	 ChadiaAbras, Diane Maloney-Krichmar, Jenny Preece. (2004). UserCentered Design, InBainbridge, W. Encyclopedia of HumanComputerInteraction. ThousandOaks: Sage Publications. NORMAN, D. A. 1986, Cognitiveengineering. In D. A. Norman and S. W. Draper (eds) User CenteredSystems Design (Hillsdale, NJ: Lawrence ErlbaumAssociatesInc.) Goodman, E., Kuniavsky, M., &Moed, A. (2012). Observingtheuserexperience: A practitioner'sguidetouserresearch. San Francisco, CA: Morgan Kaufman 					
Supplementary Textbooks	 Jesse J.G. (2011). TheElements of User Experience: User-Centered Design forthe Web and Beyond, Second Edition, USA. 					
Credit	3 ECTS					
Prerequisites of the Course (<i>Attendance</i> <i>Requirements</i>)	No Prerequisites %70 Attendance Requirements					
Type of the Course	Elective					
Instruction Language	Turkish					
Course Objectives	Learning the concept of user-centered design. Gaining experience and knowledge in user experience design. Learning research skills to develop usability and user experience concepts. Acquiring the ability to conduct research involving the user perspective.					
Course Learning Outcomes	 Gaining knowledge about user-centered design theory. Learning about the concept of usability and user experience processes. Creating product usage scenarios. Designing a tangible product using the user-centered design method. 					
Instruction Methods	Face to face					
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	1. Week History of user-centered design					
	2. Week Scenario-based design					
	3. Week Human-centered design					
	4. Week User experience, usability, usability principles					
	5. Week Usability tests (A/B testing, Survey, Field study, Observatio	on)				
Weekly Schedule	6. Week Usability tests (Interview, Focus Group, Experience Logs, 5	5-Second Tes				
	7. Week Iterative user-centered design					
	8. Week Identifying user requirements and usage scenarios					
	9. Week Visualizing design ideas					
	10. Week Redesign and analysis based on user evaluations					
	11. Week Concept and prototype development					
	12. Week Concept and prototype development					
	13. Week Evaluation of concepts and prototypes					
	14. WeekEvaluation of concepts and prototypes					
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library work: 2 Designing and implementing materials: 1 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 5 Final Exam and Preparation for Final Exam: 5					
	Number Total s Weight ing (%)					
	Midterm Exams					
	Assignment 2 60					
	Application					
Assessment Criteria	Projects					
	Practice					
	Quiz Demonstraf In terms Studies (0)					
	Percentage of Final Exam to Total 40 Score (%)					
	Attendance					

			Activity	Total Num ber of Wee ks	Du on (we y hou	eekl ur)		Tot al Peri od Wo rk Loa d		
	۲ ۲	Weekly T	Theoretical Course	14	1		2		28	
		Weekly 7	Tutorial Hours							
	F	Reading	Tasks	5			2		0	
Workload	5	Studies		5			2		0	
	A A	Material and Impl	Design ementation	7			1		7	
		Report P	reparing							
		reparing	g a Presentation							
		Aidterm	Exam and							
	F	Preperati	on for	2			5		0	
	Ē	Final Exa	am and	2			5		0	
	I	Preperati	on for Final Exam	2			5		0	
	asized)									
	Fotal Wo	orkload					, 	75		
		Total Wo	orkload / 25					75	/25	
			Program Outco	mes					5	
		N O				2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		1 2 3 4	Adequate knowled mathematics, scien engineering subjec pertaining to the re discipline; ability t theoretical and app information in thes to model and solve engineering proble Ability to identify, formulate, and solve complex engineering problems; ability to and apply proper a and modeling meth this purpose. Ability to design a system, process, de product under reali constraints and cor in such a way as to desired result; abili apply modern desig methods for this pur Ability to develop, and use modern teca and tools necessary analysis and solutio complex problems engineering applica ability to use inform technologies effect	ge in ce and ts levant o use lied e areas ms. //e ng o select nalysis nods for complex evice or stic nditions, meet the ity to gn urpose. select chniques / for on of in ations; mation ively.	x	x				

	6	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics. Ability to work efficiently in intra-disciplinary teams.	x			
	7	Ability to work efficiently in multi-disciplinary teams.			X	
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.		X		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.			x	
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.				
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.	X			
The Course's Lecturer(s) and Contact Informations	Prof. isahir	Dr. İsmail Şahin n@gazi.edu.tr				

	Program Outcome1	Program Outcome 2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome1 0	Program Outcome11
TOTAL		1	2	2	1	1	3	2	3		1
Learning outcome 1							1		1		
Learning outcome 2							1	1	1		
Learning outcome 3			1	1							
Learning outcome 4		1	1	1	1	1	1	1	1		1

	Course DescriptionForm
Course Code and Name	ETM331 ERGONOMICS
Course Semester	5
Catalog Content	Determining the basics of ergonomic design Determining the effects of environmental factors on the user Developing user-centered product design skills Evaluation of ergonomic product designs
Textbook	 Karwowski, W., Soares, M.M. and Stanton, N.A., Human Factors and Ergonomics in Consumer Product Design: Methods and Techniques, CRC Press, 2011. Babalık, F., Mühendisler İçin Ergonomi - İşbilim, Dora, 3. Bas.,
Supplementary Textbooks	1. Alaettin Sabancı, Sarp Korkut Sümer., Ergonomi, Nobel Akademik Yayıncılık; 3. baskı
Credit	3 ECTS
Prerequisites of the Course (<i>Attendance Requirements</i>)	No Prerequisites - %70 AttendanceRequirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To have knowledge about the concept and foundations of ergonomics To learn the application of anthropometric properties to design To be able to use ergonomic design elements in the product development process
Course Learning Outcomes	 Ability to design products taking into account anthropometric data of the target audience Ability to produce creative solutions in engineering problems by taking human-oriented elements into consideration Ability to design complex systems, processes, devices or products under ergonomic conditions Ability to perform research methods such as literature research, data collection, and interpretation of results to examine engineering problems from an ergonomic perspective. Ability to analyze and evaluate designed products and systems from an ergonomic perspective
Instruction Methods	Face to face

	1. Week	Introduction (Ergono design examples)	mics concept,	basics of ergo	nomics,			
	2. Week	Development of ergo examples and applica	nomic designs tions	, ergonomic de	esign			
	3. Week	Principles of ergonon work	nic design, erg	onomically hu	man and			
	4. Week	Environmental factor	s and their eff	ects on human	s			
	5. Week	Ergonomic workplace	e organization					
	6. Week	Human machine cont	act (interface)	, sample applic	cations			
Weekly Schedule	7. Week	Introducing anthropo workplace control	metric measur	ement, ergono	mic			
	8. Week	Load lifting and mor	ent applicatio	n				
	9. Week	Designing ergonomic	work tools an	d equipment				
	10. Week	Ergonomic product d	esign example	s				
	11. Week	Ergonomic product d	esign example	s and evaluation	ons			
	12. Week	Ergonomics compliar	nce check					
	13. Week	Examples of aesthetic	and ergonom	ic design appl	ications			
	14. Week	Student project preser	ntation and ev	aluation				
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library work: 2 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 3 Presentations: 2 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3							
			NT I					
			Numbers	Total Weighting (%)				
	Midterm Exan	ns	1	40				
	Assignment		1	20				
	Application Projects							
Assessment Criteria	Practice							
	Quiz							
	Percent of In-1	term Studies	60					
	Percentage of Score (%)	Final Exam to Total	1	40				
	Attendance							

		Activity	Total Number of	Duratio n (weekly		Total Period Work Load			
	Weekly	Theoretical Course	14			2			28
	Weekly	Tutorial Hours							
	Reading	g Tasks	5			2			10
	Studies		10			2			20
	Materia Implem	l Design and							
Workload	Report	Preparing	1			2			2
	Prepari	ng a Presentation	1			3 2			3
	Midterr	n Exam and				2			3
	Prepera	tion for Midterm	-			5			5
	Exam Final E	xam and Preperation	1	\vdash		3			3
	for Fina	al Exam							
	emphas	should be sized)	-			-			-
	Total W	Vorkload	-			-			75
	Total W	Vorkload / 25							75/25
	Course	Credit (ECTS)		-					5
	No			1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in meering						
	2	Ability to identify, for analyse complex engi- problems using knowl basic science, mathem engineering, and takir account the UN Susta Development Goals.	rmulate and neering ledge of natics and ng into inable						
	3	Ability to generate cro solutions to complex of problems to meet curr future needs; design c systems, processes, de products under realist constraints and condit		x					
		Ability to select and use appropriate techniques, resources and modern engineering and information technology tools, including estimation and modelling, for the analysis and solution of complex engineering problems, recognising their							
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting g data, eting complex		x				

	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.			
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).			
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	x		
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.			
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			
The Course's Lecturer(s) and Contact Informations	Departı tasarim	ment Management @gazi.edu.tr			

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL			2	1	2				2		
Learning outcome 1									1		
Learning outcome 2			1						1		
Learning outcome 3			1								
Learning outcome 4				1	1						
Learning outcome 5					1						

	Course Description Form								
Course Code and Name	ETM332 MEDICAL DEVICE DESIGN								
Course Semester	6								

Catalog Content	Understandin To be able to Gaining multi Professional a Ability to use Gain knowled	g the basic principles and system components of medical devices comprehend the medical device design process disciplinary approaches and teamwork skills in medical device design and ethical responsibility modern engineering methods in medical device design lge and skills in pre-clinical testing to evaluate the safety and efficacy of									
Textbook	 Bronzino, Biomedica Gurupur, V 	J.D., The Biomedical Engineering HandBook, IEEE Press, 1995 I Engineering Health Care Systems, Technology and Techniques, Suh, S.C., V.P., Tanik, M.M.									
Supplementary Textbooks	1. Ogrodnik, Academic	P. (2012). Medical Device Design, Innovation from concept to market. Press/Elsevier.									
Credit	3 ECTS										
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70									
Type of the Course	Elective										
Instruction Language	Turkish										
Course Objectives	Understandin Understand th To gain the al and patient sa To have know Understand h design	rstanding the engineering profession and ethics rstand the medical device design process in the ability to produce solutions in medical device design by considering user needs atient safety we knowledge of basic design and engineering issues rstand how to use multidisciplinary approaches and teamwork in medical device n									
Course Learning Outcomes	 Understa orthoped Gain con device de Ability to Gain the for medic Gaining o current to 	nd the basic principles of design of various medical devices such as ic devices, soft tissue implants, artificial organs and dental implants apetence in evaluating multidisciplinary approaches and teamwork in medical resign o evaluate the safety and effectiveness of medical devices ability to consider user needs and patient safety when developing solutions cal devices competence in developing innovative medical device designs and following echnological developments									
Instruction Methods	Face to face										
	1. Week	Basic Principles of Medical Devices and system components									
	2. Week	Electrical and mechanical device groups used in medicine.									
	3. Week	Design of devices used in minimally invasive medical interventions									
	4. Week	Design of devices for bedside diagnostic technologies									
	5. Week	Design of devices for bedside diagnostic technologies									
	6. Week	Design of devices for measuring patient radiation dose									
	7. Week	Sensor, Biosensor technologies									
Weekly Schedule	8. Week	Design of home health and national monitoring devices									
	10 Week	Portable diagnostic and therapeutic devices									
	10. Week	Portable early detection devices									
	12. Week	Micro-total Analysis Systems									
	13. Week	Integrated Bio-chips (Lab on a chip)									
	14. Week	Application									
		l									

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library Designing and implement Report preparing: 0 Preparing a Presentation: Presentations: 0 Preparation of Midterm au Final Exam and Preparatio Other:0	work: 2 ing mat 0 nd Midt on for F	2 2 eerial Tinal	ls: 4 Exam: 2 Exam: 2 Numbers		,	Total Wei	igh	tin	g ('	%)	
Assessment Criteria							40 20 60					
	Percentage of Final Exam Score (%)	to Tota	1					40				
Attendance			A	Activity	Total Numbo of Wee	l er ks	Duration (weekly hour)		F V I	Fot Peri Vor Joa	al od ·k d	
		Weekly Hours	/ The	eoretical Course	14		2			28	}	
		Weekly Tutorial Hours										
		Readin	g Ta	sks	5		3			1		;
		Studies	1.D	• 1	6		2			-		!
		Implem	al De ienta	sign and tion	4		4				16	5
		Report	Prep	paring								
Workload		Prepari	ng a	Presentation								
		Present	atior	15								
		Midteri Prepera Exam	m Ex ation	am and for Midterm	1		2					
		Final E for Fina	xam al Ex	and Preperation	1		2				2	
		Other (shou	ıld be								-
		Total W	Vork) load	_		_				75	5
		Total W	Vork	load / 25					_	,	75/2	25
		Course	Crea	lit (ECTS)							3	
		No		Program Outcom	ies		•	1	2	3	4	5
Contribution Level Retween Course Learning		1	In-d scie com eng	f mather ring con uting and lity to us r in solvi	nati icep d sp se th	ics, ots, pecific nis complex				x		
Outcomes and Program		eng	ineering problems.		n d	analyza						
	2 Ability to identify, formulate complex engineering proble					late and analyse blems using				x		
			kno	wledge of basic sc	ience, m	ath	ematics					
			and the	engineering, and t UN Sustainable D	akıng ın evelopm	to a ient	Goals.					
		3	Abi	lity to generate cre	eative so	lutio	ons to				2	ĸ
	L	com	plex engineering	problem	s to	meet						

		current and future needs; design complex systems, processes, devices or products							
		under realistic constraints and conditions.							
	4	Ability to select and use appropriate		x					
		techniques, resources and modern							
		engineering and information technology							
		tools, including estimation and modelling,							
		for the analysis and solution of complex							
		engineering problems, recognising their							
		limitations.			_				
	5	Ability to use research methods, including			х				
		experiments, collecting data, analysing and							
		interpreting results to investigate complex							
		engineering problems.							
	6	Knowledge of the effects of engineering	x						
		practices on society, health and safety,							
		economy, sustainability and environment							
		within the framework of the UN							
		Sustainable Development Goals; awareness							
		of the legal consequences of engineering							
		Acting in accordance with the othical		v	-	\vdash			
	/	principles of the engineering profession		x					
		awareness of ethical responsibilities:							
		awareness of non-discrimination,							
		impartiality and embracing diversity.							
	8	Ability to work effectively as a team							
		member or leader both individually and							
		within interdisciplinary teams (face-to-							
		face, distance or hybrid).			_				
	9	Additive to communicate effectively on							
		taking into account the various differences							
		of the target audience (e.g. education.							
		language, profession).							
	10	Knowledge of business life practices such	х						
		as project management and economic							
		feasibility analysis; awareness of							
		entrepreneurship and innovation.			_				
	11	Ability to learn independently and							
		continuously, to adapt to new and emerging							
		about technological changes							
	1	accut demotogieur enunges.	I			╵──└──┤			
	Цал	d of Department							
The Course's Lecturer(s) and Contact									
Informations	<u>tasa</u>	<u>rım@gaz1.edu.tr</u>							

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	3	3	5	3	3	4	1			1	1
Learning outcome 1	1	1	1	1		1					
Learning outcome 2			1								
Learning outcome 3			1			1					
Learning outcome 4	1	1	1	1		1	1				
Learning outcome 5	1	1	1	1		1				1	1

Course Description Form

Course Code and Name	ETM333 MECHATRONICS SYSTEM DESIGN
Course Semester	5
Catalog Content	Understanding the design steps of mechatronic systems and the ability to apply them Ability to represent and analyze systems using block diagrams Understanding electrical, mechanical, and fluid systems and the ability to integrate these systems to create mechatronic systems Understanding the working principles of different sensors and transducers and grasping their role in mechatronic systems
Textbook	 Shetty, D., Kolk R.A., Mechatronics System Design, Cengage Learning, 2011 Bradley, D. A., Seward, D., Dawson, D., & Burge, S. (2018). Mechatronics and the design of intelligent machines and systems. Crc Press.
Supplementary Textbooks	8. Pelz, G., & Waddington, R. (2004). Mechatronic systems. J. Wiley.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Gaining the ability to design processes Developing skills in expressing with blocks Acquiring the ability to understand various systems Learning about sensors and transducers
Course Learning Outcomes	 Gaining the ability to understand and apply the design steps of mechatronic systems. Developing the ability to represent and analyze systems using block diagrams. Acquiring the ability to understand electrical, mechanical, and fluid systems and to create mechatronic systems. Learning the working principles of different sensors and transducers and understanding their role in mechatronic systems.
Instruction Methods	Face to face

	1. Week	Introduction to Mecha	hatronic System Design				
	2. Week	Design processes					
	3. Week	Block diagrams, mani	pulations, and	l simulations			
	4. Week	Electrical, mechanical integration	l, and fluid sys	stems, system			
	5. Week	Sensors and transduce	ers				
	6. Week	6. Week Sensor applications					
Weekly Schedule	7. Week	Control devices					
	8. Week	System control - Logi	c methods				
	9. Week	Programmable Logic	Controllers				
	10. Week	Signals, Systems, and	Controls				
	11. Week	Laplace transforms					
	12. Week	Signal conditioning an	nd real-time ir	nterface			
	13. Week	Data conversion proce	ess				
	14. Week	Case studies					
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	 Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 3 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4 						
			Numbers	Total Weighting (%)			
	Midterm Exar	ns	1	40			
	Assignment		1	20			
	Application						
Assessment Criteria	Projects						
	Practice						
	Quiz	C + 1 -					
	Percent of In-1	term Studies		00			
	Percentage of	Final Exam to Total		40			
	Score (%)	- mai Entanti to Total					
	Attendance						

		Activity	Total Numbe r of Weeks	Dui (we hou	ration ekly r)	1	T Pe W Lo	otal riod ork oad
	Weekly Hours	7 Theoretical Course	14		2		28	
	Weekly	Tutorial Hours						
	Readin	g Tasks	5		3		15	
	Studies		5	2				10
Workload	Materia Implem	al Design and mentation	2	3				6
	Prepari	rreparing						
	Present	ations						
	Midtern Prepera	n Exam and tion for Midterm	2		4			8
	Exam Final E for Fina	xam and Preperation al Exam	2		4			8
	Other (should be emphasized) Total Workload					ļ ,	75	
	Total Workload / 25			-			75/25	
	Course	Credit (ECTS)					/-	3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	2	Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applic information in these model and solve eng Ability to identify, fo and solve complex en	e in e and vant use ed areas to ineering ormulate, ngineering	x				
		problems; ability to s apply proper analysis modeling methods fo purpose.	select and s and or this					
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho	omplex ice or ic itions, in et the v to apply ods for	x				
	4	Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer applications; ability to information technolo effectively.	elect and es and nalysis blex ring to use ogies	X				

	П		 , i	 	
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.	X		
	6	Ability to work efficiently in intra-disciplinary teams.			
	7	Ability to work efficiently in multi-disciplinary teams.			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	X		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.	X		
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.			
The Course's Lecturer(s) and	Prot	f. Dr. İsmail Şahin			
Contact Informations	isah	in@gazi.edu.tr			

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome 6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
TOTAL	1	1	1	1	2			2	2		
Learning outcome 1	1								1		
Learning outcome 2		1							1		
Learning outcome 3			1	1	1			1			
Learning outcome 4					1			1			

Course Description Form									
Course Code and Name	ETM334 FURNITURE DESIGN								
Course Semester	6								
Catalog Content	General approaches in furniture design Concept of furniture connected to indoor and outdoor spaces Furniture-user relationship The trends that determine furniture design and the reflection of technology on design Understanding furniture design elements (materials, details, production methods, etc.) Executing a furniture design process								
Textbook	 Remmele, M. (2007). <i>Charles and Ray Eames/ Objects and furniture</i>. New York: Monacelli Yayınevi. Küçükerman, Ö. (1996). <i>Endüstri için ürün tasarımında yaratıcılık</i>. İstanbul: Yem Yayınları. 								
Supplementary Textbooks	1. Habegger, J. (2005). Sourcebook of modern furniture. USA: W.W. Norton Yayınevi.								
Credit	3 ECTS								
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements								
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	Producing innovative and creative concepts in furniture design, taking into account cultural, social and environmental factors and the needs and wishes of users Creation of a research methodology for furniture design; approaching the definition of the problem related to furniture design from a creative perspective; Developing potential uses of the designed product in line with future needs. Understanding furniture design elements (materials, details, production methods, etc.) Carrying out a user-oriented furniture design process								
Course Learning Outcomes	 Current approach to the discipline of furniture design, ability to master modern and historical examples In the projects developed conceptually, he reaches results on an engineering basis, based on interdisciplinary communication, and is able to use and test materials and manufacturing methods. Ability to manage a user-oriented furniture design process Ability to use economics, marketing, consumer behavior, ergonomics and social psychology knowledge within the framework of sustainability criteria based on product-user relationship during the project development process. Ability to participate in a design project in your field within a team or manage it independently 								
Instruction Methods	Face to face								

	1. Week	Scope and general co	nsideration of	the concept of	furniture		
	2. Week	Structural classification	on of furniture	e			
	3. Week	Basic features that ide	entify a furnitu	ure			
	4. Week	Systematic shaping ir	n furniture des	ign			
	5. Week	Form search, Form sy	nthesis				
	6. Week	Product synthesis and	thesis and problem analysis				
	7. Week	Shape research accore	ding to genera	l material prop	oerties		
	8. Week	Identity and personal	ity issues of fu	ırniture			
Weekly Schedule	9. Week	Material conditions in	n furniture des	ign			
	10. Week	Examining furniture a spread in seating elen Position relationships	according to h nents, spine ar s in seating ele	uman-element ngles according ments	relationshi g to human	p: Body heig body position	
	11. Week	Function and Functio	n dressing in f	furniture desig	n		
	12. Week	Unchanging values, c	hanging behav	viors in furnitu	re design		
	13. Week	Furniture – Furniture	relations				
	14. Week	Scope and general co	nsideration of	the concept of	furniture		
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2						
			Numbers	Total Weighting			
				(%)			
	Midterm Exan	ns	1	40			
	Assignment		1	20			
	Application						
Assessment Criteria	Projects						
	Oniz						
	Percent of In-t	term Studies		60			
	(%)						
	Percentage of Score (%)	Final Exam to Total		40			
	Attendance						
	•						

		Activity	Total Numbe r of	Dur (we hou	•ation ekly r)	l	T Pe W Le	otal criod ork oad
	Weekly	Theoretical Course	14		2		28	
	Weekh	y Tutorial Hours						
	Readin	g Tasks						
	Studies	5	9	1		9		
	Materia	al Design and	10	2				20
	Implen Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	tations						
	Midter	m Exam and	5		2			10
	Prepera Exam	ation for Midterm						
	Final E for Fina	xam and Preperation al Exam	4		2			8
	Other (should be sized)						
	Total V	Vorkload	-		-			75
	Total V	Vorkload / 25					7:	5/25
	Course	Credit (ECTS)						3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and a engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering			x		
	2	2 Ability to identify, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Dayslopment Gool						
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	eative to meet eds; design cesses, nder nd		X			
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, inclu- estimation and modell the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.		x			
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre results, to investigate engineering problems	n methods, arch, ting gg data, eting complex			x		

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and x
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	Outcome	Outcome2	Outcome3	Outcome	Outcome5	Outcome6	Outcome	çıktısı 8	Outcome	Outcome10	Outcome11
	1			4			7		9		
TOTAL	3	1	2	2	3	2	1	2	1	2	3
Learning	1				1					1	1
outcome											
1											
Learning	1	1	1	1		1		1			1
outcome											
2											
Learning	1		1	1	1					1	
outcome											
3											
Learning					1	1	1		1		
outcome											
4											
Learning								1			1
outcome											
5											

Course Description Form								
Course Code and Name	Course Code and Name ETM335 DESIGN FOR MANUFACTURABILITY							
Course Semester	Course Semester 5							

Catalog Content	Ability to und Evaluating th Professional a Ability to use Teamwork an Ability to con Ability to ide Ability to des	Ability to understand and apply production technologies and mechanisms Evaluating the effect of material selection and material properties on design Professional and ethical responsibility Ability to use modern engineering methods Teamwork and leadership skills Ability to communicate orally and in writing Ability to identify, formulate and solve problems Ability to design, implement and design experiments								
Textbook	9. Anderson, Rapid Dev USA, 2014	. Anderson, D.M., Design for Manufacturability: How to Use Concurrent Engineering to Rapid Develop Low-Cost, High-Quality Products for Lean Production, CRC Press, USA, 2014.								
Supplementary Textbooks	2. Bralla, J.C	G., Design for Manufacturability Handbook, Mc-Graw Hill Pub., 1998.								
Credit	3 ECTS									
Prerequisites of the Course	No Prerequisi Attendance R	ites equirements %70								
Type of the Course	Elective									
Instruction Language	Turkish									
Course Objectives	To be able to To have detai Identify limit process To understand	determine the criteria of design suitable for manufacturing led knowledge about manufacturing methods ations and difficulties arising from manufacturing methods in the design d the relationship between material and manufacturing method								
Course Learning Outcomes	 Gaining t Developi mechanis Develop Gaining t Understa 	 Gaining the ability to apply theoretical principles through design examples Developing the ability to understand and apply production technologies and mechanisms Develop teamwork and communication skills in design engineering projects Gaining competence to consider ethical and sustainability principles in design Understanding the relationship between material selection and manufacturing method 								
Instruction Methods	Face to face									
	1. Week	Introduction								
	2. Week	Design of product components.								
	J. Week	Examination of product components in terms of mechanical design.								
	4. Week	Standard alaments and factories								
	5. week	Standard elements and fasteners.								
	7 Wook	Machanical and electro machanical machanisms								
Waalda Sahadala	8 Week	A ssembly methods								
weekly Schedule	9. Week	Processes of modification of physical and visual properties of components.								
	10. Week	Quality control methods.								
	11. Week	The effect of the chosen production method and material on the design.								
	12. Week	Factors determining production method preferences.								
	13. Week	Systems that control design and production methods.								
	14. Week	Design examples								
Teaching and Learning Methods	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library work: 5 Designing and implementing materials: 6 Report preparing: 5 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3									
	Other:0	ther:0								

				Numbers		r	Total We	igh	tin	g (%)	
	Midterm Exams			1			40					
	Assignment	Assignment						20				
	Application											
Assessment Criteria	Projects											
	Practice	Practice										
	Quiz Dercent of In term							60				
	Studies (%)							00				
	Percentage of Final Exam	to Total	1					40				
	Score (%)											
	Attendance										70	
			А	ctivity	Total Numbo of Wee	l er ks	Duration (weekly hour)	n		[7 [To Per Wo Loa	tal iod rk id
		Weekly Hours	7 The	oretical Course	14		2				2	8
		Weekly	7 Tuto	orial Hours								
		Reading	g Tas	ks	2		4			8		3
		Studies			3		5			15		5
		Materia	l Des	sign and	2		6			12		2
		Implementation Report Preparing			1		6	6		6		<u>.</u>
Workload		Preparing a Presentation		Presentation								
		Presentations		s								
		Midterm Exam and										
		Preperation for Midterm		1		3				3	3	
		Final Exam and Preperation		and Preperation	1		2					
		for Final Exam		am	l	<u> </u>		5		3		3
		Other (should be		ld be								
		Total W	/orkl	oad	_	-				75		5
		Total W	/orkl	oad / 25							75/	25
		Course	Cred	lit (ECTS)							3	3
		No		Program Outcom	nes			1	2	3	1	5
					01			1	2	5	4	5
		1	In-d scie	epth knowledge o	t mather	nati	cs, ts				х	
			com	puter-aided comp	uting an	d sp	ecific					
			engi	neering areas; abi	bility to use this		nis 1					
Contribution Level Bety	veen Course Learning		engi	neering problems	y in solving comple: s.		complex					
Outcomes and Program	Outcomes	2	Abil	ity to identify, for	rmulate a	and	analyse			x		
			com	plex engineering	problem	s us	ing					
			and	engineering, and	taking in	ito a	ccount					
			the I	UN Sustainable D	evelopm	ent	Goals.					
		3	Abil	ity to generate cre	eative so	lutio	ons to					x
			curr	ent and future nee	ds; desig	s to gn c	omplex					
			syste	ems, processes, de	evices or	pro	ducts					
			unde	er realistic constra	unts and	con	ditions.				v	
		4	tech	niques, resources	and mod	lern					^	
			engi	neering and infor	mation to	echr	nology					
			tools for t	s, including estimates and second second second second second second second second second second second second s	ation and	1 mo f co	odelling, mplex					
			engi	neering problems	, recogni	ising	g their					
		<u> </u>	limi	tations.		<u> </u>	1					
		5	Abil liter	ity to use research ature search, desig	n method	is, ii d co	ncluding nducting			х		

	experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.	
	6 Knowledge of the effects of engineering x practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	
	7 Acting in accordance with the ethical x principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	
	8 Ability to work effectively as a team x member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).	
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation. x	
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.	
The Course's Lecturer(s) and Contact Informations	Head of Department tasarim@gazi.edu.tr	

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	4	3	5	4	3	1	1	1		3	
Learning outcome 1	1	1	1	1	1					1	
Learning outcome 2	1	1	1	1	1						
Learning outcome 3	1		1	1				1			
Learning outcome 4			1			1	1			1	
Learning outcome 5	1	1	1	1	1					1	

Course Description Form								
Course Code and Name	ETM336 ECONOMIC DESIGN							
Course Semester	6							
Catalog Content	The importance of economics in industrial design and its effects on the economic consequences of design decisions The importance and strategies of cost management in the product development process Basic principles and organizational structure of product development cost accounts Analyzing the factors affecting manufacturing costs and examining the strategies used to reduce costs Management and control of costs in the product development process through the use of target costing and alternative cost techniques							

Textbook	 Parameswa Edition, 20 Cross, N., Sons, Ltd., Yaşar, r. Ş yayin daği 	 Parameswaran, M.A., An Introduction to Design Engineering, Alpha Science Pub., Int. Edition, 2004 Cross, N., Engineering Design Methods-Strategies for Product Design, John Wiley & Sons, Ltd., New York, 2001. Yaşar, r. Ş yeni ürün geliştirme sürecinde maliyet yönetimi teknikleri, kitapana basim yayin dağitim bilişim izmir – 2016 									
Supplementary Textbooks	1. Elder, W. CRC Pres	Elder, W.E. ve Hosnedl, S., Design Engineering: A Manual for Enhanced Creativity, CRC Press, Int. Edition, 2008.									
Credit	3 ECTS										
Prerequisites of the Course	No Prerequisi %70 Attendar	ites nce Requirements									
Type of the Course	Elective										
Instruction Language	Turkish										
Course Objectives	Understanding ability to thin Gaining the al evaluating des Effective man principles in t	g the importance of cost management in industrial design and developing the k cost-oriented in the design process bility to perform cost analysis in the product development process and sign decisions in terms of cost effectiveness magement and control of costs by applying strategic cost management the product development process.									
Course Learning Outcomes	 Learning the its applica Understand to real word Identifying Developing learning the 	ne basic concepts and skills related to cost management in industrial design. e ability to perform cost analysis in product development phases and learning bility. ling the importance of strategic cost management principles and relating them rld applications. strategies to reduce manufacturing costs and learning their applicability. g cost optimization skills through the use of target costing methods and heir applicability in practice.									
Instruction Methods	Face to face										
	1. Week	Introduction									
	2. Week	Cost responsibility of product developers									
	3. Week	Cost management in product development									
	4. Week	Impact on life cycle costs									
	6. Week	Impact on total costs									
	7. Week	Factors affecting manufacturing costs and processes to reduce costs									
Weekly Schedule	8. Week	Cost Management Systems									
Weekiy Schedule	9. Week	The Importance of Cost Management in New Product Development Process									
		The importance of Cost ivianagement in New Product Development Proc									
	10. Week	Emergence of Target Costing									
	10. Week 11. Week	Emergence of Target Costing Theory of Target Costing									
	10. Week 11. Week 12. Week	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing									
	10. Week 11. Week 12. Week 13. Week	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process									
	10. Week 11. Week 12. Week 13. Week 14. Week	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques									
	10. Week 11. Week 12. Week 13. Week 14. Week	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques									
Teaching and Learning Methods	10. Week 11. Week 12. Week 13. Week 14. Week Weekly theory Weekly tutori Reading Activ Internet browy Designing and Report prepar	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques etical course hours: 2 ial hours: 0 vities: 4 sing, library work: 3 d implementing materials: 3 ing: 0									
Teaching and Learning Methods	10. Week 11. Week 12. Week 13. Week 14. Week Weekly theory Weekly tutori Reading Activ Internet brown Designing and Report preparing a Proparing a Properting a Properting a Properting a Properting and Properting and Properting and Properting a P	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques etical course hours: 2 tal hours: 0 vities: 4 sing, library work: 3 d implementing materials: 3 ing: 0 resentation: 0									
Teaching and Learning Methods	10. Week11. Week12. Week13. Week14. WeekWeekly theoreWeekly tutoriReading ActivInternet browsDesigning andReport preparPreparing a PresentationsPreparation of	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques etical course hours: 2 ial hours: 0 vities: 4 sing, library work: 3 d implementing materials: 3 ing: 0 resentation: 0 : 0 f Midterm and Midterm Exam: 3									
Teaching and Learning Methods	10. Week11. Week12. Week13. Week14. WeekWeekly theoryWeekly tutoriReading ActivInternet brownDesigning andReport preparPreparing a PrPresentations:Preparation ofFinal Exam and	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques etical course hours: 2 tal hours: 0 vities: 4 sing, library work: 3 d implementing materials: 3 ing: 0 resentation: 0 : 0 f Midterm and Midterm Exam: 3 nd Preparation for Final Exam: 3									
Teaching and Learning Methods	 10. Week 11. Week 12. Week 13. Week 14. Week 14. Week Weekly theory Weekly tutori Reading Active Internet browy Designing and Report prepare Preparing a Preparing a Preparing a Preparation of Final Exam and Other:0 	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques etical course hours: 2 ial hours: 0 vities: 4 sing, library work: 3 d implementing materials: 3 ing: 0 resentation: 0 : 0 f Midterm and Midterm Exam: 3 nd Preparation for Final Exam: 3									
Teaching and Learning Methods	10. Week11. Week12. Week13. Week14. WeekWeekly theoryWeekly tutoriReading ActivInternet brownDesigning andReport preparPreparing a PrPresentations:Preparation ofFinal Exam anOther:0	Emergence of Target Costing Theory of Target Costing Basic Principles of Target Costing Target Costing Process Alternative Cost Management Techniques etical course hours: 2 tal hours: 0 vities: 4 sing, library work: 3 d implementing materials: 3 ring: 0 resentation: 0 : 0 f Midterm and Midterm Exam: 3 nd Preparation for Final Exam: 3 Numbers Total Weighting (%)									

	Midterm Exams		1			40)			
	Assignment		1			20				
	Application									
	Projects									
Assessment Criteria	Practice									
	Quiz									
	Percent of In-term					60				
	Studies (%)									
	Percentage of Final Exam	to Total				40				
	Score (%)									
	Attendance				-				Tot	a]
			Activity	Total Number	Duratio	n]]	Peri	iod
			Activity	of Weeks	hour)				Wo	rk
		Weekly '	Theoretical Course	14	2			1	<u>Loa</u> 29	a 8
		Hours		17					2	5
		Weekly	Futorial Hours							
		Reading	Tasks	5	4				20	0
		Studies		5	3				1:	5
		Material	Design and	2	3				6	;
		Impleme	ntation							
Workload		Report P	reparing							
W UI KIUAU		Preparin	g a Presentation							
		Presenta	tions							
		Midterm	Exam and	1	3			3		
		Preperati	on for Midterm							
		Final Exa	am and Preperation	1	3				3	
		for Final	Exam							
		Other (s	hould be zed)							
		Total Wo	orkload	-	-				7	5
		Total Wo	orkload / 25						75/	25
		Course (redit (ECTS)						3	
			Program Outcon	nes		1				
		No	Trogram o accor			1	2	3	4	5
		1 I	n-depth knowledge o	of mathema	tics,	x				
		s	cience, basic engine	ering conce	pts,					
		e	ngineering areas: ab	ility to use	this					
Contribution Level Rety	veen Course Learning	k	nowledge effectivel	y in solving	g complex					
Outcomes and Program	Outcomes	e	ngineering problems	S						
			Ability to identify, fo	bility to identify, formulate and analyse				х		
		k	nowledge of basic s	; problems using science, mathematic						
		a	nd engineering, and	taking into	account					
			he UN Sustainable E	evelopmer	nt Goals.					
			complex engineering	problems t	o meet	x				
		c	urrent and future nee	eds; design	complex					
		s	ystems, processes, d	evices or p	roducts					
			inder realistic constra	aints and co	inditions.	-	v			
			echniques, resources	and moder	n		X			
		e	ngineering and infor	mation tecl	hnology					
			ools, including estim	ation and n	nodelling,					
			or the analysis and so	olution of c	omplex					
			imitations.	, recognish	ug ului					
		5 4	Ability to use researc	h methods,	including					
		1	iterature search, desi	gning and o	conducting					
		e :	experiments, collection	ng data, ana	alysing and					
		e	ngineering problems	5 mvesugat 8.	e complex					

	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	<u> </u>		
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	ζ.		
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).	<u> </u>		
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).			
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.		x	
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.	x		
The Course's Lecturer(s) and Contact Informations	Dr.0 oero	Öğr. Üyesi Orhan ERDEN <u>den@gazi.edu.tr</u>			

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	1	3	1	2		2				Э	2
Learning outcome 1	1	1		1						1	
Learning outcome 2		1		1						1	
Learning outcome 3										1	1
Learning outcome 4		1	1			1				1	
Learning outcome 5						1				1	1

Course Description Form									
Course Code and Name	ETM337 COST ANALYSIS IN DESIGN								
Course Semester	5								
Catalog Content	Understanding basic cost analysis Understand the analysis of costs allocated to different functions such as production, distribution and administration Analyze the relationship between production quantity, costs and profit and identify strategies to increase profitability								
Textbook	 Gündüz, H.E., Gürdal, K. ve Elmacı, O., Maliyet Analizleri, Anadolu Üniversitesi, 2013. Evans, J. R., Olson, D. L., & Olson, D. L. (2007). Statistics, data analysis, and decision modeling. Pearson/Prentice Hall 								

Supplementary Textbooks	2. Blank, L.	2. Blank, L., & Tarquin, A. (2005). Engineering economy. McGraw-Hill									
Credit	3 ECTS										
Prerequisites of the Course	No Prerequisi %70 Attendar	Vo Prerequisites 670 Attendance Requirements									
Type of the Course	Elective	lective									
Instruction Language	Turkish	urkish									
Course Objectives	Understand an process To gain the al To gain the al knowledge an To be able to evaluate these	Inderstand and analyze the role of economic factors and market conditions in the design rocess o gain the ability to solve complex problems and the ability to make logical analysis o gain the ability to create new solutions and designs by bringing together different nowledge and ideas o be able to calculate the costs of new products emerging in the design process and to valuate these costs in economic terms									
Course Learning Outcomes	 Ability to a effective set Ability to a economic f Ability to a processes Ability to a f Ability to a processes Ability to a f The ability these product 	 Ability to analyze complex design problems in a rational way and produce logical and effective solutions Ability to evaluate the economic impact of industrial design projects by analyzing economic factors and market conditions Ability to manage industrial design projects and take an active role in decision-making processes Ability to calculate the costs of new design products and optimize these costs The ability to develop innovative design products and evaluate the marketability of these products through creative and synthetic thinking 									
Instruction Methods	Face to face										
Weekly Schedule	1. Week 2. Week 3. Week 4. Week 5. Week 6. Week 7. Week 8. Week 9. Week 10. Week 11. Week 12. Week 13. Week 14. Week	Elasticities of Supply a Elasticities of Supply a Temporary, short and Individual and market Introduction to cost the Total, average and mar fixed and variable cost Economic review in C Cost Analysis in New Technical review in C Determination of capa Financial review in C Product Costing Proce	and Demand long term demand, utility theory eory rginal costs ost Analysis Product Development Pr ost Analysis city utilization rate ost Analysis ss epayment period	rocess							
Teaching and Learning Methods	Weekly theory Weekly tutori Reading Activ Internet brow Designing and Report prepar Preparing a Pr Presentations: Preparation of Final Exam an Othery	/ theoretical course hours: 2 / tutorial hours: 0 g Activities: 4 t browsing, library work: 3 ing and implementing materials: 3 preparing: 0 ng a Presentation: 0 ations: 0 ation of Midterm and Midterm Exam: 3 Xam and Preparation for Final Exam: 3									
			Numbers	Total Weighting (%)							
	Midterm Exan	ns	1	40							
	Assignment		1	20							
	Application										
Assessment Cuitoria	Projects										
Assessment Uriteria	Practice										
	Quiz										

P	Percent of In-term						60)				
P	Percentage of Final Exam	to Total)				
S	Score (%)											
	Attendance		А	activity	Tota Numb of Wee	l er eks	Duration (weekly hour)	n]	To Per Wo Loa	tal iod rk d
		Weekly Hours	The	oretical Course	14		2				2	8
		Weekly	Tute	orial Hours								
		Reading	; Tas	sks	5		4				0	
		Studies			5		3				1	5
		Material Impleme	l De enta	sign and tion	2		3				6)
Workload		Report I	Prep	aring								
W OI KIDAU		Preparin	ng a	Presentation								
		Presenta	tion	IS								
		Midtern Preperat Exam	1 Ex	am and for Midterm	1		3					
		Final Ex for Fina	am 1 Ex	and Preperation am	1		3					
		Other (s	shou	ıld be								
			orkl	oad							7	5
	Total W	orkl	oad / 25							25		
		Course Credit (ECTS)								3		
		No	Program Outcomes					1	2	3	4	5
Contribution Level Betwee	en Course Learning	1	In-depth knowledge of mather science, basic engineering con computer-aided computing an engineering areas; ability to us knowledge effectively in solvi				cs, ts, ecific is complex		х			
Outcomes and Program O	utcomes	2	Abil com knov and the l	lity to identify, for plex engineering wledge of basic so engineering, and UN Sustainable D	rmulate a problem eience, m taking in evelopm	and s us nathe nto a	analyse ing ematics ccount Goals			х		
		3	Ability to generate creative solutions to complex engineering problems to meet current and future needs; design complex systems, processes, devices or products under realistic constraints and conditions				ons to meet omplex ducts ditions.	x				
		4	Abil tech engi tools for t engi	lity to select and u niques, resources neering and infor s, including estim he analysis and so neering problems tations	and moo mation to ation and blution o , recogn	opria dern echr d mo f co ising	nte nology odelling, mplex g their		x			
		5	Abil liter expe inter	lity to use research ature search, design eriments, collection rpreting results, to ineering problems	n methoo gning an g data, a investig	ds, in d co analy gate	ncluding onducting ysing and complex					
		6	Kno prac ecor with Sust of th solu	wledge of the effectives on society, h nomy, sustainabili in the framework cainable Developm ne legal consequent tions.	ects of en health an ty and en of the U hent Goa hees of e	ngin d sa nvir JN als; a ngir	eering fety, onment wareness neering					

	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity. 8 Ability to work effectively as a team x member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid). 9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession). 10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of
	entrepreneurship and innovation. 11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Dr.Öğr. Üyesi Orhan ERDEN oerden@gazi.edu.tr

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	2	3	1	2				1		3	2
Learning outcome 1	1	1		1						1	
Learning outcome 2	1	1		1							
Learning outcome 3								1		1	1
Learning outcome 4		1	1								
Learning outcome 5										1	1

Course Description Form									
Course Code and Name	ETM338 ECOLOGICAL DESIGN								
Course Semester	6								
Catalog Content	Professional and ethical responsibility Ability to use modern engineering methods Teamwork and leadership skills. Ability to communicate verbally and in writing Ability to identify, formulate and solve problems Ability to design, implement and design experiments								
Textbook	 White, P., Pierre, L., Belletire and S. Okala, Practitioner: Integrating Ecological Design, Okala Team, 2013 Van der Ryn, S., Cowan, S., Ecological Design, Tenth Anniversary Edition, Island Press, 2007. 								
Supplementary	2. Melnick, R. (2001). Ecology and design: frameworks for learning. Island Press.								
Credit	3 ECTS								
Prerequisites of the Course	No Prerequisites Attendance Requirements %70								

Type of the Course	Elective	Elective										
Instruction Language	Turkish											
Course Objectives	Understanding Understand th To learn soluti To have know	the engineering profess e field of design engineer on approaches to engine ledge of basic design an	sion and ethics ering activities eering problems d engineering issues									
Course Learning Outcomes	 Awareness Develop an processes effe Gain the ab Understand ideologies Designs car environmental 	of social equity and taki understanding of ecolog ctively ility to learn and apply n eco design ideologies to be understood as a hol impacts over the entire	ng these values into according these values into according a second processes and neasurement methods of and develop the ability istic system view, encon life cycle	bunt in the design process ad the ability to manage these renvironmental performance to design in line with these npassing the full spectrum of								
Instruction Methods	Face to face											
	1. Week	Introduction to ecolog	ical design									
	2. Week	Product system lifecyc	le									
	3. Week	Ecodesign strategy wh	eel									
	4. week	Ecodesign ideologies										
	5. week	Evolving strategies										
	7 Week	Ecological design proc	20000									
W	7. Week	Measuring environment	tal performance									
weekly Schedule	9. Week	The science of life cycle assessment										
	10. Week	Assessment of toxicity	,									
	11. Week	Design ethics - Biotic	and social imperatives									
	12. Week	Ecology for designers										
	13. Week	Ensuring social equality										
	14. Week	4. Week Ecological Design Practices										
Teaching and Learning Methods	Weekly theory Weekly tutori Reading Activ Internet brows Designing and Report prepar Preparing a Pr Presentations: Preparation of Final Exam an Other:0	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library work: 5 Designing and implementing materials: 5 Report preparing: 7 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 4										
			Numbers	Total Weighting (%)								
	Midterm Exan	ns	1	40								
	Assignment		1	20								
	Projects											
Assessment Criteria	Practice											
	Quiz											
	Percent of In-t	erm		60								
	Studies (%)											
	Percentage of	Final Exam to Total		40								
	Attendance											

		Activity	Total Number of Weeks	Duratio (weekly hour)	n		Tot Peri Woi Loa	al od rk d
	Weekly	Theoretical Course	14	2			28	8
	Weekly	Tutorial Hours						
	Readin	g Tasks	4	2			8	
	Studies		3	5			15	5
	Materia	al Design and	2	5			1()
	Report	Preparing	1	7			7	
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midteri Prepera Exam	n Exam and ttion for Midterm	1	3			3	
		xam and Preperation al Exam	1	4			4	
		should be						
		Vorkload					5	
	Total W	Vorkload / 25					75/	25
	Course	Credit (ECTS)					3	
	No	Program Outcom	nes		1 2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1 2 3 4	In-depth knowledge o science, basic enginee computer-aided comp engineering areas; abi knowledge effectively engineering problems Ability to identify, for complex engineering p knowledge of basic sc and engineering, and t the UN Sustainable D Ability to generate cre complex engineering p current and future nee systems, processes, de under realistic constra Ability to select and u techniques, resources engineering and inform tools, including estimat for the analysis and sc	f mathemati rring concep uting and sp lity to use the v in solving of rmulate and problems us tience, mathe taking into a evelopment eative solution problems to ds; design c evices or pro- tints and com- ise appropria and modern mation techn ation and mo-	cs, ts, ecific iis complex analyse ing ematics ccount Goals. ons to meet omplex ducts ditions. tte				X
	5	 5 Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems. 					x	
	6	Knowledge of the effe practices on society, h economy, sustainabili within the framework Sustainable Developm of the legal consequer solutions	ects of engin health and sa ty and envir of the UN hent Goals; a heces of engin				x	
	7	Acting in accordance principles of the engina awareness of ethical re awareness of non-disc impartiality and embra	with the ethneering profe esponsibiliti crimination, acing divers	ical ession, es; ity.				x

	8 4 1 9 4 10 4	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid). Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession). Knowledge of business life practices such as project management and economic		X		-
		feasibility analysis; awareness of entrepreneurship and innovation. Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively	x			_
The Course's Lecturer(s) and Contact Informations	Prof. E	Dr. Veysel ÖZDEMİR mir@gazi.edu.tr				

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL			3	3	4	3	3			2	1
Learning outcome 1			1	1	1	1	1			1	
Learning outcome 2			1	1	1	1	1			1	
Learning outcome 3			1	1	1	1	1				
Learning outcome 4			1	1	1	1	1				
Learning outcome 5			1	1		1	1				1

Course Description Form									
Course Code and Name	ETM339 SHEET METAL MOLD DESIGN								
Course Semester	5								
Catalog Content	Sheet-metal dies and their importance in industry Factors affecting die operation, Sheet-metal behavior theory, Introduction of punching-cutting and bending dies, Die elements and their tasks, Calculations required for sheet-metal die design, Creation of lane layout plan, Punching-cutting, bending and drawing mold design Errors in molded parts and methods of eliminating errors								
Textbook	 Such, I. (2006). <i>Handbook of die design</i>. New York: Mc-Graw Hill Pub. Boljonovic, V. (2005). <i>Die design fundamentals</i>. New York: Industrial Press. 								
Supplementary Textbooks	 Research in Engineering Design Int. Journal of Design Engineering 								
Credit	3 ECTS								
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements								
Type of the Course	Elective								
Instruction Language	Turkish								

Course Objectives	Understanding Learning the fa Learning mold Being able to n Learning drillin Learning the E	the impo ectors affe elements nake the ng-cuttin rrors Occ	ortance of sheet metal molds and ecting mold operation, s and their functions, necessary calculations for sheet n g, bending, and drawing mold de curring in Molded Parts and Corr	industry, netal mold design, sign, ection Methods								
Course Learning Outcomes	 Basis of die Better sheet 	e design i t-metal d	s learned. ie designs based on knowledge o	f this course can be learned.								
Instruction Methods	Face to face											
	1. Week	Sheet-r	netal dies: Definition, functions	and industrial importance								
	2. Week	Basic sheet-metal die design										
	3. Week	Factors	Factors affecting die operation									
	4. Week	The theory of sheet metal behavior										
	5. Week	Metal o	cutting/punching dies and their fu	inctions								
	6. Week	Calcula	ations required for cutting and pu	nching dies								
	7. Week	Strip m	aterial placement and efficiency	in cutting and punching dies								
Weekly Schedule	8. Week	Die elements										
	9. Week	Cutting	g and punching mold design									
	10. Week	Bendin	g molds: Bending process and re	lated calculations								
	11. Week	Bendin	g die design and bending die exa	mples								
	12. Week	Drawing dies: Drawing process and related calculations										
	13. Week	Drawing die design and drawing die examples										
	14. Week	Faults in molded parts and methods of eliminating faults										
Teaching and Learning Methods	Weekly theoret: Weekly tutorial Reading Activit Internet browsin Designing and i Report Preparin Preparation of N Final Exam and	ical cours hours: 0 ies: 0 ng, librar mplemen g: 5 Midterm Preparat	se hours: 2 y work: 4 nting materials: 5 and Midterm Exam: 3 tion for Final Exam: 4									
			Numbers	Total Weighting (%)								
	Midtern Even	15	1	40								
	Assignment	.15	1	20								
	Application		1	20								
	Projects											
Assessment Criteria	Practice											
	Quiz											
	Percent of In-t Studies (%)	erm		60								
	Percentage of Exam to Total Attendance	Final Score	1	40								

		Activity	Total Number of	Duratio n (weekly			Total Period Work Load		
	Weekly	Theoretical Course	14			2			28
	Weekly	Tutorial Hours							
	Readin	g Tasks							
	Studies		5			4			20
	Materia Implen	al Design and nentation	2			5			10
Workload	Report	Preparing	2	5			10		
w orkioau	Prepari	ng a Presentation							
	Presentations								
	Prepera Exam	tion for Midterm	1			3			3
	Final E for Fina	xam and Preperation	1			4			4
	Other (emphas	should be sized)							
	Total V	Vorkload	-			-			75
	Total V	Vorkload / 25							75/25
	Course	Credit (ECTS)							3
	No		les	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		Adequate knowledge mathematics, science engineering subjects to the relevant discip ability to use theoret applied information areas to model and sc engineering problem	e in e and pertaining lline; ical and in these olve s.				x		
	2	Ability to identify, fo and solve complex e problems; ability to s apply proper analysis modeling methods fo purpose.	ormulate, ngineering select and s and or this						
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho	omplex ice or ic itions, in et the v to apply ods for this				x		
	4	Ability to develop, so use modern technique tools necessary for a solution of complex in engineering applic ability to use informa- technologies effective	elect and es and nalysis and problems cations; ation ely.		x				

	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.		x			
	6	Ability to work efficiently in intra-disciplinary teams.					
	7	Ability to work efficiently in multi-disciplinary teams.		x			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.			x		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.				x	
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			x		
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.	x				
The Course's Lecturer(s) and Contact Informations		Prof. Dr. İsmail ŞAHİN isahin@gazi.edu.tr					

	Program Outcome 1	Program Outcome2	Program Outcome3	Program Outcome 4	Program Outcome5	Program Outcome6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
TOTAL	4		4	2	2		2	3	4		
Learning outcome 1							1		1		
Learning outcome 2	1		1	1	1				1		
Learning outcome 3	1		2				1	2			
Learning outcome 4	1		1	1					1		
Learning outcome 5	1				1						
Learning outcome 6								1	1		

Course Description Form							
Course Code and Name	ETM341 PSYCHOLOGY IN DESIGN						
Course Semester	5						
Catalog Content	Understanding the dynamics behind behavior and decision-making processes General knowledge and skills about User Experience (UX) and User Interface (UI) design Ability in behavior design in the interaction between humans and the environment						
Textbook	6. Joe Leech, Psychology for Designers: How to apply psychology to web design and the design process, mrjoe press; 2nd edition, 2017.						
Supplementary Textbooks	 9. Aarron Walter, Designing For Emotion, A Book Apart, 2020. 10. Sheena Iyengar, The Art Of Choosing: The Decisions We Make Everyday of our Lives, What They Say About Us and How We Can Improve Them, Abacus, 2011. 						
Credit	3 ECTS						
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements						
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	Gaining competency in understanding the psychological counterparts of the human mind and functions in psychology. Learning fundamental approaches and tools that take into account human behavior to find lasting design solutions to global challenges.						

Course Learning Outcomes	 Understanding of the fundamental psychological processes that govern human behavior, emotions, attitudes, and decision-making. Understanding of the basic aspects of user interface design. Knowledge of basic behavioral and social science methodology and psychometrics, including ethics. Ability to conduct a simple behavioral intervention design. 							
Instruction Methods	Face to face							
	1. Week Introduction to design psychology							
	2. Week	Understanding human behavior and experience						
	3. Week	Emotions, attitudes, and decision-making processes						
	4. Week	Human-technology interaction						
	5. Week	Psychometrics						
	6. Week	Introduction to design	for behavior	change				
Weekly Schedule	7. Week	Design methods for behavior change						
	8. Week	Design ethics						
	9. Week	Emotion mapping						
	10. Week Design for well-being							
	11. Week	11. Week Becoming a savvy consumer of social science						
	12. Week User Experience Design (UX) 12. Week User Experience Design (UX)							
	13. Week	Application						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 3 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4							
			Numbers	Total Weighting (%)	ng			
	Midterm Exan	ns	1	40				
	Assignment		2	20				
	Projects		L	20				
Assessment Criteria	Practice							
	Quiz							
	Percent of In-t	erm Studies		60				
	(%) Demonstrage of Final Exercise Testal							
	Score (%)	rmai Exam to Total		40				
	Attendance							

		Activity		Duration (weekly hour)		Total Period Work Load			
	Weekly Hours	7 Theoretical Course	14	2		28			
	Weekly	Tutorial Hours							
	Reading	g Tasks	5	3			15		
	Studies		5	2			10		
Workload	Materia Implem	I Design and ientation	2	3			6		
	Report Preparing								
	Preparing a Presentation			+		+			
	Midterm Exam and Preperation for Midterm		2	4		8			
	Exam Final Exam and Preperation for Final Exam		2	4			8		
	Other (should be emphasized)					7.5			
	Total Workload		-		-			/ 5 75/25	
	Total Workload / 25			+		3			
	Course	Program Outcomes							
	No	6		1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering							
	2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.							
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho Ability to develop, so use modern techniqu	omplex ice or ic itions, in et the v to apply ods for elect and es and						
		tools necessary for an and solution of comp problems in engineer applications; ability t information technolo effectively.	nalysis blex ring to use ogies						
11	Conformity to ethical	x							
----	--	---	---	---	--				
10	lifelong learning; ability to access information, to follow developments in science and technology, and to continue to								
9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive. Recognition of the need for	x	x						
8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of			X					
7	Ability to work efficiently in multi-disciplinary teams.		x						
6	Ability to work efficiently in intra-disciplinary teams.								
5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.								

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
						6					
TOTAL							2	3	2	1	1
Learning outcome 1							1	1	1		
Learning outcome 2								1	1		
Learning outcome 3							1				
Learning outcome 4								1		1	1

Course Description Form						
Course Code and Name	ETM343 MANUFACTURING TECHNOLOGIES 2					
Course Semester	5					
Catalog Content	Understanding of machining methods Understanding of work and tool molds Understanding of metal shaping methods Understanding of powder metallurgy Ability to manufacture a simple system using the learned methods					
Textbook	 Degarmo, E.P, Black, J.T. and Kohser, R.A. (1997). <i>Materials and processes in manufacturing</i>. USA: Prentice-Hall, Inc, Int. Ed. Boothroyd, G., Knight, W. A. (1989). <i>Fundamentals of machining and machine cutting</i>. New York: Mark Dekker Inc. M.P. Groover, <i>Fundamentals of modern manufacturing</i>, 3rd ed., 2007, Wiley 					
Supplementary Textbooks	 Kalpakjian, S., Schmid, S. R. (2005). Manufacturing engineering and technology. Londra: Pearson, 5th Ed. DeGarmo, E. P., Black, J. T. (2007). Materials and processes in manufacturing. USA: John Wiley & Sons, 10th Ed. 					
Credit	3 ECTS					
Prerequisites of the Course (<i>Attendance Requirements</i>)	No Prerequisites - %70 Attendance Requirements					
Type of the Course	Elective					
Instruction Language	Turkish					
Course Objectives	Learning machining methods Learning modern manufacturing methods Learning high-speed shaping of metals					
Course Learning Outcomes	 Learning basic operations and practical applications Learning turning methods Learning milling methods Learning grinding methods Learning work and assembly molds 					
Instruction Methods	Face to face					

]	
	1. Week	Introduction and ba	asic concepts				
	2. Week	Machining: Turnin	ng method, too	ls, fasteners			
	3. Week	Turning methods a	and application	S			
	4. Week	4. Week Taper turning, screw drawing, spring winding					
	5. Week	5. Week Machining: Milling method tools, fasteners					
	6. Week	Milling methods a	nd applications	5			
Weekly Schedule	7. Week	Simple division, sp	olit division				
weekly Schedule	8. Week	Simple division, split division					
	9. Week	Slotted partition, A	Angular partitio	on			
	10. Week	Machining: Grindi	ng methods (s	anding, grindir	ng, honing,	lapping, etc.)	
	11. Week	Plane grinding, Cy	lindrical grind	ing, Centerless	s grinding		
	12. Week	Tool sharpening ar	nd polishing op	perations			
	13. Week	Binding business p	oatterns				
	14. Week	Assembly Molds					
		I					
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work 5 Designing and implementing materials: 5 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4						
	Midtorm Evon		Numbers	Total Weighting (%)			
	Assignment	115		00			
	Application						
Assassment Criteria	Projects						
Assessment Criteria	Practice						
	Quiz						
	Percent of In-t	term Studies	1	60			
	(%) Percentage of	Final Exam to Total	1	40			
	Score (%)		1				
	Attendance]	

		Activity	Total Number of	Di n (w	ura	ntio kly			Total Period Work Load
	Weekly	Theoretical Course	14	-		2			28
	Weekly	Tutorial Hours							
	Readin	g Tasks							
	Studies		2			7			14
	Materia Implem	al Design and	5			5			25
	Report	Preparing							
Workload	Prepari	ng a Presentation							
	Present	ations							
	Midtern Prepera Exam	n Exam and tion for Midterm	1			4			4
	Final E	xam and Preperation	1			4			4
	Other (should be							
	emphas Total W	vorkload	_			_			75
	Total W	/orkload / 25							75/25
	Course	Credit (ECTS)							3
	No	Program Outcom	nes	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		Adequate knowle mathematics, scie engineering subjects to the relevant ability to use theor applied information areas to model engineering problem Ability to identify, fo and solve complex en- problems; ability to s apply proper analysis modeling methods for purpose. Ability to design a co- system, process, dev product under realist constraints and cond such a way as to mee- desired result; ability	edge in nce and pertaining discipline; retical and a in these and solve s. ormulate, ngineering select and s and or this omplex ice or ic itions, in et the y to apply	x		x			
	4	Ability to develop, se use modern techniqu tools necessary for an solution of complex in engineering applic ability to use informatechnologies effectiv Ability to design and experiments, gather of analyze and interpret examination of engir problems or disciplir research topics.	lect and es and nalysis and problems eations; ation ely. conduct data, results for heering he-specific		x		x		

	6	Ability to work efficiently in intra-disciplinary teams.		x			
	7	Ability to work efficiently in multi-disciplinary teams.				x	
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	x				
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive				x	
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			x		
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.		x			
The Course's Lecturer(s) and Contact Informations		Prof. Dr. Adnan AKKURT aakkurt@gazi.edu.tr					

	Program Outcome 1	Program Outcome 2	Program Outcome 3	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7	Program Outcome 8	Program Outcome 9	Program Outcome 10	Program Outcome 11
TOTAL	1	2	1	2	4	2	4	1	4	3	2
Learning outcome 1	1	1	1		1		1	1	1		
Learning outcome 2		1		1	1		1		1		1
Learning outcome 3			1	1	1				1	1	
Learning outcome 4					1	1	1		1	1	
Learning outcome 5			1				1			1	1

Course Description Form							
Course Code and Name	ETM350 SYSTEMATIC DESIGN 2						
Course Semester 6							
Catalog Content	Preparation and project selection, Introduction to Embodiment Design (ED), ED concepts and issues, ED general rules (clarity, simplicity and safety), ED principles (force distribution, separation of services, self-help, stability and bi-stability, flawless design), ST sample (Impact experimental set). ED example (Impulse-loading test rig).						

Textbook	1. Börklü, H.R. (Turkish trans.), Mühendislik Tasarımı Sistematik Yaklaşım ('Pahl, G., Beitz, W., Feldhusen, J. ve Grote, K.H, Engineering Design: A Systematic Approach, Springer, 2007'), Hatiboğlu Yayınevi, Ankara, 2010.						
Supplementary Textbooks	1. Cross, Nig design. Jo	gel. Engineering design methods: strategies for product hn Wiley & Sons, 2021.					
Credit	3 ECTS						
Prerequisites of the Course (No Prerequisi %70 Attendar	ites nce Requirements					
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	To have knowledge about ED concepts and issues Learning the general rules of ED (clarity, simplicity and safety) Learning the ED Principles Examine and understand ED examples To be able to perform ED of simple systems						
Course Learning Outcomes	 Ability to apply basic principles of forming design Ability to define the components of systems, determine their relationships, and evaluate the interactions between these components Ability to design systems in accordance with engineering standards and methods Ability to understand problems by seeing real-world applications of forming design 						
Instruction Methods	Face to face						
	1. Week	Summary and evaluation of Systematic Design 1 course					
	2. Week	Selection of the term design project					
	3. Week	Embodiment Design (ED): Introduction, Importance, Application					
	4. Week	Concepts and issues of ED					
	5. Week	A checklist for ED, ED General rules: (a) Clarity					
	6. Week	ED General rules: (b) Simplicity, (c) Safety (general)					
	7. Week	(c) Safety (direct, indirect and warnings), Data sheets					
	8. Week	Material selection, Application with the use of ED checklist					
Weekly Schedule	9. Week	Principles of ED: (a) Force transmission (Flow lines of force and uniform strength, Direct and short force transmission path, Matched deformations)					
	10. Week	Balanced forces, (b) Division of tasks (Assignment of Sub-functions, Division of tasks for distinct functions, Division of tasks for identical functions)					
	11. Week	(c) Self-help (Self-reinforcing solutions, Self-balancing solutions, Self-protecting solutions)					
	12. Week	(d) Stability and bi-stability, (e) Fault-free design					
	13. Week	ED example: Impulse-loading test rig					
	14. Week	Examination of design projects					

Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 2 Presentations: 1 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2				
		Numbers	Total Weighting (%)		
	Midterm Exams	1	40		
	Assignment				
	Application				
Assassment Criteria	Projects	1	20		
Assessment Criteria	Practice				
	Quiz				
	Percent of In-term Studies (%)		60		
	Percentage of Final Exam to Total Score (%)		40		
	Attendance				

		Activity	Total Numbe r of	Dur (we hou	•ation ekly r)	L	T Pe W L	'otal eriod /ork oad	
	Weekly	Theoretical Course	14		2		28		
	Weekh	/ Tutorial Hours							
		g Tasks	<u> </u>						
	Studies		5		2			10	
		al Design and	5		2			10	
	Implen Report	Preparing							
Workload	Prepari	ng a Presentation	10		2			20	
	Present	ations	3		1			3	
	Midter	m Exam and	1		2			2	
	Prepera Exam	ation for Midterm							
	Final E for Fina	xam and Preperation	1		2			2	
	Other (should be							
	Total V	Vorkload			-			75	
	Total V	Vorkload / 25					7	5/25	
	Course	Credit (ECTS)						3	
	No	Program Outcom	nes	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effecti solving complex engin problems.	f basic computer- specific lity to use ively in neering		x				
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	rmulate using tience, neering, nt the UN tent Goals.		X				
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet ds; design cesses, nder nd		X				
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, inclu- estimation and modell the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.		x				
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting g data, eting complex		x				

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Prof. Dr. Hüseyin Rıza BÖRKLÜ

rborklu@gazi.edu.tr

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	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5	Outcome6	Outcome7	çıktısı 8	Outcome9	Outcome10	Outcome11
TOTAL	2	2	2	2	2	1					1
Learnin	1	1	1	1	1						1
g											
outcome											
1											
Learnin	1	1									
g											
outcome											
2											
Learnin			1								
g											
outcome											
3											
Learnin				1	1	1					
g											
outcome											
4											

Course Description Form							
Course Code and Name	ETM351 AUTOMATIC CONTROL						
Course Semester	5						

Catalog Content	Learning the definition, importance and application areas of automatic control, mathematical foundations such as differential equations, Laplace Transform, function transformations, basic control concepts such as feedback control, open and closed loop systems, block diagrams, mathematical modeling of dynamic systems and control strategies of these systems by applying them through examples.
Textbook	 Özdağ, N., Dinibütün, A.T., Kuzucu, A. (1998). Otomatik kontrol temelleri. İstanbul: Birsen Yayıncılık. Kuo, B.J. (1999). Otomatik kontrol sistemleri. İstanbul: Literatür Yayıncılık.
Supplementary Textbooks	1. Raven, F. H. (1968). Automatic control engineering. McGraw-Hill.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To teach automatic control subjects and methods. To provide application skills. To give the concept of circuit and system and to be able to apply it. To teach obtaining models of physical systems. To teach how to do system design.
Course Learning Outcomes	 Ability to explain basic concepts about automatic control Ability to apply Laplace Transform and Inverse Laplace Transform to transform functions from time-domain(t) to frequency-domain(s) (or vice versa) Be able to mathematically model dynamic systems and establish system dynamics Ability to show control systems with block diagrams Ability to use the information learned within the course in solving design problems
Instruction Methods	Face to face

	1. Week	Introduction to Autor output, control, distu	natic Control: bance variable	System, control and a es);	automatic control	
	2. Week	Control loop and its c disadvantages of oper	components; C n-loop and clo	closed-loop cont		
	3. Week	Gain, transfer functio	n			
	4. Week	Examine and design	the control loo	pp		
	5. Week	Laplans transform				
	6. Week	Transfer function and	l characteristic	function		
	7. Week	Applications				
Weekly Schedule	8. Week	Experimental studies				
	9. Week	System dynamics				
	10. Week	Electrical and mechan				
	11. Week	Transfer function, blo	n			
	12. Week	Applications				
	13. Week	Controller types				
	14. Week	Experimental studies,	, closed loop c	control		
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutorial Reading Activi Internet browsi Designing and Report preparing Preparing a Pre Presentations: (Preparation of I Final Exam and	tical course hours: 2 l hours: 0 ties: 1 ng, library work: 1 implementing material ng: 0 esentation: 0 0 Midterm and Midterm d Preparation for Final	s: 1 Exam: 2 Exam: 2			
			Numbers	Total		
				Weighting (%)		
	Midterm Exan	ns	1	40		
	Assignment		1	20		
	Application					
Assessment Criteria	Projects					
	Ouiz					
	Percent of In-t	term Studies		60		
Percentage of Final Exam to Total 40						
	Score (%)					
	Attendance					

		Activity	Total Duration Numbe (weekly r of hour)			Total Perio Work Load		
	Weekly	Theoretical Course	14	2				28
	Weekly	/ Tutorial Hours						
	Readin	g Tasks	5	1			5	
	Studies		14		1		1	14
	Materia	al Design and	14		1		1	14
	Implen Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midter	m Exam and	4		2			8
	Prepera Exam	ation for Midterm						
	Final E for Fina	xam and Preperation al Exam	3		2			6
	Other (emphas	should be sized)						
	Total V	Vorkload			-			75
	Total V	Vorkload / 25					7	5/25
	Course	Credit (ECTS)				i		3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and s engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering	X				
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	mulate using vience, neering, nt the UN vent Goals.			X		
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet ds; design cesses, nder nd	x				
	4 Ability to select and use appropriate techniques, resources and modern engineering and information technology tools, including estimation and modelling, for the analysis and solution of complex engineering problems, recognising their limitations.					v	x	
	5	including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	arch, ting g data, eting complex			A		

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate x effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and x
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr

	Program Outcome 1	Program Outcome2	Program Outcome3	Program Outcome 4	Program Outcome5	Program Outcome6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
TOTAL	1	3	1	4	3	1		1	1	2	2
Learning outcome 1	1										1
Learning outcome 2		1		1							
Learning outcome 3		1	1	1	1	1			1	1	
Learning outcome 4				1	1						
Learning outcome 5		1		1	1			1		1	1

Course Description Form							
Course Code and Name	ETM352 DESIGN FOR ADDITIVE MANUFACTURING						
Course Semester	6						

Catalog Content	Additive manufacturing and application areas Materials used in additive manufacturing Additive manufacturing technologies Basic principles of Design for Additive Manufacturing Part consolidation and toptology optimization Part consolidation and generative design Multi-scale structure design
Textbook	 Leary, Martin. Design for additive manufacturing. Elsevier, 2019. Diegel, Olaf, Axel Nordin, and Damien Motte. A practical guide to design for additive manufacturing. Singapore: Springer Singapore, 2019.
Supplementary Textbooks	 Ian Gibson, David Rosen, Brent Stucker "Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing", Springer, 2014 İsmail Şahin, Design for Additive Manufacturing Lecture Notes, 2023
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Explain the industrial application areas of additive manufacturing Evaluate the advantages and limitations of different additive manufacturing technologies Integrating additive manufacturing design and manufacturing processes Developing the ability to work with different materials in additive manufacturing Integrate design for additive manufacturing methods such as topology optimization, generative design and lattice structures into designs Developing innovative solutions to various design and production problems
Course Learning Outcomes	 To have knowledge about the basic concepts and history of additive manufacturing. Application areas of additive manufacturing and materials used are recognized. Understand metallic and non-metallic additive manufacturing technologies. Capabilities and limitations of additive manufacturing technologies can be assessed. Strategic and functional design principles can be applied to additive manufacturing. Multi-scale and multi-material design approaches can be integrated and applied.
Instruction Methods	Face to face

	1. Week	Introduction to addit history	ive manufactı	aring: Definitio	ons and			
	2. Week	Application areas of	additive man	ufacuring				
	3. Week	Materials used in ad-	ditive manufa	cturing				
	4. Week	Metal additive manu	facturing and	technologies				
	5. Week	5. Week Non-metallic additive manufacturing and technol						
	6. Week	Additive manufacturing technologies: Capabilities and Limitations						
Weekly Schedule	7. Week	Strategic design con	siderations for	r Additive mar	nufacturing			
	8. Week	Basic principles of I (DfAM)	Design for Add	litive Manufac	cturing			
	9. Week	Methods and tools o	f the DfAM a	pproach				
	10. Week	Part consolidation a	nd topology op	otimization				
	11. Week	Part consolidation and generative design						
	12. Week	Multi-scale structure design						
	13. Week	13. Week Multi-material design and part assembly						
	14. Week	14. Week Lattice structures						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 4 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 0 Presentations: 2 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 5							
			Numbers	Total Weighting				
	Midterm Exan	ns	1	40				
	Assignment							
	Application		1	20				
Assessment Criteria	Practice		1	20				
	Quiz							
	Percent of In-t	erm Studies		60				
	(%) Percentage of	Final Exam to Total		40				
	Score (%)			U F				
	Attendance							

		Activity	Total Numbe r of Weeks	Dur (we hou	•ation ekly r)	l	To l Pe d	ota rio or
	Weekly	Theoretical Course	14	14 2			2	.8
	Weekly	Tutorial Hours						
	Reading	g Tasks	5		3		1	5
	Internet	t Studies, library	4	4			1	6
	Materia Implem	al Design and						
Workload	Report	Preparing						
	Prepari	ng a Presentation						
	Present	ations	4		2			8
	Midterr Prepera Exam	n Exam and tion for Midterm	1		5			5
	Final E for Fina	xam and Preperation al Exam	1		5		3	
	emphas	should be bized)						
	Total W	Vorkload	-		-		75	
	Total W	Vorkload / 25				75/25		
	Course	Credit (ECIS)				1		5
	No		les	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to						X	
	2	Ability to identify, for and solve complex en problems; ability to s apply proper analysis modeling methods for purpose.	ormulate, ngineering select and s and or this			X		
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer	omplex ice or ic itions, in et the v to apply ods for elect and es and nalysis blex ring		x			X
		applications; ability t information technolo effectively.	to use ogies					

						5	Ability to d experiments analyze and for examina problems or research top	esign and co s, gather dat l interpret re ation of engi r discipline- pics.	onduct ta, esults ineering specific			X						
						6	Ability to w intra-discip	vork efficier linary teams	ntly in a s.	Σ								
						7	Ability to w multi-discip	vork efficier olinary team	ntly in Is.									
						8	Ability to c effectively orally and i knowledge	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of										
-					9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.												
						10	Recognition lifelong leat access infor developmen technology.	n of the need rning; abilit rmation, to f nts in scienc and to cont	d for y to follow e and tinue to									
						11	Conformity principles, j ethical resp Information in engineer	to ethical professional onsibility; on standar ing applicat	and ds used ions.			X						
	The Cont	Course's I tact Inforn	Lecturer(s) nations	and		Pro	of. Dr. İsmail hin@gazi.edu	Şahin 1.tr										
		Program Outcome	Program Outcome2	Program Outcome	Program Outcome4	Program Outcome	Program Outcome6	Program Outcome	Program çıktısı 8	Pro Ou	ogran itcom	ı l	Progra Outcon	m ne10	Program Outcome			
TOTAL		4	3	3	5	5 3	1	7	4	9					3			
Learning outcome	g 1				1	1												
Learning outcome	ing 1 1 1 1 1 1 1					1	1					1						
Learning outcome	ing 1 1 1																	
Learning outcome	g 4		1			1	1		1	1								
Learning	g 5	1	1	1	1	1			1	1					1			
Learning outcome	tcome 5 1 arning 1 tcome 6 1					1	1					1						

	Course Description Form
Course Code and Name	ETM353 MODELMAKING AND PROTOTYPING
Course Semester	5
Catalog Content	Basic modeling skills Determination of the techniques used in the process of transforming product designs into physical models Ability to select and use different modeling techniques Creating models with functional properties
Textbook	3. Hallgrimsson, B. (2012). <i>Prototyping and modelmaking for product design</i> . China: Laurence King Pub, Int. Ed.
Supplementary Textbooks	 Direct-Write Technologies for Rapid Prototyping Applications : Sensors, Electronics, and Integrated Power Sources
Credit	3 ECTS
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To learn basic modeling techniques To have knowledge about transforming design concepts into physical models Learning rapid prototyping techniques
Course Learning Outcomes	 Gain knowledge of basic modeling techniques to meet current needs for engineering design. Learn the techniques used in the process of transforming complex product designs into physical models under different constraints and conditions. 3Develop the ability to select and use appropriate modeling techniques for engineering design. Gain knowledge about the effects of modeling techniques on health and safety, economy, sustainability and environment.
Instruction Methods	Face to face

		General i	information about the aim.	content and evaluation methods							
	1. Week	of the co	urse								
	2. Week	The role	of modeling and prototypin	g in design engineering							
	3. Week	Basic mo	odeling tools and materials								
	4. Week	Introduct	tion to model making: Selec	tion of materials and tools, health and sa	fety rules.						
	5. Week	Introduct scale and	tion to model making: Model assembly technical inform	el planning and design process, scaling, c ation.	hoosing th						
	6. Week	Simple modeling techniques: Cardboard, model cardboard, etc. model make									
Weekly Schedule	7. Week	Simple n	nodeling techniques: Model	making with cardboard, model cardboar	d, etc.						
	8. Week	Simple n	Simple modeling techniques: Model making with balsa								
	9. Week	Simple n	nodeling techniques: Model	making with balsa							
	10. Week	Simple n	nodeling techniques: Foam	naterials, gluing and filling materials							
	11. Week	Simple n	nodeling techniques: Foam	naterials, gluing and filling materials							
	12. Week	Design and construction of models with functional features									
	13. Week	Use of 31	Use of 3D printers and rapid prototyping techniques								
	14. Week	Surface t	Surface treatment and detailing								
Teaching and Learning Methods	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 0 Report preparing: 2 Preparation of presentation: 3 Presentation: 2 Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 4										
			Numbers	Total Weighting (%)							
	Midterm Exan Assignment	18	1	30							
	Application Projects		1	30							
Assessment Criteria	Practice		1								
	Quiz										
	Percent of In-t	erm		60							
	Studies (%)	F '1									
	Fercentage of	Final Score		40							
	Attendance	~~~~~									
			1	i							

		Activity	Total Number of	D n (v	ura vee	ntio kly)		Total Period Work Load
	Weekly Hours	Theoretical Course	14			2			28
	Weekly	7 Tutorial Hours							
	Readin	g Tasks							
	Studies	Dasian 1	8			2			16
	Implem	n Design and nentation							
Workload	Report	Preparing	5			2			10
workioau	Prepari	ng a Presentation	4			3			12
	Present	ations n Exam and	1			2			2
	Prepera Exam	tion for Midterm	1			3			3
	Final E for Fina Other (xam and Preperation al Exam should be	1			4			4
	emphas	sized)							
	Total V	Vorkload	-			-			75
	I otal V	Credit (ECTS)		-					2/5/25
		Program Outcom	nes		_	_		_	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1 2 3	In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems. Ability to identify, for analyse complex engi problems using knowl basic science, mathem engineering, and takin account the UN Susta Development Goals. Ability to generate creas solutions to complex of problems to meet curr	f basic computer- specific lity to use ively in neering rmulate and neering ledge of natics and og into inable eative engineering rent and		x	3		5	
	4	future needs; design c systems, processes, de products under realist constraints and condit Ability to select and u appropriate technique and modern engineeri information technolog including estimation a modelling, for the ana solution of complex e problems, recognising limitations.	omplex evices or ic ions. use s, resources ng and gy tools, und lysis and ngineering g their	x					

	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.	x		
	6	Knowledge of the effects of engineering practices on society, health and sofety, economy	x		-
	7	Acting in accordance with the ethical principles of the engineering profession,			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).			
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).			
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.	x		
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			
The Course's Lecturer(s) and Contact Informations		Head of Department tasarim@gazi.edu.tr			

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	outcome1	outcome2	outcome3	outcome4	outcome5	outcome6	outcome7	outcome8	outcome9	outcome10	outcome11
TOTAL			2	1	1	1				1	
Learning			1								
outcome											
1											
Learning			1								
outcome											
2											
Learning				1	1						
outcome											
3											
Learning						1				1	
outcome											
4											1

Course Description Form					
Course Code and Name	ETM354 AUTOMOTIVE DESIGN				

Course Semester	6
Catalog Content	History of vehicle architecture in design Gain an overview of the automotive design process Learning about systems and market segments Learning motion transmission systems Basic aerodynamic body design Identify safety and accident regulations
Textbook	Macey, S., Wardle, G., The Fundamentals of Car Design and Packaging, Design Studio Press, 2009
Supplementary Textbooks	Hoadley, F.E., Automobile Design Techniques & Design Modeling: The Men, the Methods & the Materials, T a H Productions, 1999
Credit	3 AKTS
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Learning automotive design processes Basic knowledge for a good automotive design provided Learning product development and conceptual design processes
Course Learning Outcomes	 Learn how to effectively use computer-aided computing and in-depth knowledge of the automotive industry to solve complex engineering problems. Learn to design complex systems, processes, devices or products under realistic constraints and conditions. To be able to select and use appropriate techniques, resources, and modern engineering and information technology tools for the analysis and solution of complex engineering problems. To be able to work effectively as a team member or leader, both individually and in interdisciplinary teams.
Instruction Methods	Face to face

	1. Week	Introduction - History	of vehicle ar	chitecture in de	sign					
	2 Week	Overview of the desig	n process							
	2. WCCK	Functional objectives	Sustama and	markat sagma	nta					
	3. Week	Functional objectives,	, systems and	market segme	ins					
	4. Week	Size and proportion								
	5. Week	Interiors and cargo								
	6. Week	Movement transfer lin	ne							
	7. Week	Wheels and tires								
Weekly Schedule	8. Week	Suspension and Chassis								
	9. Week	Body	Body							
	10. Week	Aerodynamics								
	11. Week	Safety and accident re	gulations							
	12. Week	Portability								
	13. Week	Design exercises								
	14. Week	A general design assignment								
		1								
	Weekly theoretical course hours: 2									
Teaching and Learning Mathads	Weekly tutorial hours: 0									
Teaching and Learning Methous	Reading Activities: 1									
(These are examples. Please fill which	Internet browsing, library work: 4									
activities you use in the course)	Designing and	implementing materials	: 6							
	Report prepari	ng: 4								
	Prenaring a Pre	esentation: 0								
	Presentations:	0								
	Preparation of	• Midterm and Midterm F	Fxam: 5							
	Final Exam an	d Preparation for Final F	Exam: 5							
			Numbers	Total						
			1 (unioers	Weighting						
	Midterm Exa	ns	1	60						
	Assignment									
	Application Projects									
Assessment Criteria	Practice									
	Quiz									
	Percent of In-term Studies 60									
	(%) Percentage of Final Exam to Total 1									
	Score (%)		-							
	Attendance									

		Activity	Total Number of	D n (w	ura veel	tio kly			Total Period Work Load
	Weekly Hours	Theoretical Course	14			2			28
	Weekly	Tutorial Hours							
	Readin	g Tasks	5			1			5
	Studies	1.0.1	3			4			12
	Implem	entation	2			6			12
Workload	Report	Preparing	2			4			8
WORKIDAU	Prepari	ng a Presentation							
	Midter	n Exam and							
	Prepera Exam	tion for Midterm	1			5			5
	Final E for Fina	xam and Preperation al Exam	1			5			5
	Other (should be							
	Total W	Vorkload							75
	Total W	/orkload / 25							75/25
	Course	Credit (ECTS)			1				3
	No	Program Outcom	ies	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	Adequate knowledge mathematics, science engineering subjects to the relevant discip ability to use theoreti applied information i areas to model and so engineering problem	e in e and pertaining line; ical and in these olve s.	x					
	2	Ability to identify, fo and solve complex er problems; ability to s apply proper analysis modeling methods fo purpose.	ormulate, ngineering select and s and or this						
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho	omplex ice or ic itions, in et the to apply ods for this	х					
	4	Ability to develop, so use modern techniqu tools necessary for a solution of complex in engineering applic ability to use informa technologies effectiv	elect and es and nalysis and problems cations; ation ely.	х					
	5	Ability to design and experiments, gather of analyze and interpret examination of engir problems or disciplir research topics.	l conduct data, results for neering ne-specific						

	6	Ability to work efficiently in intra-disciplinary teams.			
	7	Ability to work efficiently in multi-disciplinary teams.			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	x		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.			
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.			
The Course's Lecturer(s) and Contact Informations		Assoc. Prof. Dr. Harun Gökçe harungokce@gazi.edu.tr	1	 1	

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL	1		1	1				1			
Learning outcome 1	1										
Learning outcome 2			1								
Learning outcome 3				1							
Learning outcome 4								1			

Course Description Form							
Course Code and Name	ETM232 ENGINEERING MATERIALS						
Course Semester	4						
Catalog Content	Classification of engineering materials Steel, cast iron types and uses. Heat treatments of metals and alloys. Non-ferrous metals and their use. Types, properties and manufacturing methods of ceramics, polymers and composite materials. Material selection in engineering design.						
Textbook	 Wadhwa, A. S., Dhaliwal, E. H.S. (2008). A textbook of engineering material and metallurgy. India: Firewall Media. Rajput, R. K. (2008). Engineering material. New Delhi: S. Chand & Company. 						
Supplementary Textbooks	1. Callister, W. (2018). Material science and engineering. USA: Wiley.						
Credit	3 ECTS						
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements						
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	Introducing the basic properties of engineering materials and the material properties of atomic size, Teaching the relationships between physical, metallurgical and mechanical properties of materials, Ensuring understanding of the basic principles in material selection. Contributing to the material selection methodology and correct material selection in the design process of an industrial product.						
Course Learning Outcomes	 Students taking this course will be introduced to the physical and mechanical properties of materials, heat treatment, phase diagrams, etc. learns the subjects. Gains information about the general properties of engineering materials. Can create the function-purpose and constraints cycle in product design and determine the general properties of the required material. Knows the material selection methodology and can select materials using the necessary data sources. Can observe the behavior of the selected material according to the product and environment. 						
Instruction Method	Face to face						

						-			
	1. Week	Materials and Desig and Material Select	gn, Developn tion	nent of Engin	eering Ma	terials, Indu			
	2. Week	Engineering Materi Hybrid Materials, F	ial Family, M Functional Cl	ics, Polyn f Material					
	3. Week	Material Design and components, Produ	d Selection, I ct Function I	1 Selection, Design Principles and S ct Function Definition and Loading					
	4. Week	Material Properties Selection and Data	and Manufa Sources	, Reverse Ei					
	5. Week	Properties of metals	s and alloys						
	6. Week	Effect of alloying e	lements on th	ne properties	of steels				
Weekly Schedule	7. Week	Usage, types and co	1.						
	8. Week	Non-ferrous metal	and alloys						
	9. Week	Ceramic materials,	production a	nd application	ns				
	10. Week	Polymers production	on and applic	ations					
	11. Week	Composite material	Composite materials production and applications						
	12. Week	Damage to material	Damage to materials. Damage sources and prevention						
	13. Week	13. WeekDamage in materials, their sources and prevention (or adhesion wear)							
	14. Week	Case studies on material selection in industrial products							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: (Preparation of Final Exam and	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 1 Internet browsing, library work: 2 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2							
			Numbers	Total					
				Weighting					
	Midterm Exan	ns	1	40					
	Assignment		1	20					
	Application								
Assessment Criteria	Practice								
	Quiz								
	Percent of In-t	term Studies		60					
	(%)	E'. 1 E		40					
	Percentage of Score (%)	Final Exam to Total		40					
	Attendance								

		Activity	Total Duration Numbe (weekly r of hour)		l	T Pe W Lo	otal criod ork oad		
	Weekly	Theoretical Course	14	2				28	
	Weekly	/ Tutorial Hours							
	Readin	g Tasks	7		1			7	
	Studies		14		2			28	
	Materia	al Design and							
	Report	Preparing							
Workload	Prepari	ng a Presentation							
	Present	ations							
	Midtern Prepera Exam	m Exam and ttion for Midterm	3		2			6	
	Final E for Fina	xam and Preperation	3		2			6	
	emphas	should be sized)							
	Total V	Vorkload	-		-			75	
	Total V	Vorkload / 25					75/25		
	Course	Credit (ECTS)			1	1		3	
	No	Program Outcom	ies	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering						
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm			x				
	3	Ability to generate cro solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet eds; design cesses, nder nd					x	
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, incl- estimation and model the analysis and soluti complex engineering recognising their limit	nse s, mation uding ling, for ion of problems, tations.			X			
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting gg data, eting complex	X					

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the x ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life x practices such as project management and economic x feasibility analysis; awareness of entrepreneurship and x
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Bölüm Yönetimi tasarim@gazi.edu.tr

	Program Outcome	Program Outcome2	Program Outcome3	Program Outcome	Program Outcome5	Program Outcome6	Program Outcome	Program çıktısı 8	Program Outcome	Program Outcome10	Program Outcome11
	1			4			7		9		
TOTAL		3	5	3	1	4	1	2		3	1
Learning outcome 1		1	1	1	1						
Learning outcome 2		1	1	1		1				1	
Learning outcome 3			1	1		1				1	
Learning outcome 4			1			1	1	1			
Learning outcome 5		1	1			1		1		1	1

Course Description Form									
Course Code and Name	ETM234 SEMIOLOGY AND SEMANTICS IN DESIGN								
Course Semester	4								
Catalog Content	Interpretation skills of the symbolic qualities of design objects. Ability to apply the semiotic analysis process to products. Recognition of basic concepts and understanding the meaning of products. Ability to understand the relationship between the mental representations of products and the real world. Understanding the relationship between the representation and use of products. Ability to understand user and culture relationships. Understanding the cultural role of products. Application skills of design behaviors based on semantics. Ability to analyze different design movements.								
Textbook	 Hjelm, S.I., Semiotics in Product Design, Technical Report, Royal Institute of Technology, Stockhom, Sweden, 2002. Krippendorff, K. (2005). The semantic turn: A new foundation for design. crc Press. 								
Supplementary Textbooks	 Silverman, K., The subject of Semiotics, New York: Oxford University Press, 1983 								
Credit	3 ECTS								
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements								
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	Learning about signs and semantics in design, and gaining the ability to apply them. Understanding the impact of signs on users and understanding the methodology of semiotics. Gaining the ability to implement design.								
Course Learning Outcomes	 Developing the ability to understand basic concepts in semantics and perform semiotic analysis. Providing the ability to understand and interpret the interaction between mental processes and the real world. Acquiring the ability to understand and evaluate user behaviors along with cultural interactions. Developing a general understanding of the evolutionary processes of design and different design movements. 								
Instruction Methods	Face to face								

	1. Week	1. Week Introduction and basic concepts						
	2. Week	Semiotic nature of de	sign objects					
	3. Week	Semiotic analysis pro	cess of indust	rial products				
	4. Week	Conceptual prerequisi	ites for produc	et semiotics				
	5. Week	Mental-real world relation of proc	ationship in pi luct types	roduct semiotic	cs and			
	6. Week	Concept of product, p	roduct appear	ance				
	7. Week	Product image conten product meaning	t, information	related to the	product,			
	8. Week	Functional and semantic structure of the human-object- society system						
Weekly Schedule	9. Week	Specific contents of in terms, product meaning	nformation, m ng profile	eaning, and ex	pression			
	10. Week	Semantic structure of culture group relation	product imag ship	e, company im	age, user			
	11. Week	Expressiveness and exproduct context and c	xpression forn ategorization	ns in the desig	n process,			
	12. Week	Readability and condi based on product sem	itions of objec iotics	ts, design beha	aviors			
	13. Week	Semantic resolution of form elements, semantic resolutio of product appearance						
	14. Week	Design behaviors, movements, trends, and styles explained semiotically						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 3 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4							
			110110715	Weighting				
	Midterm Exan	ns	1	40				
	Assignment		1	20				
	Application							
Assessment Criteria	Projects							
Assessment Crittia	Practice							
	Quiz							
	Percent of In-	erm Studies		60				
	(%) Percentage of	Final Exam to Total		40				
	Score (%)	i mai enam io 10tai		40				
	Attendance							

		Activity	Total Numbe r of Weeks	Duration (weekly hour)			T Pe W Lo	otal riod ork oad
	Weekly Hours	7 Theoretical Course	14	2				28
	Weekly Tutorial Hours							
	Reading Tasks		5		3			15
	Studies	5		2			10	
Workload	Materia Implem	al Design and mentation	2	3				6
	Proport	r reparing						
	Present	ations						
	Midtern Prepera	n Exam and tion for Midterm	2		4			8
	Exam Final E for Fina	xam and Preperation al Exam	2		4			8
	Other (emphas	should be sized)					ļ ,	75
	Total Workload		-	-			74	, <i>5</i> 5/2.5
	Course	Credit (ECTS)					/-	3
	No Program Outcom		nes	1	2	2	1	5
				1	4	3	4	3
Contribution Level Between Course Learning Outcomes and Program Outcomes		Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applic information in these model and solve eng	e in e and vant use ed areas to ineering	X				
	2	Ability to identify, for and solve complex en problems; ability to s apply proper analysis modeling methods for purpose.	ormulate, ngineering select and s and or this	x				
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for						
	4	Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer applications; ability to information technolo effectively.	elect and es and nalysis blex tring to use ogies	X				

	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.		X		
	6	Ability to work efficiently in intra-disciplinary teams.	X			
	7	Ability to work efficiently in multi-disciplinary teams.	X			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.				
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.				
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to				
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.				
The Course's Lecturer(s) and Contact Informations	Prof	. Dr. İsmail Şahin				
Contact Informations	isah	in@gazi.edu.tr				

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome 6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
TOTAL	1	1	2	1	2	1	1				
Learning outcome 1	1				1						
Learning outcome 2		1	1								
Learning outcome 3						1	1				
Learning outcome 4			1	1	1						

Course Description Form											
Course Code and Name	ETM236 FO	RM MATERIAL AND FUNCTION									
Course Semester	4										
Catalog Content	To be able to function and to To be able to process To be able to methods and a	b have knowledge about basic issues such as material properties, design user needs, factors affecting product design and creative design process o comprehend the relationship between material selection and design to understand various types of materials, forming techniques, joining application examples									
Textbook	 Grillo, P.J. Ashby, M. materail se 	(2010). Form, function and design. New York: Dover Pub. and Johnson, K. (2010). <i>Materials and design – The art and science of</i> election in product design. USA: B-H Pub.									
Supplementary Textbooks	1. Elder, W CRC Pres	. Elder, W.E. ve Hosnedl, S., Design Engineering: A Manual for Enhanced Creativity, CRC Press, Int. Edition, 2008.									
Credit	3 ECTS	ECTS									
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70									
Type of the Course	Elective										
Instruction Language	Turkish										
Course Objectives	To be able to production m Creating com Developing ic To gain the al	To be able to analyze the relationship between form, function, material selection and production methods in design Creating composition using formal elements of design Developing ideas and manual skills to solve basic design problems Fo gain the ability to provide balance in material selection and design process									
Course Learning Outcomes	 To be able application To gain a d 3. Ability to a encourage Ability to a design pro Understand produce in 	to produce creative solutions to design problems by examining sample as in industrial design different perspective on the problems encountered in the design process understand the role of innovative materials in the design process and to innovation in design. develop harmonious designs by balancing form, material and function in the cess. ding how materials and design processes affect each other and the ability to novative solutions using this relationship.									
Instruction Methods	Face to face										
	1. Week	Design engineering profession and professional ethics									
	2. Week	The meaning and importance of design									
	3. Week	Historical development of design									
	4. Week	Problem solving and communication skills									
	5. Week	Problem solving and communication skins									
	7 Week	Principles of design									
Washley Cabadada	7. Week	Beginner design process									
weekiy Schedule	9. Week	Analyze simple part designs									
	10. Week	Part-level design									
	11. Week	Simple part design applications									
	12. Week	Analyzing simple system designs									
	13. Week	System-level design									
	14. Week	Simple system design applications									

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 6 Internet browsing, library Designing and implement Report preparing: 3 Preparing a Presentation: Presentations: 0 Preparation of Midterm an Final Exam and Preparation Other:0	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 6 Internet browsing, library work: 4 Designing and implementing materials: 4 Report preparing: 3 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3 Other:0 Numbers Total Weighting (%)											
				Numbers		r.	Total Wei	g (°					
	Midterm Exams Assignment Application			1 1 1			40 20						
Assessment Criteria	Projects												
	Ouiz											-	
	Percent of In-term							60					
	Studies (%)												
	Percentage of Final Exam	to Total						40					
	Attendance											-	
			Activity				Duration (weekly hour)	Duration weekly 10ur)			Tota Perio Wor Load		
		Weekly	The	oretical Course	14		2			28			
		Weekly	Tute	orial Hours			1						
		Reading	g Tas	sks	2		6			12			
		Studies			2		4			8			
		Material Des		sign and	3		1			17			
		Implem	enta	tion ·					_		12	, 	
Workload		Report I	Prep	aring	2		3				6		
		Preparir	$\frac{1g a}{r}$	Presentation					+			_	
		Presentation		is om and					_				
		Preperat Exam	tion	for Midterm	2		3			6			
		for Fina	<u>l Ex</u>	am	1		3			3			
		Other (shou	ild be									
		Total W	orkl	oad					+		75		
		Total W	orkl	oad / 25						7	75/2	25	
		Course	Cred	lit (ECTS)							3		
		No		Program Outcom	es			1	2	3	4	5	
		1	In-d scie	epth knowledge o nce, basic enginee	f mathen ring con	nati cep	cs, ts,	X		5	-	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		computer-aided comp engineering areas; abi knowledge effectively			outing and specific ility to use this y in solving complet		ecific nis complex						
		2	Abi	lity to identify, for	mulate a	ind	analyse			x	\uparrow	\neg	
			com	plex engineering j	problems using								
			knowledge of basic science and engineering, and taking			mathematics							
			the	UN Sustainable Development Goals.									
			Abil com	lity to generate cre	ative sol	lutio s to	ons to meet				2	۲	
		current and future needs; design complex systems, processes, devices or products											
--------------------------------------	-------------	--	---	---	--								
		under realistic constraints and conditions.											
	4	Ability to select and use appropriate		x									
		techniques, resources and modern											
		engineering and information technology											
		tools, including estimation and modelling,											
		for the analysis and solution of complex											
		engineering problems, recognising their											
		limitations.											
	5	Ability to use research methods, including											
		literature search, designing and conducting											
		experiments, collecting data, analysing and											
		interpreting results, to investigate complex											
		engineering problems.											
	6	Knowledge of the effects of engineering		X									
		economy sustainability and environment											
		within the framework of the UN											
		Sustainable Development Goals: awareness											
		of the legal consequences of engineering											
		solutions.											
	7	Acting in accordance with the ethical	x										
		principles of the engineering profession,											
		awareness of ethical responsibilities;											
		awareness of non-discrimination,											
		impartiality and embracing diversity.											
	8	Ability to work effectively as a team											
		member or leader both individually and											
		within interdisciplinary teams (face-to-											
		A hility to communicate offectively on		-									
	9	Addity to communicate effectively on											
		taking into account the various differences											
		of the target audience (e.g. education											
		language, profession).											
	10	Knowledge of business life practices such	x										
	10	as project management and economic											
		feasibility analysis; awareness of											
		entrepreneurship and innovation.											
	11	Ability to learn independently and		x									
		continuously, to adapt to new and emerging											
		technologies and to think inquisitively											
		about technological changes.											
The Course's Lecturer(s) and Contact	Hea	d of Department											
Informations	<u>tasa</u>	rim@gazi.edu.tr											

	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome
	1	2	3	4	5	6	7	8	9	10	11
TOTAL	2	4	5	3		3	1			2	3
Learning outcome 1	1	1	1	1							1
Learning outcome 2	1	1	1			1				1	1
Learning outcome 3		1	1								
Learning outcome 4		1	1	1		1					
Learning outcome 5			1	1		1	1			1	1

	Course Description Form							
Course Code and Name	ETM238 COMPUTER GRAPHICS							
Course Semester	4							
Catalog Content	Application areas of computer graphics include line and curve drawing, polygon drawing, polygon painting, transformations (translation, rotation, scaling, reflection, shifting), 2-D view, line clipping, polygon cropping, 3-D view, parallel and perspective projection, 3D clipping, visible surface detection, lighting, ray tracing, parametric curves and surfaces, animation.							
Textbook	 Fleet, D. and Hertzman, A., Computer Graphics Lecture Note Computer Science Dept., University of Toronto, Canada, 2006. Shirley, P. and Marschner, S., Fundementals of Computer Graphics, Taylor & Francis Group, Int. Ed., 2010. 							
Supplementary Textbooks	Journal of Computer Graphics Techniques Computer & Graphics - Journal							
Credit	3 ECTS							
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements							
Type of the Course	Elective							
Instruction Language	Turkish							
Course Objectives	To teach introductory level the theory and application of computer graphics To gain application skills To be able to design various graphic design applications and finalize them in a computer environment ready for printing							
Course Learning Outcomes	 Knowledge of computer graphics (drawing, transformations, view, lighting, rendering). Ability to design computer graphics software under realistic constraints and conditions, using theoretical and applied knowledge in these fields. Ability to find, select and use modern tools and techniques necessary to design and implement computer graphics environments. Gaining application skills on the practical aspects of the subjects. Ability to work effectively individually and in interdisciplinary teams. 							
Instruction Methods	Face to face							

	1. Week Introduction to charting								
	2. Week	Curves							
	3. Week	Conversions							
	4. Week	Coordinate independent geometry							
	5. Week	3D objects							
	6. Week	Camera models							
	7. Week Basic lighting and reflection								
Weekly Schedule	8. Week	Shading							
	9. Week	Texture overlay							
	10. Week	Basic ray tracing, ra	ay metering a	and projection	1				
	11. Week	Diffused ray tracing	g, interpolatio	on					
	12. Week	Parametric curves a	nd surfaces						
	13. Week	Animation							
	14. Week	Animation							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2								
Assessment Criteria	NumbersTotal Weighting (%)Midterm Exams140Assignment120ApplicationProjectsPracticeQuizPercent of In-term Studies(%)Percentage of Final Exam to TotalSource (%)								
	Attendance								

		Activity	Total Numbe r of	Dun (we hou	ation ekly r)	T Pe W Lo	otal criod ork oad	
	Weekly	Theoretical Course	14		2			28
	Weekly	7 Tutorial Hours						
	Readin	g Tasks						
	Studies		9		1			9
	Materia	al Design and	10		2			20
	Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midtern Prepera Exam	m Exam and ation for Midterm	5		2			10
	Final E for Fina	xam and Preperation al Exam	4		2			8
	emphas	snould be sized)						
	Total V	Vorkload	-		-			75
	Total V	Vorkload / 25					75	5/25
	Course	Credit (ECTS)						3
	No		105	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	1 In-depth knowledge of mathematics, science, basic engineering concepts, computer- aided computing and specific engineering areas; ability to use this knowledge effectively in solving complex engineering problems			x			
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	rmulate using cience, neering, nt the UN nent Goals.	x				
	3	Ability to generate crossolutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet eds; design cesses, nder nd			X		
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, incl- estimation and model the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.			x		
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting ug data, eting complex					

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid). x
	9 Ability to communicate x effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and x
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr

	Program Outcome 1	Program Outcome2	Program Outcome3	Program Outcome 4	Program Outcome5	Program Outcome6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
TOTAL	2	1	3	3		1	1	3		2	2
Learning outcome 1	1		1	1			1				
Learning outcome 2	1	1	1	1				1			
Learning outcome 3			1	1		1					
Learning outcome 4								1	1	1	1
Learning outcome 5								1	1	1	1

	Course Description Form						
Course Code and Name	ETM240 DESIGN CULTURE						
Course Semester	4						
Catalog Content	Ability to comprehend the visual language and differences of art and design and aesthetic sensitivity and reflect them on their designs Ability to focus on the cultural relationship between design and consumption Ability to understand and convey the cultural context of design Ability to evaluate consumption products as part of the culture created in society						
Textbook	1. Barnard, M., Sanat, Tasarım ve Görsel Kültür, 2002, Ütopya Yayınları						
Supplementary Textbooks	1. Julier, G., The Culture of Design, SAGE Publications, 2013.						
Credit 3 AKTS							
Prerequisites of the Course (Attendance Requirements)	No Prerequisites - %70 Attendance Requirements						
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	Understanding the cultural context of design from past to present To have knowledge about the development of cultural elements To learn the ability to comprehend the visual language and differences of art and design and aesthetic sensitivity and to reflect them on their designs To learn the steps in the development process of culture and design						
Course Learning Outcomes	 Have knowledge about the basic concepts, elements and principles of visual communication design and communication To have knowledge about the visual language and differences of art and design and aesthetic sensitivity and reflection on design. Steps in the development process of culture and design, analysis of production and technical processes are learned. Comprehension of national and universal values; understanding of design from national to universal is learned. To be able to adapt to new and emerging technologies and to have knowledge about the process of questioning thinking about technological changes. 						
Instruction Methods	Face to face						

	1. Week	The concept and theorem	ry of culture						
	2. Week	Cultural content, relat evolution	tions and proc	esses, biologic	al				
	3. Week	Renaissance and enlig	ghtenment phi	losophy					
	4. Week	Democratization Mov effects	ements, Frend	ch Revolution	and its				
	5. Week	Traditions and innova	tions of the ea	arly modern pe	eriod				
	6. Week	From image to image	in the modern	n period					
	7. Week	Participation in mode	rn art and desi	ign					
	8. Week	From equality to pluralism in the modern era							
Weekly Schedule	9. Week	Modern period spaced	craft aesthetics	s					
	10. Week	Postmodern era indivi	idualism						
	11. Week	Postmodern design ar	nd technology						
	12. Week	Economic, social, ind developments	ustrial and tec	chnological					
	13. Week	The impact of new modesign and economic	odes of produce relations	ction on societ	y, art,				
	14. Week	The contribution of art and design to urban culture and the cultural cycle							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library work: 3 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 2 Presentations: 2 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3								
			Numbers	Total Weighting					
	Midterm Ever	ns	1	(%)	{				
	Assignment	115	1	30	-				
	Application				1				
Assessment Criteria	Projects]				
	Practice				-				
	Quiz	Cto 1			-				
	Percent of In-1	term Studies		60					
	Percentage of	Final Exam to Total		40					
	Score (%)				-				
	Attendance								

		Activity	Total Number of Weeks	D (w ho	ura veel our	itio kly)	n		Total Period Work Load
	Weekl	y Theoretical Course	14			2			28
	Hours Weekl	v Tutorial Hours							
		g Tasks	5			2			10
	Studies	5	5	3				15	
	Materi and	al Design							
Workload	Report	Preparing							
() of month	Prepar	ing a Presentation	5			2			10
	Presen	tations	3			2			6
	Preper	m Exam and ation for	1			3			3
	Final E Prepera	Exam and ation for Final	1			3			3
	Other (be emp	(should bhasized)							
	Total Workload								75
	Total V	Workload / 25					75/25		
	Course	Credit (ECTS)			-			1	3
	No	Program Outcom	ies	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		In-depth knowledge mathematics, science engineering concepts computer-aided comp specific engineering ability to use this kno effectively in solving engineering problem	of e, basic s, puting and areas; owledge g complex s.						
	2	Ability to identify, for and analyse complex engineering problem knowledge of basic s mathematics and eng and taking into accou Sustainable Develops Goals. Ability to generate or solutions to complex engineering problem current and future ne complex systems, pro- devices or products u realistic constraints a conditions.	s using science, ineering, int the UN ment reative s to meet eds; design ocesses, ind	x					

4	Ability to select and use appropriate techniques, resources and modern engineering and information technology tools, including estimation and modelling, for the analysis and solution of complex engineering problems, recognising their limitations.				
5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.	x			
6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.				
7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.				
8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).				
9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).		X		
10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.				

	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact	Head of Department
Informations	tasarim@gazi.edu.tr

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL			1		1				3		1
Learning outcome 1			1						1		
Learning outcome 2									1		
Learning outcome 3					1						
Learning outcome 4									1		
Learning outcome 5											1

	Course Description Form
Course Code and Name	ETM242 DESCRIPTIVE GEOMETRY
Course Semester	4
Catalog Content	Introduction (Introduction and Importance of Descriptive Geometry) Traces - Traces of Lines, Traces of Planes Piercing Points Sections of Planes Parallelism and Perpendicularity Transformations - Reflection, Rotation, Translation Tangents Vector Operations Shading and Shadowing General Applications
Textbook	 Bayvas, Ş., Dericioğlu, N. ve Özgönül, O., Tasarı Geometri Temel Metot ve Uygulamalar I-II, Ankara, 1969. Hawk, M. C., Schaum's Outline of Theory And Problems Of Descriptive Geometry, 1962 by McGraw-Hill, Inc.
Supplementary Textbooks	1. Smith, J. K. (2020). Mühendislik Çizim ve Tasarımı. Örnek Yayıncılık.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Understanding the fundamental concepts of descriptive geometry and how these concepts are applied to geometric modeling. Providing information about projection and explaining projection methods. Drawing developments of three-dimensional geometric shapes such as prisms, pyramids, cylinders, cones, spheres, and creating their sectional views. Generating cross-sectional views of objects formed by cutting them with a plane. Applying the concepts learned in descriptive geometry to examples.
Course Learning Outcomes	 They will be able to use basic design geometry concepts to model complex systems. They will be able to use projection techniques to analyze and model objects from different perspectives. They will be able to integrate three-dimensional geometric shapes into engineering designs to develop suitable solutions for real-world problems. They will be able to optimize their designs by examining the internal structures of objects. They will be able to plan their projects by applying design geometry principles, considering environmental, economic, and social impacts.
Instruction Methods	Face to face

Week Traces 3. Week Traces of lines 4. Week Traces of planes 5. Week Piercing points 6. Week Sections of planes 7. Week Parallelism and perpendicularity 8. Week Transformations - Reflection, Rotation 9. Week Transformations - Translation 10. Week Transformations - Translation 10. Week Transformations - Translation 11. Week Vector operations 12. Week Inclined projection 13. Week Shading and shadowing 14. Week General applications 7. Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0 Presentations: 0
3. WeekTraces of lines4. WeekTraces of planes5. WeekPiercing points6. WeekSections of planes7. WeekSections of planes7. WeekParallelism and perpendicularity8. WeekTransformations - Reflection, Rotation9. WeekTransformations - Translation10. WeekTangents11. WeekVector operations12. WeekInclined projection13. WeekShading and shadowing14. WeekGeneral applicationsVeckly theoretical course hours: 2Weekly tutorial hours: 0Reading Activities: 0Internet browsing, library work: 2Designing and implementing materials: 2Report preparing: 0Presentation: 0Presentation: 0Presentation: 0Preparation of Midterm and Midterm Exam: 2Final Exam and Preparation for Final Exam: 1
4. WeekTraces of planes5. WeekPiercing points6. WeekSections of planes7. WeekParallelism and perpendicularity8. WeekTransformations - Reflection, Rotation9. WeekTransformations - Reflection, Rotation9. WeekTransformations - Translation10. WeekTangents11. WeekVector operations12. WeekInclined projection13. WeekShading and shadowing14. WeekGeneral applicationsWeekly theoretical course hours: 2Weekly tutorial hours: 0Reading Activities: 0Internet browsing, library work: 2Designing and implementing materials: 2Report preparing: 0Preparation of Midterm and Midterm Exam: 2Final Exam and Preparation for Final Exam: 1
Weekly Schedule5. WeekPiercing points6. WeekSections of planes7. WeekParallelism and perpendicularity8. WeekTransformations - Reflection, Rotation9. WeekTransformations - Translation10. WeekTangents11. WeekVector operations12. WeekInclined projection13. WeekGeneral applications14. WeekGeneral applications(These are examples. Please fill which activities you use in the course)Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Report preparing: 0 Preparation: 0 Preparation: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
Weekly Schedule 6. Week Sections of planes 7. Week Parallelism and perpendicularity 8. Week Transformations - Reflection, Rotation 9. Week Transformations - Translation 10. Week Tangents 11. Week Vector operations 12. Week Inclined projection 13. Week Shading and shadowing 14. Week General applications Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparation: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
Weekly Schedule 7. Week Parallelism and perpendicularity 8. Week Transformations - Reflection, Rotation 9. Week Transformations - Translation 10. Week Tangents 11. Week Vector operations 12. Week Inclined projection 13. Week Shading and shadowing 14. Week General applications Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing: 0 Preparing a Presentation: 0 Presentation: 0 Preparing of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
Weekly Schedule 8. Week Transformations - Reflection, Rotation 9. Week Transformations - Translation 10. Week Tangents 11. Week Vector operations 12. Week Inclined projection 13. Week Shading and shadowing 14. Week General applications Veekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Preparation: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
9. WeekTransformations - Translation10. WeekTangents11. WeekVector operations12. WeekInclined projection13. WeekShading and shadowing14. WeekGeneral applicationsWeekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Preparation of Midterm And Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
10. WeekTangents11. WeekVector operations12. WeekInclined projection13. WeekShading and shadowing14. WeekGeneral applicationsWeekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Preparation of Midterm Activities: 0 Preparation of Midterm Activities: 0 Preparation of Midterm Activities: 0 Preparation of Final Exam: 1
11. WeekVector operations12. WeekInclined projection13. WeekShading and shadowing14. WeekGeneral applicationsWeekly theoretical course hours: 2Weekly theoretical course hours: 2Weekly tutorial hours: 0Reading Activities: 0Internet browsing, library work: 2Designing and implementing materials: 2Report preparing: 0Preparing a Presentation: 0Preparing a Presentation: 0Preparing of Midterm and Midterm Exam: 2Final Exam and Preparation for Final Exam: 1
12. WeekInclined projection13. WeekShading and shadowing14. WeekGeneral applications14. WeekGeneral applicationsWeekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparation: 0 Preparation: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
13. WeekShading and shadowing14. WeekGeneral applications14. WeekGeneral applicationsWeekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
14. WeekGeneral applicationsTeaching and Learning Methods (These are examples. Please fill which activities you use in the course)Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
Teaching and Learning MethodsWeekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Preparation of Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1
Numbers Total Weighting (%)
Midterm Exams 1 40
Assignment 1 20
Application
Assessment Criteria
Practice
Percent of in-term Studies 60
Percentage of Final Exam to Total 40
Attendance

		Activity	Total Numbe r of	Dur (we hou	•ation ekly r)	l	T Pe W Lo	otal criod ork oad
	Weekly	Theoretical Course	14		2			28
	Weekly	/ Tutorial Hours						
	Readin	g Tasks						
	Studies		5		2			10
	Materia Implem	al Design and	14		2			28
	Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midtern Prepera Exam	m Exam and ttion for Midterm	3		2			6
	Final E for Fina	xam and Preperation al Exam	3		1			3
	emphas	should be sized)						
	Total W	Vorkload	-		-		,	75
	Total W	Vorkload / 25					75	5/25
	Course	Program Outcom	les					3
	No			1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes		In-depth knowledge o mathematics, science, engineering concepts, aided computing and s engineering areas; abi this knowledge effecti solving complex engin problems.	f basic computer- specific lity to use ively in meering				x	
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	rmulate x s using cience, ineering, nt the UN nent Goals.					
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro- devices or products un realistic constraints ar	to meet ds; design cesses, nder nd			x		
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, inclu- estimation and modell the analysis and soluti complex engineering recognising their limit	mation uding ling, for ion of problems, tations.		x			
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre results, to investigate engineering problems	n methods, arch, ting g data, ting complex	X				

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr

	Program Outcome 1	Program Outcome2	Program Outcome3	Program Outcome 4	Program Outcome5	Program Outcome6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
TOTAL	4	1	3	2	1	1	1				1
Learning outcome 1			1	1			1				1
Learning outcome 2	1	1	1								
Learning outcome 3	1			1							
Learning outcome 4	1		1								
Learning outcome 5	1				1	1					

COURSE D	DESCRIPTION FORM					
Course Code and Name	ETM244 DESIGN METHODOLOGIES					
Course Semester	4					
Catalog Content	Problem solving skills Creativity and innovation skills Design methodology and usage skills Design thinking skills Skills in the use of biomimicry and biomimetic concepts TRIZ method and application skills Skills in the use of contradiction matrix and 40 principles					
Textbook	 Birkhofer, H., The Future of Design Methodology, Springer, 2021. Karen Gatt, TRIZ for Engineers: Enabling Inventive Problem Solving, Wiley, 2011 Yoram Reich Biomimetic Design Method for Innovation and Sustainability, Springer International Publishing, e-Book 					
Supplementary Textbooks	1. Blessing, L.T.M and Chakrabarti, A., DRM, a Design Resear Methodology, Springer, 2009.					
Credit	3 ECTS					
Prerequisites of the Course	No Prerequisites Attendance Requirements %70					
Type of the Course	Elective					
Instruction Language	Turkish					
Course Objectives	Problem solving concept learning Understanding and learning traditional and innovative problem-solving methodologies Learning the concept of design inspired by nature and understanding application examples Learning the theory of innovative and creative problem solving (TRIZ) and understanding application examples					
Course Learning Outcomes	 Learning the advantages and disadvantages of design methodologies. Learning the ability to systematically follow the design process. Learning to understand engineering design stages and determine appropriate methods to optimize design. Learning to identify fundamental problems in the design process and utilize various problem-solving techniques. 					
Instruction Methods	Face to face					
	Week Subjects					
Weekly Schedule	1 Problem concept 2 Traditional Problem solving techniques 3 Traditional Problem solving techniques 4 Innovative Problem solving techniques 5 Innovative Problem solving techniques 6 Innovation and creativity 7 TRIZ 8 The contradiction matrix and the 40 principles 9 Contradiction matrix and application examples in 40 principle					
	design problems					

	10	General principles c	f Bio-inspi	red Design	n				
	11	General principles of	f Bio-inspin	red Design	n .:	1		1 .	
	10 General principles of Bio-inspired Design 11 General principles of Bio-inspired Design 12 Use of biomimicry in design and application examples in problems 13 Design thinking application examples Weekly theoretical course hours: 2 Weekly theoretical course hours: 2 Weekly theoretical course hours: 10 Reading Activities: 3 Internet browsing, library work: 4 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4 Prinal Exam and Preparation for Final Exam: 4 Projects Projects Practice Quiz Percent of In-term Studies (%) Percent of In-term Studies (%) Percentage of Final Exam 40 Veekly Theoretical Course Hours 14 2 Weekly Theoretical Course Hours 14 Reading Tasks 5 3 Studies 5 4 Material Design and Implementation Reading Tasks					s in	desig	gn	
	13	Design thinking							
	14	Design thinking app	lication exa	mples					
	Weekly	theoretical course he	ours: 2						
	Weekly	tutorial hours: 0							
Teaching and Learning Methods	Internet	g Activities: 3	ork· 1						
Teaching and Dear Ining Methods	Designi	ng and implementin	g materials:	0					
	Report	preparing: 0	5	•					
	Prepari	ng a Presentation: 0							
	Present	ations: 0		4					
	Prepara Final E	tion of Midterm and xam and Preparation	for Final E	xam: 4 xam: 4					
			Numbow		otal Wa	aht	ina		
			Tumbers		(%)	igni.	mg		
					()	,			
	Midter	m Exams	1		40				
	Assign	ment	1		20				
	Applic	ation							
Assessment Criteria	Project	S							
	Practic	e							
	Quiz								
	Percen	t of In-term			60				
	Studies	s (%)							
	D	(E' 1 E-			40				
	to Tota	l Score (%)			40				
	Attend	ance							
				Total	Durati	0]	[otal	l
		, ,• •,		Number	n		P	erio	d
		Activity		0f Weeks	(weekl	y	1	Load	
	Waakhu	Theoretical Course He	11#0	14	nour)			28	
	Weekly	Tutorial Llaura	urs	14	2			20	
	Deading			5	2			15	
	Reading	Tasks		5	3			10	
	Studies	D' 11 1		3	4			20	
Workload	Materia	Design and Implemen	tation						
	Report I	Preparing							
	Preparir	g a Presentation							
	Presenta	tions							
	Midtern	Exam and Preperation	n for	1	4			4	
	Final Ex	am and Preperation for	r Final	2	4			8	
	Other (should be emphasized)		-	-			-	
	Total W	orkload		-	-			75	
	Total W	orkload / 25					7	5/25	5
	Course	Credit (ECTS)						3	
	No	Program Outcon	nes		1	2	3	4	5
									~
	11								

	Contra	hBrian L	DR atures	Perman		1 Program	In-depth knowledge of mathematics, science, basic engineering concepts, computer-aided computing and specific engineering areas; ability to use this knowledge effectively in Program Program Program Program	
	Outco	menteniep	noernoersmeen Noernoersmeen	CongramLe	Outcome4	Program Outcome5	solving complex engineering program Program Program Program Program Outcome	am me
0	TAL	1	2	3	3	2 2	Ability to identify, formulate and analyse x 2	\square
it	come 1			1			complex engineering problems using knowledge	
	arning come 2		1	1	1		of basic science, mathematics and engineering, and taking into account the UN Sustainable	
a	arning		1	1	1	1	Development Goals. 1 1	
t	come 3 arning				1	1 3	Ability to generate creative solutions to complex x	
ıt	come 4						engineering problems to meet current and future needs; design complex systems, processes, devices or products under realistic constraints and conditions.	
						4	Ability to select and use appropriate techniques, resources and modern engineering and information technology tools, including estimation and modelling, for the analysis and solution of complex engineering problems, recognising their limitations.	
						5	Ability to use research methods, including x iterature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.	
						6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions	
						7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non- discrimination, impartiality and embracing diversity.	
						8	Ability to work effectively as a team member or x eader both individually and within interdisciplinary teams (face-to-face, distance or pybrid)	
						9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).x	
						10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.	
						11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.	
	The C Inform	ourse's Leonations	cturer(s) an	d Contact		1	Head of Department rasarim@gazi.edu.tr	

	Course Description Form
Course Code and Name	ETM246 MATERIAL SELECTION IN DESIGN
Course Semester	4
Catalog Content	 The importance of material selection in design AND the basics of material selection are explained Learning material selection and material selection diagrams in terms of mechanical and physical properties Selection of materials (metals, polymers, ceramics, composites) in terms of application Understanding the relationship between material selection and process
Textbook	 Materials Selection in Mechanical Design, 3E, M.F. ASHBY, Elsevier Butterworth-Heinemann, 2005. Malzeme Seçimi ve Uygulamaları, F. Fındık, Seçkin Yayıncılık, 2018
Supplementary Textbooks	1. Selection and Use of Engineering Materials, Butterworth J.A. Charles, Crane, FAA Heinemann, 1992.
Credit	3
Prerequisites of the Course	There is no prerequisite for the course.
Type of the Course	Selective
Instruction Language	Turkish
Course Objectives	To ensure that they acquire basic knowledge about material selection and design and apply this knowledge to possible situations.
Course Learning Outcomes	 Can classify materials and knows their advantages and disadvantages. Understands the material selection characteristics in terms of mechanical and physical properties. Knows and applies material selection criteria. It establishes criteria for special applications. Selects suitable materials for design applications, taking into account working conditions.
Instruction Methods	Face to face

	1. Week	The importance of n	naterial in desi	gn					
	2. Week	The importance of b classification of eng	asic factors in ineering mater	material selectio	on and				
	3. Week	Types of metallic m properties	aterials, chemi	cal and physical					
	4. Week	Mechanical properti	es of metallic	materials					
	5. Week	Application areas of	metallic mate	rials					
	6. Week	Ceramic material ty	pes, properties	and application	areas				
Weekly Schedule	7. Week	Polymer material ty	Polymer material types, properties and application areas						
	8. Week	Composite material	types, properti	ies and application	on areas				
	9. Week	Engineering materia	l types, proper	ties and applicat	tion areas				
	10. Week	Material selection ba	ased on materi	al properties					
	11. Week	Ashby diagrams							
	12. Week	Sample material sele	ection applicat	ions					
	13. Week	Week Sample material selection applications							
	14. Week	Assignment presentations							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: Preparation of Final Exam and	tical course hours: 2 1 hours: 0 ties: 1 ng, library work: 1 implementing materia ng: 2 ssentation: Midterm and Midterm d Preparation for Final	ıls: 1 Exam: 8 1 Exam: 14						
			Number s	Total Weighti ng (%)					
	Midterm Exar	ns	1	40					
	Assignment		1	20					
	Application								
Assessment Criteria	Projects								
	Ouiz								
	Percent of In-1	term Studies		60					
	(%)								
	Percentage of Total Score (%	Final Exam to 6)		40					
	Attendance								

		Activi ty	Total Numb er of Week s	D o (' y h	our n wee	ati ekl r)			Tot al Peri od Wor k Loa
	Week	y Theoretical Course	14			2			d 28
	Week	y Tutorial Hours						+	
	Readin	ng Tasks	10			1			10
Workload	Studie	S	5			1			5
	Veckly T Hours Weekly T Reading Studies Material and Implement Report Pr Preparing Presentat Midterm Final Exa Preparati Midterm Final Exa Preparati Midterm Other (sl be emphasiz Total Wo Course C N 0 1 In n e 2 A 2 A 2 A 3 A 9 2 3 A 9 2 4 A 4 A 4 A 4 A 4 A	ial Design							
	Implei	mentation						_	
	Repor	t Preparing	5			2		+	10
	Prepai	tations						+	
	Midter	rm Exam and						+	
	Prepar	ation for	1			8			8
	Final I	Exam Exam							
	Prepai Exam	ation for Final	1			14			14
	Other	(should							
	be empha	usized)							
	Total	Workload							
	Total	Workload / 25							75/25
	Cours	e Credit (ECTS)							3
	N	Program Outco	mes	1	2	3	4	5	
	0				_		_		
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge mathematics, science engineering concept computer-aided com and specific enginee ability to use this kn effectively in solving engineering problem	of e, basic s, puting ring areas; owledge g complex as.	c X g reas; ge plex					
	2	Ability to identify, fa and analyse complex engineering problem knowledge of basic s mathematics and eng and taking into acco UN Sustainable Dev Goals.	ormulate as using science, gineering, unt the elopment		x				
		3 Ability to generate creative solutions to complex engineering problems to m current and future needs; design complex systems, processes, devices or prod under realistic constraints conditions				x			
	4	Ability to select and appropriate techniqu resources and moder engineering and info technology tools, inc estimation and mode	use es, n ormation cluding clling, for	x					

		the analysis and solution of complex engineering problems, recognising their limitations.					
	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.		x			
	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	x				
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.					
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).		X			
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).					
	1 0	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.					
	1	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			x		
The Course's Lecturer(s) and Contact Informations							

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL	4	2	3	1	2			2			3
Learning outcome 1	1	1	1								
Learning			1		1						1

outcome 2									
Learning outcome 3	1		1				1		
Learning outcome 4	1				1		1		1
Learning outcome 5	1	1		1					1

	Course Description Form
Course Code and Name	ETM330 USER CENTERED DESIGN
Course Semester	6
Catalog Content	User-centered design skills Ability to apply scenario-based design approach Understanding and ability to apply human-centered design principles Acquiring knowledge and skills in user experience design Ability to apply iterative user-centered design methodology Ability to identify user requirements and usage scenarios Capability to generate and visualize design ideas based on user needs Ability to analyze user feedback and reshape the design Concept creation and prototyping skills Ability to evaluate created concepts and prototypes
Textbook	 ChadiaAbras, Diane Maloney-Krichmar, Jenny Preece. (2004). UserCentered Design, InBainbridge, W. Encyclopedia of HumanComputerInteraction. ThousandOaks: Sage Publications. NORMAN, D. A. 1986, Cognitiveengineering. In D. A. Norman and S. W. Draper (eds) User CenteredSystems Design (Hillsdale, NJ: Lawrence ErlbaumAssociatesInc.) Goodman, E., Kuniavsky, M., &Moed, A. (2012). Observingtheuserexperience: A practitioner'sguidetouserresearch. San Francisco, CA: Morgan Kaufman
Supplementary Textbooks	 Jesse J.G. (2011). TheElements of User Experience: User-Centered Design forthe Web and Beyond, Second Edition, USA.
Credit	3 ECTS
Prerequisites of the Course (Attendance Requirements)	No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Learning the concept of user-centered design. Gaining experience and knowledge in user experience design. Learning research skills to develop usability and user experience concepts. Acquiring the ability to conduct research involving the user perspective.
Course Learning Outcomes	 Gaining knowledge about user-centered design theory. Learning about the concept of usability and user experience processes. Creating product usage scenarios. Designing a tangible product using the user-centered design method.
Instruction Methods	Face to face

	1. Week	History of user-cent	ered design					
	2. Week	Scenario-based desi	gn					
	3. Week	Human-centered des	sign					
	4. Week	User experience, us	ability, usabilit	y principles				
	5. Week	Usability tests (A/B	testing, Surve	y, Field study,	Observati	on)		
Weekly Schedule	6. Week	6. Week Usability tests (Interview, Focus Group, Experience Logs,						
, , , , , , , , , , , , , , , , , , ,	7. Week	Iterative user-center	ed design					
	8. Week	Identifying user req	s					
	9. Week	Visualizing design i	deas					
	10. Week	Redesign and analys	sis based on us	er evaluations				
	11. Week	Concept and prototy	pe developme	nt				
	12. Week Concept and prototype development							
	13. Week							
	14. Week	Evaluation of conce	pts and prototy	/pes				
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: (Preparation of Final Exam and	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library work: 2 Designing and implementing materials: 1 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 5 Final Exam and Preparation for Final Exam: 5						
			Number s	Total Weighti ng (%)				
	Midterm Exan	ns						
	Assignment		2	60				
	Projects							
Assessment Criteria	Practice							
	Quiz							
	Percent of In-1	term Studies		60				
	(%)							
	Percentage of	Final Exam to						
	1 otal Score (%	(%)						
	Anondanice							

		Activi ty	Total Num ber of Week s	Du on (wo y h	rati eekl our)		T al P o W k L	fot eri d Vor oa
	Weekl Hours	y Theoretical Course	14			2	d	28
	Weekl	y Tutorial Hours						
	Readir	ng Tasks	5		, ,	2	1	0
Workload	Studie	s	5		-	2]	0
	Materi and Impler	al Design nentation	7		1			7
	Repor	t Preparing						
	Prepar	ing a Presentation						
	Presen	tations						
		rm Exam and ation for rm Exam	2			5]	0
	Final I Preper Exam	Exam and ation for Final	2		4	5	1	0
	Other	(should						
	empha	sized)						
	Total	Workload					7	75
	Total	Workload / 25					75	/25
	Course	e Credit (ECTS)					3	
	N	Program Outco	mes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	2	Adequate knowledg mathematics, science engineering subject pertaining to the rel discipline; ability to theoretical and appl information in these model and solve en problems. Ability to identify, formulate, and solve complex engineerin problems; ability to and apply proper ar and modeling meth this purpose. Ability to design a system, process, de product under realis constraints and con	ge in ce and s evant o use ied e areas to gineering e select nalysis ods for complex vice or stic ditions,	x	x			
		in such a way as to desired result; ability apply modern design methods for this pu	meet the ty to n rpose.					

	4 5 6	Ability to develop, select and use modern techniques and tools necessary for analysis and solution of complex problems in engineering applications; ability to use information technologies effectively. Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics. Ability to work efficiently in intra-disciplinary teams.	x	x		
	7	Ability to work efficiently in multi-disciplinary teams.			X	
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.		X		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.			X	
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.				
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.	x			
The Course's Lecturer(s) and Contact Informations	Pro isal	of. Dr. İsmail Şahin hin@gazi.edu.tr				

	Program Outcome1	Program Outcome 2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome1 0	Program Outcome11
TOTAL		1	2	2	1	1	3	2	3		1
Learning outcome 1							1		1		
Learning outcome 2							1	1	1		
Learning outcome 3			1	1							
Learning outcome 4		1	1	1	1	1	1	1	1		1

Course DescriptionForm									
Course Code and Name	ETM331 ERGONOMICS								
Course Semester	5								
Catalog Content	Determining the basics of ergonomic design Determining the effects of environmental factors on the user Developing user-centered product design skills Evaluation of ergonomic product designs								
Textbook	 Karwowski, W., Soares, M.M. and Stanton, N.A., Human Factors and Ergonomics in Consumer Product Design: Methods and Techniques, CRC Press, 2011. Babalık, F., Mühendisler İçin Ergonomi - İşbilim, Dora, 3. Bas., 								
Supplementary Textbooks	1. Alaettin Sabancı, Sarp Korkut Sümer., Ergonomi, Nobel Akademik Yayıncılık; 3. baskı								
Credit	3 ECTS								
Prerequisites of the Course (Attendance Requirements)	No Prerequisites - %70 AttendanceRequirements								
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	To have knowledge about the concept and foundations of ergonomics To learn the application of anthropometric properties to design To be able to use ergonomic design elements in the product development process								
Course Learning Outcomes	 Ability to design products taking into account anthropometric data of the target audience Ability to produce creative solutions in engineering problems by taking human-oriented elements into consideration Ability to design complex systems, processes, devices or products under ergonomic conditions Ability to perform research methods such as literature research, data collection, and interpretation of results to examine engineering problems from an ergonomic perspective. Ability to analyze and evaluate designed products and systems from an ergonomic perspective 								
Instruction Methods	Face to face								

	1. Week	Introduction (Ergono design examples)	mics concept,	basics of ergo	nomics,				
	2. Week	Development of ergo examples and applica	nomic designs tions	s, ergonomic d	esign				
	3. Week	Principles of ergonon work	nic design, erg	onomically hu	ıman and				
	4. Week	Environmental factor	s and their eff	ects on human	IS				
	5. Week	Ergonomic workplace	e organization						
	6. Week	Human machine cont	act (interface)	, sample appli	cations				
Weekly Schedule	7. Week	Introducing anthropo workplace control	metric measur	ement, ergono	omic				
	8. Week	Load lifting and mor	ent applicatio	n					
	9. Week	Designing ergonomic	work tools ar	nd equipment	equipment				
	10. Week	Ergonomic product d	esign example	s					
	11. Week	Ergonomic product d	esign example	es and evaluati	ons				
	12. Week	 Week Ergonomics compliance check Week Examples of aesthetic and ergonomic design appl 							
	13. Week	3. Week Examples of aesthetic and ergonomic design appl							
	14. Week								
Teaching and Learning Methods	Weekly theore Weekly tutoria	tical course hours: 2 1 hours: 0							
(These are examples. Please fill which activities you use in the course)	Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: 2 Preparation of 1 Final Exam and	Activities: 2 prowsing, library work: 2 g and implementing materials: 0 reparing: 0 g a Presentation: 3 ions: 2 on of Midterm and Midterm Exam: 3 am and Preparation for Final Exam: 3							
			1 (uniber 5	Weighting					
	Midterm Exar	ns	1	(%) 40	+				
	Assignment		1	20	1				
	Application]				
Assessment Criteria	Projects				-				
	Practice				-				
	Quiz Percent of In	term Studies		60	-				
	(%)			00					
	Percentage of Score (%)	Final Exam to Total	1	40					
	Attendance								

		Activity	Total Number of	D n (w	ura vee	ntio kly	•		Total Period Work Load
	Weekly	Theoretical Course	14			2			28
	Weekly	Tutorial Hours							
	Reading	g Tasks	5			2			10
	Studies	10			2			20	
	Materia Implem								
Workload	Report	Preparing	1	3					
	Prepari	ng a Presentation	1	2				S	
	Midterr	n Exam and	1			2			3
		tion for Midterm	1			5			5
		xam and Preperation	1			3			3
		al Exam	-			-			
	other (emphas	should be sized)	-			-			-
	Total W	Vorkload	-			-			75
	Total W	Vorkload / 25							75/25
	Course	Credit (ECTS)						-	3
	No	Program Outcom	nes	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	f basic computer- specific lity to use ively in neering rmulate and							
	2	analyse complex engi problems using knowl basic science, mathem engineering, and takir account the UN Susta Development Goals.	neering ledge of natics and ng into inable						
	3	Ability to generate cre solutions to complex of problems to meet curr future needs; design c systems, processes, de products under realist constraints and condit	eative engineering rent and omplex evices or ic ions.		x				
	4	Ability to select and u appropriate technique and modern engineeri information technolog including estimation a modelling, for the ana solution of complex e problems, recognising limitations.	se s, resources ng and gy tools, and lysis and ngineering g their	x					
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting g data, eting complex		x				

	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.			
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).			
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	x		
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.			
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			
The Course's Lecturer(s) and Contact Informations	Departı tasarim	ment Management @gazi.edu.tr		·	

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL			2	1	2				2		
Learning outcome 1									1		
Learning outcome 2			1						1		
Learning outcome 3			1								
Learning outcome 4				1	1						
Learning outcome 5					1						

Course Description Form									
Course Code and Name	ETM332 MEDICAL DEVICE DESIGN								
Course Semester	6								
Catalog Content	Understanding the basic principles and system components of medical devices To be able to comprehend the medical device design process Gaining multidisciplinary approaches and teamwork skills in medical device design Professional and ethical responsibility Ability to use modern engineering methods in medical device design Gain knowledge and skills in pre-clinical testing to evaluate the safety and efficacy of								
Textbook	 Bronzino, J.D., The Biomedical Engineering HandBook, IEEE Press, 1995 Biomedical Engineering Health Care Systems, Technology and Techniques, Suh, Gurupur, V.P., Tanik, M.M. 								
Supplementary Textbooks	 Ogrodnik, P. (2012). Medical Device Design, Innovation from concept to market. Academic Press/Elsevier. 								
Credit	3 ECTS								
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70							
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	Understanding the engineering profession and ethics Understand the medical device design process To gain the ability to produce solutions in medical device design by considering user needs and patient safety To have knowledge of basic design and engineering issues Understand how to use multidisciplinary approaches and teamwork in medical device design								
Course Learning Outcomes	 Understand the basic principles of design of various medical devices such as orthopedic devices, soft tissue implants, artificial organs and dental implants Gain competence in evaluating multidisciplinary approaches and teamwork in medical device design Ability to evaluate the safety and effectiveness of medical devices Gain the ability to consider user needs and patient safety when developing solutions for medical devices Gaining competence in developing innovative medical device designs and following current technological developments 								
Instruction Methods	Face to face								
	1. Week	Basic Principles of Medical Devices and system components							
	2. Week	Electrical and mechanical device groups used in medicine.							
	3. Week	Design of devices used in minimally invasive medical interventions							
	4. Week	Design of devices for bedside diagnostic technologies							
	5. Week	Design of devices for bedside diagnostic technologies							
	6. Week	Design of devices for measuring patient radiation dose							
	7. Week	Sensor, Biosensor technologies							
Weekly Schedule	8. Week	Design of home health and national monitoring devices							
	10 Wook	Portable diagnostic and therapeutic devices							
	10. Week	Portable early detection devices							
	12 Week	Micro-total Analysis Systems							
	13. Week	Integrated Bio-chins (Lab on a chin)							
	14. Week	Application							

Other:0	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 4 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2 Other:0							
Numbers Total Weighting ((%)							
Midterm Exams140Assignment120Application								
Projects								
Assessment Criteria Practice								
Quiz								
Percent of In-term 60								
Percentage of Final Exam to Total 40								
Score (%)								
Attendance	TE (<u> </u>						
Activity Total Duration Number (weekly of Weeks hour)	l ota Perio Worl Load	d k						
Weekly Theoretical Course 14 2	28							
Hours Weekly Tutorial Hours								
Reading Tasks 5 3	15							
Studies 6 2	12							
Material Design and	16							
Implementation 4 4	10							
Report Preparing		_						
Preparing a Presentation								
Presentations								
Midterm Exam and Preperation for Midterm 1 2 Exam	2							
for Final Exam and Preperation 1 2	2							
Other (should be								
Total Workload	75							
Total Workload / 25	75/25							
Course Credit (ECTS)	3	-						
No Program Outcomes 1 2 2		5						
	4,	5						
In-depth knowledge of mathematics, science, basic engineering concepts, computer-aided computing and specific engineering areas; ability to use this	x							
Contribution Level Between Course Learning knowledge effectively in solving complex engineering problems								
Outcomes and Program Outcomes Chighteeting proteins. 2 Ability to identify, formulate and analyse	x							
complex engineering problems using								
knowledge of basic science, mathematics and engineering and taking into account								
the UN Sustainable Development Goals.								
2 Ability to concepts appoint a substance to	X							

							_
		current and future needs; design complex systems, processes, devices or products					
		under realistic constraints and conditions.					
	4	Ability to select and use appropriate		2	ĸ		
		techniques, resources and modern					
		engineering and information technology					
		tools, including estimation and modelling,					
		for the analysis and solution of complex					
		engineering problems, recognising their					
		limitations.					
	5	Ability to use research methods, including			2	۲	
		literature search, designing and conducting					
		experiments, collecting data, analysing and					
		interpreting results, to investigate complex					
	-	Engineering problems.			-		_
	6	reactions on society, health and sofety	х				
		economy sustainability and environment					
		within the framework of the UN					
		Sustainable Development Goals: awareness					
		of the legal consequences of engineering					
		solutions.					
	7	Acting in accordance with the ethical		x			
		principles of the engineering profession,					
		awareness of ethical responsibilities;					
		awareness of non-discrimination,					
		impartiality and embracing diversity.			_		
	8	Ability to work effectively as a team					
		member or leader both individually and					
		within interdisciplinary teams (face-to-					
		A hility to communicate offectively on			-		_
	9	Addity to communicate effectively on					
		taking into account the various differences					
		of the target audience (e.g. education					
		language, profession).					
	10	Knowledge of business life practices such	x				
	10	as project management and economic					
		feasibility analysis; awareness of					
		entrepreneurship and innovation.					
	11	Ability to learn independently and					
		continuously, to adapt to new and emerging					
		technologies and to think inquisitively					
		about technological changes.					
The Course's Lecturer(s) and Contact	Hea	d of Department					
Informations	<u>tasa</u>	<u>rim@gazi.edu.tr</u>					

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	3	3	5	3	3	4	1			1	1
Learning outcome 1	1	1	1	1		1					
Learning outcome 2			1								
Learning outcome 3			1			1					
Learning outcome 4	1	1	1	1		1	1				
Learning outcome 5	1	1	1	1		1				1	1

Course Description Form							
Course Code and Name	ETM333 MECHATRONICS SYSTEM DESIGN						
Course Semester	5						
Catalog Content	Understanding the design steps of mechatronic systems and the ability to apply them Ability to represent and analyze systems using block diagrams Understanding electrical, mechanical, and fluid systems and the ability to integrate these systems to create mechatronic systems Understanding the working principles of different sensors and transducers and grasping their role in mechatronic systems						
Textbook	 Shetty, D., Kolk R.A., Mechatronics System Design, Cengage Learning, 2011 Bradley, D. A., Seward, D., Dawson, D., & Burge, S. (2018). Mechatronics and the design of intelligent machines and systems. Crc Press. 						
Supplementary Textbooks	1. Pelz, G., & Waddington, R. (2004). Mechatronic systems. J. Wiley.						
Credit	3 ECTS						
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements						
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	Gaining the ability to design processes Developing skills in expressing with blocks Acquiring the ability to understand various systems Learning about sensors and transducers						
Course Learning Outcomes	 Gaining the ability to understand and apply the design steps of mechatronic systems. Developing the ability to represent and analyze systems using block diagrams. Acquiring the ability to understand electrical, mechanical, and fluid systems and to create mechatronic systems. Learning the working principles of different sensors and transducers and understanding their role in mechatronic systems. 						
Instruction Methods	Face to face						

	1. Week	1. Week Introduction to Mechatronic System Design						
	2. Week	Design processes						
	3. Week	Block diagrams, man	ipulations, and	l simulations				
	4. Week	Electrical, mechanica integration	l, and fluid sy	stems, system				
	5. Week	Sensors and transduce	ers					
	6. Week	Sensor applications						
Weekly Schedule	7. Week	Control devices						
	8. Week	System control - Logic methods						
	9. Week	Programmable Logic Controllers						
	10. Week	Signals, Systems, and	l Controls					
	11. Week	Laplace transforms						
	12. Week	Signal conditioning a	nd real-time in	nterface				
	13. Week	Data conversion proc	ess					
	14. Week	Case studies						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: Preparation of Final Exam and	tical course hours: 2 1 hours: 0 ities: 3 ing, library work: 2 implementing materials ng: 0 esentation: 0 0 Midterm and Midterm 1 d Preparation for Final 1	s: 3 Exam: 4 Exam: 4					
			Numbers	Total Weighting (%)				
	Midterm Exar	ns	1	40				
	Assignment		1	20				
	Application							
Assessment Criteria	Practice							
	Ouiz							
	Percent of In-	term Studies		60				
	(%)							
	Percentage of	Final Exam to Total		40				
	Score (%)							
	Allendance							
		Activity	Total Numbe r of Weeks	Dui (we hou	ration ekly r)	1	T Pe W Lo	otal riod ork oad
---	-----------------------------	--	---	-------------------	----------------------	---	--------------------	----------------------------
	Weekly Hours	7 Theoretical Course	14		2			28
	Weekly	Tutorial Hours						
	Readin	g Tasks	5		3			15
	Studies		5		2			10
Workload	Materia Implem	al Design and mentation	2	3				6
	Prepari	rreparing						
	Present	ations						
	Midtern Prepera	n Exam and tion for Midterm	2		4			8
	Exam Final E for Fina	xam and Preperation al Exam	2		4			8
	Other (emphas	should be sized)					ļ ,	75
	Total W	Vorkload / 25	-		-		74	5/2.5
	Course	Credit (ECTS)					/-	3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	2	Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applic information in these model and solve eng Ability to identify, fo and solve complex en	e in e and vant use ed areas to ineering ormulate, ngineering	x				
		problems; ability to s apply proper analysis modeling methods fo purpose.	select and s and or this					
		Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho	omplex ice or ic itions, in et the v to apply ods for	x				
	4	Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer applications; ability to information technolo effectively.	elect and es and nalysis blex ring to use ogies	X				

	П		 , , , , , , , , , , , , , , , , , , ,	 	
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.	X		
	6	Ability to work efficiently in intra-disciplinary teams.			
	7	Ability to work efficiently in multi-disciplinary teams.			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	X		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.	X		
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.			
The Course's Lecturer(s) and	Prot	f. Dr. İsmail Şahin			
Contact Informations	isah	in@gazi.edu.tr			

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome 6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
TOTAL	1	1	1	1	2			2	2		
Learning outcome 1	1								1		
Learning outcome 2		1							1		
Learning outcome 3			1	1	1			1			
Learning outcome 4					1			1			

	Course Description Form
Course Code and Name	ETM334 FURNITURE DESIGN
Course Semester	6
Catalog Content	General approaches in furniture design Concept of furniture connected to indoor and outdoor spaces Furniture-user relationship The trends that determine furniture design and the reflection of technology on design Understanding furniture design elements (materials, details, production methods, etc.) Executing a furniture design process
Textbook	 Remmele, M. (2007). <i>Charles and Ray Eames/ Objects and furniture</i>. New York: Monacelli Yayınevi. Küçükerman, Ö. (1996). <i>Endüstri için ürün tasarımında yaratıcılık</i>. İstanbul: Yem Yayınları.
Supplementary Textbooks	1. Habegger, J. (2005). Sourcebook of modern furniture. USA: W.W. Norton Yayınevi.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Producing innovative and creative concepts in furniture design, taking into account cultural, social and environmental factors and the needs and wishes of users Creation of a research methodology for furniture design; approaching the definition of the problem related to furniture design from a creative perspective; Developing potential uses of the designed product in line with future needs. Understanding furniture design elements (materials, details, production methods, etc.) Carrying out a user-oriented furniture design process
Course Learning Outcomes	 Current approach to the discipline of furniture design, ability to master modern and historical examples In the projects developed conceptually, he reaches results on an engineering basis, based on interdisciplinary communication, and is able to use and test materials and manufacturing methods. Ability to manage a user-oriented furniture design process Ability to use economics, marketing, consumer behavior, ergonomics and social psychology knowledge within the framework of sustainability criteria based on product-user relationship during the project development process. Ability to participate in a design project in your field within a team or manage it independently
Instruction Methods	Face to face

	1. Week	Scope and general co	nsideration of	the concept of	furniture							
	2. Week	Structural classification of furniture Basic features that identify a furniture										
	3. Week	Basic features that ide	entify a furnitu	ure								
	4. Week	Systematic shaping ir	n furniture des	ign								
	5. Week	Form search, Form sy	nthesis									
	6. Week	Product synthesis and	l problem anal	ysis								
	7. Week	Shape research accord	ding to genera	l material prop	perties							
	8. Week	Identity and personal	ity issues of fu	ırniture								
Weekly Schedule	9. Week	Material conditions in										
	10. Week	Examining furniture a spread in seating elen Position relationships	relationshi g to human	p: Body heig body positio								
	11. Week	Function and Functio	n									
	12. Week	Unchanging values, c	re design									
	13. Week	Furniture – Furniture										
	14. Week	Scope and general co	nsideration of	the concept of	furniture							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: (Preparation of Final Exam and	tical course hours: 2 l hours: 0 ties: 0 ing, library work: 1 implementing materials ng: 0 esentation: 0 0 Midterm and Midterm 1 d Preparation for Final	s: 2 Exam: 2 Exam: 2									
			Numbers	Total								
				Weighting (%)								
	Midterm Exan	ns	1	40								
	Assignment	ent <u>1 20</u>										
	Application	on										
Assessment Criteria	Practice											
	Quiz											
	Percent of In-	term Studies		60								
	(%)											
	Percentage of Score $\binom{0}{2}$	Final Exam to Total		40								
Score (%) Attendance												
			1	1								

		Activity	Total Numbe r of	Dur (we hou	•ation ekly r)	l	T Pe W Lo	otal riod ork oad
	Weekly	Theoretical Course	14		2			28
	Hours Weekly	7 Tutorial Hours						
	Readin	g Tasks						
	Studies		9		1			9
	Materia	al Design and	10		2			20
	Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midtern Prepera Exam	m Exam and ation for Midterm	5		2			10
	Final E for Fina	xam and Preperation al Exam	4		2			8
	emphas	sized)						
	Total W	Vorkload	-		-		,	75
	Total W	Vorkload / 25					75	5/25
	Course	Credit (ECTS)				1		3
	No		les	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering			X		
	2 Ability to identify, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN			x				
	3	Ability to generate crossolutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet eds; design cesses, nder nd		X			
		Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, incl- estimation and model the analysis and soluti complex engineering recognising their limit	nse s, mation uding ling, for ion of problems, tations.		X			
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting gg data, eting complex			X		

	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.		x		
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	X			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).		X		
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	X			
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and		x		
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			X	
The Course's Lecturer(s) and Contact Informations	De tas	partment Management arim@gazi.edu.tr				

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	Outcome	Outcome2	Outcome3	Outcome	Outcome5	Outcome6	Outcome	çıktısı 8	Outcome	Outcome10	Outcome11
	1			4			7		9		
TOTAL	3	1	2	2	3	2	1	2	1	2	3
Learning	1				1					1	1
outcome											
1											
Learning	1	1	1	1		1		1			1
outcome											
2											
Learning	1		1	1	1					1	
outcome											
3											
Learning					1	1	1		1		
outcome											
4											
Learning								1			1
outcome											
5											

		Course Description Form								
Course Code and Name	ETM335 DE	SIGN FOR MANUFACTURABILITY								
Course Semester	5									
Catalog Content	Ability to und Evaluating the Professional a Ability to use Teamwork an Ability to con Ability to iden Ability to des	lerstand and apply production technologies and mechanisms e effect of material selection and material properties on design and ethical responsibility modern engineering methods d leadership skills muunicate orally and in writing ntify, formulate and solve problems ign, implement and design experiments								
Textbook	1. Anderson, Rapid Dev USA, 2014	D.M., Design for Manufacturability: How to Use Concurrent Engineering to elop Low-Cost, High-Quality Products for Lean Production, CRC Press, 4.								
Supplementary Textbooks	1. Bralla, J.C	G., Design for Manufacturability Handbook, Mc-Graw Hill Pub., 1998.								
Credit	3 ECTS									
Prerequisites of	No Prerequisi	tes								
the Course	Attendance R	equirements %70								
Type of the Course	Elective									
Instruction Language	Turkish									
Course Objectives	To be able to To have detai Identify limita process To understand	determine the criteria of design suitable for manufacturing led knowledge about manufacturing methods ations and difficulties arising from manufacturing methods in the design I the relationship between material and manufacturing method								
Course Learning Outcomes	 Gaining t Developi mechanis Develop Gaining t Understa 	the ability to apply theoretical principles through design examples ng the ability to understand and apply production technologies and sms teamwork and communication skills in design engineering projects competence to consider ethical and sustainability principles in design nding the relationship between material selection and manufacturing method								
Instruction Methods	Face to face									
	1. Week	Introduction								
	2. Week	Design of product components.								
	3. Week	Examination of product components in terms of mechanical design.								
	4. Week	Materials and material selection.								
	5. Week	Standard elements and fasteners.								
	0. Week	Machanical and electro machanical machanisms								
	7. Week	A ssembly methods								
weekly Schedule	9. Week	Processes of modification of physical and visual properties of components.								
	10. Week	Veek Quality control methods								
	11. Week	The effect of the chosen production method and material on the design.								
	12. Week	Factors determining production method preferences.								
	13. Week	Systems that control design and production methods.								
	14. Week	Design examples								

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library Designing and implement Report preparing: 5 Preparing a Presentation: Presentations: 0 Preparation of Midterm an Final Exam and Preparatio Other:0	Veekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library work: 5 Designing and implementing materials: 6 Report preparing: 5 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3 Dther:0												
				Numbers		ſ	Fotal Wei	ght	ing	g (¢	%)			
	Midterm Exams Assignment Application			1		40 20								
Assessment Criteria	Projects													
	Ouiz											-		
	Percent of In-term							60						
	Studies (%)													
	Percentage of Final Exam	to Total	l					40						
	Attendance											-		
			A	activity	Total Number of Weeks		Duration (weekly hour)] P V L	Fota erio Vor .oac	al od k ł		
		Weekly	The	coretical Course	14		2				28			
		Weekly Tutorial Hours						+						
		Reading	g Tas	sks	2		4				8			
		Studies			3		5		1		15			
		Materia	l De	sign and	2		6				12			
		Implem	enta	tion	2	_	0		_		12	, 		
Workload		Report	Prep	aring	I	_	6		_		6	_		
		Preparii	ng a	Presentation		-			+			_		
		Presenta	ation	is om and		_			_					
		Prepera Exam	tion	for Midterm	1		3						3	
		for Fina	ıl Ex	am	1		3				3			
		Other (shou	ld be										
		Total W	/orkl	load	-		-		+		75			
		Total W	/orkl	load / 25						7	75/2	25		
		Course	Crec	lit (ECTS)							3			
		No		Program Outcom	es			1	2	3	4	5		
		1	In-d scie	lepth knowledge o nce, basic enginee	f mathem	natic	cs, cs,	1	2	2	- (5		
Contribution Level Betw	veen Course Learning		com engi kno engi	puter-aided comp ineering areas; abi wledge effectively ineering problems.	uting and lity to us in solvii	i spe e thi ng c	ecific is complex							
Outcomes and Program	Outcomes	2	Abi	lity to identify, for	mulate a	nd a	analyse			ĸ	\uparrow			
			com	plex engineering j	g problems using									
	knowledge of basic sci and engineering, and ta			taking into account										
			the	UN Sustainable D	evelopm	ent (Goals.				\square			
		3	Abi com	lity to generate cre plex engineering	ative sol problems	utio to 1	ons to meet				2	C		

						_
		current and future needs; design complex systems, processes, devices or products				
		under realistic constraints and conditions.				
	4	Ability to select and use appropriate			x	
		techniques, resources and modern				
		engineering and information technology				
		tools, including estimation and modelling,				
		for the analysis and solution of complex				
		limitations				
	5	Ability to use research methods including		v		\dashv
	5	literature search, designing and conducting				
		experiments, collecting data, analysing and				
		interpreting results, to investigate complex				
		engineering problems.				
	6	Knowledge of the effects of engineering	x			
		practices on society, health and safety,				
		economy, sustainability and environment				
		Sustainable Development Goals: awareness				
		of the legal consequences of engineering				
		solutions.				
	7	Acting in accordance with the ethical	x			
		principles of the engineering profession,				
		awareness of ethical responsibilities;				
		awareness of non-discrimination,				
		impartiality and embracing diversity.			_	-
	8	Ability to work effectively as a team	X			
		within interdisciplinary teams (face-to-				
		face, distance or hybrid).				
	9	Ability to communicate effectively on				
	-	technical issues, both orally and in writing,				
		taking into account the various differences				
		of the target audience (e.g. education,				
		language, profession).				-
	10	Knowledge of business life practices such		X		
		as project management and economic feasibility analysis: awareness of				
		entrepreneurship and innovation.				
	11	Ability to learn independently and		+	+	
	11	continuously, to adapt to new and emerging				
		technologies and to think inquisitively				
		about technological changes.				
The Course's Lecturer(s) and Contact	Hea	d of Department				
Informations	tasa	<u>rim@gazi.edu.tr</u>				

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	4	3	5	4	3	1	1	1		3	
Learning outcome 1	1	1	1	1	1					1	
Learning outcome 2	1	1	1	1	1						
Learning outcome 3	1		1	1				1			
Learning outcome 4			1			1	1			1	
Learning outcome 5	1	1	1	1	1					1	

Course Description Form												
Course Code and Name	ETM336 EC	ONOMIC DESIGN										
Course Semester	6											
Catalog Content	The importar consequences The importan Basic principl Analyzing the to reduce cost Management of target costi	the of economics in industrial design and its effects on the economic of design decisions ce and strategies of cost management in the product development process les and organizational structure of product development cost accounts e factors affecting manufacturing costs and examining the strategies used is and control of costs in the product development process through the use ng and alternative cost techniques										
Textbook	 Parameswi Edition, 20 Cross, N., Sons, Ltd. Yaşar, r. Ş yayin dağı 	aran, M.A., An Introduction to Design Engineering, Alpha Science Pub., Int. 004 Engineering Design Methods-Strategies for Product Design, John Wiley & , New York, 2001. yeni ürün geliştirme sürecinde maliyet yönetimi teknikleri, kitapana basim tim bilişim izmir – 2016										
Supplementary Textbooks	1. Elder, W. CRC Pres	E. ve Hosnedl, S., Design Engineering: A Manual for Enhanced Creativity, s, Int. Edition, 2008.										
Credit	3 ECTS											
Prerequisites of the Course	No Prerequisi %70 Attendar	tes nce Requirements										
Type of the Course	Elective											
Instruction Language	Turkish	urkish										
Course Objectives	Understanding the importance of cost management in industrial design and develo ability to think cost-oriented in the design process Gaining the ability to perform cost analysis in the product development process ar evaluating design decisions in terms of cost effectiveness Effective management and control of costs by applying strategic cost management principles in the product development process											
Course Learning Outcomes	 Learning the its applica Understand to real wo Identifying Developing learning the 	he basic concepts and skills related to cost management in industrial design. e ability to perform cost analysis in product development phases and learning bility. ling the importance of strategic cost management principles and relating them rld applications. strategies to reduce manufacturing costs and learning their applicability. g cost optimization skills through the use of target costing methods and heir applicability in practice.										
Instruction Methods	Face to face											
Weekly Schedule	Internotes 1. Week Introduction 2. Week Cost responsibility of product developers 3. Week Cost management in product development 4. Week Methods for product development cost management and 5. Week Impact on life cycle costs 6. Week Impact on total costs 7. Week Factors affecting manufacturing costs and processes to reduce costs 8. Week Cost Management Systems 9. Week The Importance of Cost Management in New Product Development Protect 10. Week Emergence of Target Costing 11. Week Theory of Target Costing 12. Week Basic Principles of Target Costing 13. Week Target Cost Management Techniques											

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library Designing and implement Report preparing: 0 Preparing a Presentation: Presentations: 0 Preparation of Midterm an Final Exam and Preparatio Other:0	Veekly tutorial course nours: 2 Veekly tutorial hours: 0 Ceading Activities: 4 Internet browsing, library work: 3 Designing and implementing materials: 3 Ceport preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3 Other:0											
				Numbers		Total Weightin					ing (%)		
	Midterm Exams Assignment Application			1 1 1				40 20					
Assassment Criteria	Projects												
Assessment Criteria	Practice												
	Quiz							()					
	Studies (%)							00					
	Percentage of Final Exam	to Total						40					
	Score (%)												
	Attendance						D //			r	Fot	al	
			A	Activity	Total Numbe of Weel	r KS	Duration (weekly hour)	1		P V I	Perio Vor Load	od k i	
			The	coretical Course	14		2				28	;	
		Weekly	orial Hours										
		Reading Tasks			5		4				20)	
		Studies			5		3		1		15	;	
		Materia	l De	sign and	2		3				6		
		Implem	enta Dura	tion		_						_	
Workload		Report	Prep									_	
		Dresent		Presentation								_	
		Midterr	n Ex	s and 1		3						_	
		Prepera Exam	tion	for Midterm	1						5		
		for Final	xam ıl Ex	and Preperation	I		3				3		
		Other (shou	ıld be		T							
		Total W	/orkl	load	_		-				75	;	
		Total W	/orkl	load / 25						ŕ	75/2	25	
		Course	Crec	lit (ECTS)							3		
		No		Program Outcom	ies			1	2	3	4	5	
		1	In-d scie	epth knowledge o	f mathem	atic	cs,	x	2	5	т 	5	
Contribution Level Between Course Learning			com engi kno	puter-aided comp ineering areas; abi wledge effectively	uting and lity to use in solvir	l spe e th ng c	ecific is complex						
Outcomes and Program Outcomes			engi	ineering problems			malara				-		
			Abi.	ing to identify, for	mulate a	na a usi	ng			X			
			kno	wledge of basic sc	ience, ma	athe	ematics						
			and engineering, and taking into account the UN Sustainable Development Goals.										
				bility to generate creative solutions to x					\rightarrow	\neg			
		com	plex engineering	oroblems	to	meet							

		current and future needs; design complex systems, processes, devices or products				
		under realistic constraints and conditions.			+	+
	4	techniques resources and modern		x		
		engineering and information technology				
		tools, including estimation and modelling,				
		for the analysis and solution of complex				
		engineering problems, recognising their				
		limitations.			+	+
	>	literature search, designing and conducting				
		experiments, collecting data, analysing and				
		interpreting results, to investigate complex				
		engineering problems.				
	6	Knowledge of the effects of engineering	х			
		practices on society, health and safety,				
		within the framework of the UN				
		Sustainable Development Goals; awareness				
		of the legal consequences of engineering				
		solutions.			\rightarrow	
	7	Acting in accordance with the ethical	х			
		principles of the engineering profession,				
		awareness of concarresponsionnes,				
		impartiality and embracing diversity.				
	8	Ability to work effectively as a team	x			
		member or leader both individually and				
		face distance or hybrid)				
	0	Ability to communicate effectively on				
		technical issues, both orally and in writing,				
		taking into account the various differences				
		of the target audience (e.g. education,				
	10	language, profession).		_		
	10	as project management and economic			x	
		feasibility analysis; awareness of				
		entrepreneurship and innovation.				
	11	Ability to learn independently and		x		
		continuously, to adapt to new and emerging				
		technologies and to think inquisitively				
	1	about weimological clidilges.				
	Dr Ö	Dğr. Üvesi Orhan ERDEN				
The Course's Lecturer(s) and Contact	Oerc	en@gazi edu tr				
11101 mations	0010	<u>ona, guznouu.u</u>				

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	1	3	1	2		2				5	2
Learning outcome 1	1	1		1						1	
Learning outcome 2		1		1						1	
Learning outcome 3										1	1
Learning outcome 4		1	1			1				1	
Learning outcome 5						1				1	1

Course Description Form											
Course Code and Name	ЕТМ337 СО	ST ANALYSIS IN DESIGN									
Course Semester	5										
Catalog Content	Understandin Understand the distribution and Analyze the strategies to in	g basic cost analysis ne analysis of costs allocated to different functions such as production, nd administration relationship between production quantity, costs and profit and identify nerease profitability									
Textbook	 Gündüz, 2013. Ev Olson, D Hall 	H.E., Gürdal, K. ve Elmacı, O., Maliyet Analizleri, Anadolu Üniversitesi, ans, J. R., Olson, D. L., & . L. (2007). Statistics, data analysis, and decision modeling. Pearson/Prentice									
Supplementary Textbooks	1. Blank, L.	, & Tarquin, A. (2005). Engineering economy. McGraw-Hill									
Credit	3 ECTS										
Prerequisites of the Course	No Prerequisi %70 Attendar	tes nee Requirements									
Type of the Course	Elective										
Instruction Language	Turkish										
Course Objectives	Understand an process To gain the al To gain the al knowledge an To be able to evaluate these 1. Ability to a effective so 2. Ability to	and analyze the role of economic factors and market conditions in the design polity to solve complex problems and the ability to make logical analysis polity to create new solutions and designs by bringing together different d ideas calculate the costs of new products emerging in the design process and to e costs in economic terms analyze complex design problems in a rational way and produce logical and polutions evaluate the economic impact of industrial design projects by analyzing for the products of market and distance									
Course Learning Outcomes	 Ability to manage industrial design projects and take an active role in decision-making processes Ability to calculate the costs of new design products and optimize these costs The ability to develop innovative design products and evaluate the marketability of these products through creative and synthetic thinking 										
Instruction Methods	Face to face										
	1. Week	Definition of Supply and Demand									
	2. Week	Elasticities of Supply and Demand									
	4 Week	Individual and market demand utility theory									
	5. Week	Introduction to cost theory									
	6. Week	Total, average and marginal costs									
	7. Week	fixed and variable costs									
Weekly Schedule	8. Week	Economic review in Cost Analysis									
	9. Week	Cost Analysis in New Product Development Process									
	10. Week	Technical review in Cost Analysis									
	11. Week	Determination of capacity utilization rate									
	12. Week	Financial review in Cost Analysis									
	13. Week	Product Costing Process									
	14. Week	Determination of the repayment period									

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library Designing and implement Report preparing: 0 Preparing a Presentation: Presentations: 0 Preparation of Midterm an Final Exam and Preparatio Other:0	Veekly tutorial course nours: 2 Veekly tutorial hours: 0 teading Activities: 4 nternet browsing, library work: 3 Designing and implementing materials: 3 teport preparing: 0 Preparing a Presentation: 0 Preparation of Midterm and Midterm Exam: 3 Prinal Exam and Preparation for Final Exam: 3 Other:0										
				Numbers]	Fotal We	g ('				
	Midterm Exams Assignment Application			1 1 1				40 20				
Assessment Criteria	Projects											
	Practice											
	Quiz							<u>(</u>)				
	Studies (%)							00				
	Percentage of Final Exam	to Total	-					40				
	Score (%)											
	Attendance						D (1			r	Fot	
			A	ctivity	Total Numbe of Weel	r KS	Ouration (weekly hour)	1		P V I	eri Vor Load	od k i
			The	oretical Course	14		2				28	;
			Tut	orial Hours								
		Reading	sks	5		4				20)	
		Studies	2		5		3				15	;
		Materia	l De	sign and	2		3				6	
		Implem	enta	tion								
Workload		Report	Prep	aring								
		Preparii	ng a	1 Presentation								_
		Presenta	ation	IS	1		2					
		Prepera Exam	tion	for Midterm	1		3				3	
		Final Ex for Fina	xam 1 Ex	and Preperation am	1		3				3	
		Other (shou	ıld be								
		Total W	orkl	oad							75	;
		Total W	orkl	oad / 25						ŕ	75/2	25
		Course	Crec	lit (ECTS)							3	
		No		Program Outcom	ies			1	2	3	4	5
		1	In-d scie com	epth knowledge o nce, basic enginee	f mathem ring conduting and	natio cept	cs, ts, ecific		x	-	-	
Contribution Level Between Course Learning			engi kno engi	ineering areas; abi wledge effectively ineering problems.	lity to us in solvir	e th	is complex					
Outcomes and Program Outcomes			2 Ability to identify, formulate and an				analyse			x		
			com	plex engineering puledge of basic as	problems	usi	ing					
			and engineering, and taking into account									
			the	UN Sustainable D	evelopme	ent	Goals.					
				lity to generate cre plex engineering	ative sol	utic to 1	ons to meet	x				

							_
		current and future needs; design complex systems, processes, devices or products					
		under realistic constraints and conditions.					
	4	Ability to select and use appropriate	-	x			
		techniques, resources and modern					
		engineering and information technology					
		tools, including estimation and modelling,					
		for the analysis and solution of complex					
		engineering problems, recognising their					
		limitations.		_	+		
	5	Ability to use research methods, including					
		experiments, collecting data, analysing and					
		interpreting results to investigate complex					
		engineering problems					
	6	Knowledge of the effects of engineering					
	0	practices on society, health and safety.					
		economy, sustainability and environment					
		within the framework of the UN					
		Sustainable Development Goals; awareness					
		of the legal consequences of engineering					
		solutions.			\rightarrow		
	7	Acting in accordance with the ethical					
		principles of the engineering profession,					
		awareness of ethical responsibilities;					
		awareness of non-discrimination,					
		A hility to work offectively on a term		_	+	+	
	8	Monthly to work effectively as a learn	x				
		within interdisciplinary teams (face-to-					
		face, distance or hybrid).					
	9	Ability to communicate effectively on			-		
		technical issues, both orally and in writing,					
		taking into account the various differences					
		of the target audience (e.g. education,					
		language, profession).					
	10	Knowledge of business life practices such		2	K		
		as project management and economic					
		feasibility analysis; awareness of					
		entrepreneurship and innovation.			\rightarrow		
	11	Ability to learn independently and		x			
		continuously, to adapt to new and emerging					
		about technological changes					
		about technological changes.					┙
	D., /						
The Course's Lecturer(s) and Contact	Dr.0	Jgr. Uyesi Urnan EKDEN					
Informations	oerc	<u>len@gazi.edu.tr</u>					

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	2	3	1	2				1		3	2
Learning outcome 1	1	1		1						1	
Learning outcome 2	1	1		1							
Learning outcome 3								1		1	1
Learning outcome 4		1	1								
Learning outcome 5										1	1

	Course Description Form										
Course Code and Name	ETM338 EC	OLOGICAL DESIGN									
Course Semester	6										
Catalog Content	Professional a Ability to use Teamwork and Ability to com Ability to ider Ability to desi	nd ethical responsibility modern engineering methods d leadership skills. municate verbally and in writing tify, formulate and solve problems gn, implement and design experiments									
Textbook	 White, P., Design, Ol Van der R Press, 200 	Pierre, L., Belletire and S. Okala, Practitioner: Integrating Ecological kala Team, 2013 yn, S., Cowan, S., Ecological Design, Tenth Anniversary Edition, Island 7.									
Supplementary	1. Melnick, I	Melnick, R. (2001). Ecology and design: frameworks for learning. Island Press.									
Credit	3 ECTS										
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70									
Type of the Course	Elective										
Instruction Language	Turkish	kish									
Course Objectives	Understanding Understand th To learn solut To have know	Understanding the engineering profession and ethics Understand the field of design engineering activities To learn solution approaches to engineering problems To have knowledge of basic design and engineering issues									
Course Learning Outcomes	 Awareness Develop an processes effe Gain the ab Understand ideologies Designs car environmental 	of social equity and taking these values into account in the design process understanding of ecological design processes and the ability to manage these ctively ility to learn and apply measurement methods of environmental performance eco design ideologies and develop the ability to design in line with these n be understood as a holistic system view, encompassing the full spectrum of impacts over the entire life cycle									
Instruction Methods	Face to face										
	1. Week	Introduction to ecological design									
	2. Week	Product system lifecycle									
	3. Week	Ecodesign strategy wheel									
	4. Week	Evolving strotegies									
	6 Week	Design for recycling									
	7 Week	Ecological design processes									
Wookly Schodulo	8. Week	Measuring environmental performance									
Weekly Scheude	9. Week	The science of life cycle assessment									
	10. Week	Assessment of toxicity									
	11. Week	Design ethics - Biotic and social imperatives									
	12. Week	Ecology for designers									
	13. Week	Ensuring social equality									
	14. Week	Ecological Design Practices									

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library Designing and implement Report preparing: 7 Preparing a Presentation: 0 Preparation of Midterm an Final Exam and Preparatio Other:0	Veekly theoretical course hours: 2 Veekly tutorial hours: 0 Reading Activities: 2 Internet browsing, library work: 5 Designing and implementing materials: 5 Report preparing: 7 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 4 Other:0										
				Numbers		Total W	/ei	ght	ting	g (%	6)	
	Midterm Exams					10						
	Assignment			1			4	20				
	Application											
Assessment Criteria	Projects											
	Practice											
	Quiz Demont of In term							50				
	Studies (%)						,	,0				
	Percentage of Final Exam	to Tota	1				4	10				
	Score (%)											
	Attendance											
			A	ctivity	Total Number of Weeks	Durati (weekl hour)	on y			T P W L	fota eric Vor oac	al od k l
			Weekly Theoretical Course Hours				2				28	
		Weekly	/ Tuto	orial Hours								
		Reading	g Tas	ks	4		2	-			8	
		Studies			3		5					
		Materia	al Des	ion and					-		15	
		Implem	nentat	ion	2	5					10	
		Report	Prepa	aring	1	7			7			
Workload		Prepari	ng a I	Presentation								
		Present	ation	5					1			
		Midterr	m Exa	am and								
		Prepera	ation f	for Midterm	1		3				3	
		Exam Einal Ei		and Duan anotion					\dashv			
		for Fina	al Exa	and Freperation	1	4	4				4	
		Other (shou	ld be								
		emphas	sized)						\neg			
		Total W	Vorklo	bad					\dashv		75	
		Total W	Vorkle	oad / 25					\dashv	/	5/2	25
		Course	Cred	it (ECTS)			_		_		3	
		No		Program Outcom	es			1	2	3	4	5
		1	In-de	epth knowledge of	fmathema	tics,		+	+	-	+	
		scier	nce, basic enginee	ring conce	pts,							
		com	puter-aided comp	uting and s	pecific							
Contribution Level Between Course Learning Outcomes and Program Outcomes			engu	neering areas; abi	lity to use f	his complex						
			engi	neering problems.	in solving	complex						
			Abil	ity to identify, for	mulate and	lanalyse	\uparrow	+	\uparrow	+	\uparrow	
			com	plex engineering j	problems u	sing						
			knowledge of basic science, mathematics									
	the UN Sustainable Development Goals.											
		3	Abil	ity to generate cre	ative solutions to					+	,	ς Ι

	4	complex engineering problems to meet current and future needs; design complex systems, processes, devices or products under realistic constraints and conditions. Ability to select and use appropriate techniques, resources and modern engineering and information technology tools, including estimation and modelling, for the analysis and solution of complex engineering problems, recognising their limitations				x
	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.			x	
	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.				X
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.				X
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).				
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).				
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.		x		
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.	X			
The Course's Lecturer(s) and Contact Informations	Prof. <u>vozd</u>	Dr. Veysel ÖZDEMİR emir@gazi.edu.tr				

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	outcome	outcome	outcome	outcome	outcome	outcome	outcome	outcome	outcome	outcome	outcome
	1	2	3	4	5	6	7	8	9	10	11
TOTAL			5	5	4	5	5			2	1
Learning outcome 1			1	1	1	1	1			1	
Learning outcome 2			1	1	1	1	1			1	
Learning outcome 3			1	1	1	1	1				
Learning outcome 4			1	1	1	1	1				
Learning outcome 5			1	1		1	1				1

	Course Description Form
Course Code and Name	ETM339 SHEET METAL MOLD DESIGN
Course Semester	5
Catalog Content	Sheet-metal dies and their importance in industry Factors affecting die operation, Sheet-metal behavior theory, Introduction of punching-cutting and bending dies, Die elements and their tasks, Calculations required for sheet-metal die design, Creation of lane layout plan, Punching-cutting, bending and drawing mold design Errors in molded parts and methods of eliminating errors
Textbook	 Such, I. (2006). <i>Handbook of die design</i>. New York: Mc-Graw Hill Pub. Boljonovic, V. (2005). <i>Die design fundamentals</i>. New York: Industrial Press.
Supplementary Textbooks	 Research in Engineering Design Int. Journal of Design Engineering
Credit	3 ECTS
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Understanding the importance of sheet metal molds and industry, Learning the factors affecting mold operation, Learning mold elements and their functions, Being able to make the necessary calculations for sheet metal mold design, Learning drilling-cutting, bending, and drawing mold design, Learning the Errors Occurring in Molded Parts and Correction Methods
Course Learning Outcomes	 Basis of die design is learned. Better sheet-metal die designs based on knowledge of this course can be learned.
Instruction Methods	Face to face

	1. Week	Sheet-r	netal dies: Definition, functions and ind	ustrial importance						
	2. Week	Basic s	heet-metal die design	Ĩ						
	3. Week	Factors	affecting die operation							
	4. Week	The the	eory of sheet metal behavior							
	5. Week	Metal o	cutting/punching dies and their functions	3						
	6. Week	Calcula	Calculations required for cutting and punching dies							
	7. Week	Strip m	Strip material placement and efficiency in cutting and punching dies							
Weekly Schedule	8. Week	Die ele	Die elements							
	9. Week	Cutting	Cutting and punching mold design							
	10. Week	Bendin	g molds: Bending process and related ca	alculations						
	11. Week	Bending die design and bending die examples								
	12. Week	Drawir	ng dies: Drawing process and related cale	culations						
	13. Week	Drawir	ng die design and drawing die examples							
	14. Week	Faults in molded parts and methods of eliminating faults								
Teaching and Learning Methods	Weekly theoreti Weekly tutorial Reading Activit Internet browsin Designing and i Report Preparin Preparation of M Final Exam and	ical cours hours: 0 ies: 0 ng, librar mplemen g: 5 Aidterm Prepara	se hours: 2 y work: 4 nting materials: 5 and Midterm Exam: 3 tion for Final Exam: 4							
			Numbers	Total Weighting (%)						
	Midterm Exan	15	1	40						
	Assignment		1	20						
	Application									
Assessment Criteria	Projects									
rissessment eriteria	Practice									
	Quiz									
	Percent of In-t	erm		60						
	Studies (%)	Final								
	Exam to Total	Score	1	40						
	Attendance	50010								

		Activity	Total Number of	Duratio n (weekly			Total Period Work Load		
	Weekly	Theoretical Course	14	2			28		
	Weekly	Tutorial Hours							
	Readin	g Tasks							
	Studies		5			4			20
	Materia Implen	al Design and nentation	2	5			10		
Workload	Report	Preparing	2			5			10
w orkioau	Prepari	ng a Presentation							
	Present	ations							
	Prepera Exam	tion for Midterm	1			3			3
	Final E for Fina	xam and Preperation	1			4			4
	Other (emphas	should be sized)							
	Total V	Vorkload	-			-			75
	Total V	Vorkload / 25					75/25		
	Course	Credit (ECTS)							3
	No	No No				3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	e in e and pertaining lline; ical and in these olve s.				x			
	2	Ability to identify, fo and solve complex e problems; ability to s apply proper analysis modeling methods fo purpose.	ormulate, ngineering select and s and or this						
		3 Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this					x		
	4	Ability to develop, so use modern technique tools necessary for a solution of complex in engineering applic ability to use informa- technologies effective	elect and es and nalysis and problems cations; ation ely.		x				

	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.		x			
	6	Ability to work efficiently in intra-disciplinary teams.					
	7	Ability to work efficiently in multi-disciplinary teams.		x			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.			x		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.				x	
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			x		
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.	x				
The Course's Lecturer(s) and Contact Informations		Prof. Dr. İsmail ŞAHİN isahin@gazi.edu.tr					

	Program Outcome 1	Program Outcome2	Program Outcome3	Program Outcome 4	Program Outcome5	Program Outcome6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
TOTAL	4		4	2	2		2	3	4		
Learning							1		1		
outcome											
1											
Learning	1		1	1	1				1		
outcome											
2											
Learning	1		2				1	2			
outcome											
3											
Learning	1		1	1					1		
outcome											
4											
Learning	1				1						
outcome											
5											
Learning								1	1		
outcome											
6											

Course Description Form								
Course Code and Name	ETM341 PSYCHOLOGY IN DESIGN							
Course Semester	5							
Catalog Content	Understanding the dynamics behind behavior and decision-making processes General knowledge and skills about User Experience (UX) and User Interface (UI) design Ability in behavior design in the interaction between humans and the environment							
Textbook	 Joe Leech, Psychology for Designers: How to apply psychology to web design and the design process, mrjoe press; 2nd edition, 2017. 							
Supplementary Textbooks	 Aarron Walter, Designing For Emotion, A Book Apart, 2020. Sheena Iyengar, The Art Of Choosing: The Decisions We Make Everyday of our Lives, What They Say About Us and How We Can Improve Them, Abacus, 2011. 							
Credit	3 ECTS							
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements							
Type of the Course	Elective							
Instruction Language	Turkish							
Course Objectives	Gaining competency in understanding the psychological counterparts of the human mind and functions in psychology. Learning fundamental approaches and tools that take into account human behavior to find lasting design solutions to global challenges.							
Course Learning Outcomes	 Understanding of the fundamental psychological processes that govern human behavior, emotions, attitudes, and decision-making. Understanding of the basic aspects of user interface design. Knowledge of basic behavioral and social science methodology and psychometrics, including ethics. Ability to conduct a simple behavioral intervention design. 							
Instruction Methods	Face to face							

	1. Week Introduction to design psychology							
	2. Week	Understanding human	n behavior and	l experience				
	3. Week	Emotions, attitudes, a	nd decision-m	naking processe	es			
	4. Week	Human-technology in	nteraction					
	5. Week	Psychometrics						
	6. Week Introduction to design for behavior change							
Weekly Schedule	Design methods for b	Design methods for behavior change						
	8. Week	Design ethics						
	9. Week	Emotion mapping						
	10. Week	Design for well-being	g					
	11. Week	Becoming a savvy co	nsumer of soc	ial science				
	12. Week	User Experience Des	ign (UX)					
	13. Week	User Interface Design	n (UI)					
	14. Week	Application						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 3 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4							
			Numbers	Total Weighting (%)				
	Midterm Exar	ns	1	40				
	Assignment							
	Application		2	20				
Assessment Criteria	Projects							
	Practice							
	Quiz Dercent of In	term Studies		60				
	(%)	ierin Studies						
	Percentage of Score (%)	Final Exam to Total		40				
	Attendance							

		Activity	Total Numbe r of Weeks	Dur (we hou	ation ekly r)	1	T Pe W Lo	otal riod ork oad
	Weekly Hours	7 Theoretical Course	14	2			28	
	Weekly	Tutorial Hours						
	Readin	g Tasks	5	3			15	
	Studies		5	2				10
Workload	Materia Implem	I Design and ientation	2	3			6	
	Report	Preparing						
	Present	ations						
	Midteri Prepera	n Exam and tion for Midterm	2		4			8
	Exam Final E for Fina	xam and Preperation	2		4			8
	Other (emphas	should be sized)						75
	Total W	Vorkload	-	-			75/25	
	Course	Credit (ECTS)				3		
	Program Outcom		nes	1	2	2	4	
	No	6		1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to						
	2	Ability to identify, for and solve complex en problems; ability to s apply proper analysis modeling methods for purpose.	ormulate, ngineering select and s and or this					
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design method Ability to develop, so use modern techniqu	omplex ice or ic itions, in et the v to apply ods for elect and ues and					
		and solution of comp problems in engineer applications; ability t information technolo effectively.	nalysis blex ring to use ogies					

11	Conformity to ethical	x			
10	lifelong learning; ability to access information, to follow developments in science and technology, and to continue to				
9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive. Recognition of the need for	x	x		
8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of			X	
7	Ability to work efficiently in multi-disciplinary teams.		x		
6	Ability to work efficiently in intra-disciplinary teams.				
5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.				

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
						6					
TOTAL							2	3	2	1	1
Learning outcome 1							1	1	1		
Learning outcome 2								1	1		
Learning outcome 3							1				
Learning outcome 4								1		1	1

	Course Description Form
Course Code and Name	ETM343 MANUFACTURING TECHNOLOGIES 2
Course Semester	5
Catalog Content	Understanding of machining methods Understanding of work and tool molds Understanding of metal shaping methods Understanding of powder metallurgy Ability to manufacture a simple system using the learned methods
Textbook	 Degarmo, E.P, Black, J.T. and Kohser, R.A. (1997). <i>Materials and processes in manufacturing</i>. USA: Prentice-Hall, Inc, Int. Ed. Boothroyd, G., Knight, W. A. (1989). <i>Fundamentals of machining and machine cutting</i>. New York: Mark Dekker Inc. M.P. Groover, <i>Fundamentals of modern manufacturing</i>, 3rd ed., 2007, Wiley
Supplementary Textbooks	 Kalpakjian, S., Schmid, S. R. (2005). Manufacturing engineering and technology. Londra: Pearson, 5th Ed. DeGarmo, E. P., Black, J. T. (2007). Materials and processes in manufacturing. USA: John Wiley & Sons, 10th Ed.
Credit	3 ECTS
Prerequisites of the Course (<i>Attendance Requirements</i>)	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Learning machining methods Learning modern manufacturing methods Learning high-speed shaping of metals
Course Learning Outcomes	 Learning basic operations and practical applications Learning turning methods Learning milling methods Learning grinding methods Learning work and assembly molds
Instruction Methods	Face to face

	1. Week	Introduction and ba	asic concepts					
	2. Week	Machining: Turnin	g method, too	ls, fasteners				
	3. Week	Turning methods a						
	4. Week	Taper turning, scre						
	5. Week	. Week Machining: Milling method tools, fasteners						
	6. Week	Milling methods and applications						
Weekly Schedule	7. Week	Simple division, sp						
weekly Schedule	8. Week	Simple division, sp	lit division					
	9. Week	Slotted partition, A	ngular partitio	on				
	10. Week	Machining: Grindi	ng methods (s	anding, grindir	ng, honing,	lapping, etc.)		
	11. Week	Plane grinding, Cy	lindrical grind	ing, Centerless	s grinding			
	12. Week	Tool sharpening an	nd polishing op	perations				
	13. Week	Binding business p	atterns					
	14. Week	Assembly Molds						
Teaching and Learning Methods	Weekly theoret Weekly tutorial	tical course hours: 2 hours: 0						
(These are examples. Please fill which	Internet browsi Designing and	ng, library work 5	s: 5					
activities you use in the course)	Report preparir	ng: 0						
	Preparing a Pre	esentation: 0						
	Presentations: ()						
	Preparation of I	Midterm and Midterm	Exam: 4					
	Final Exam and	l Preparation for Final	Exam: 4					
			Numbers	Total Weighting				
	Midterm Exan	ns	1	60				
	Assignment							
	Application Projects							
Assessment Criteria	Practice							
	Quiz							
	Percent of In-term Studies 1 60							
	Percentage of Final Exam to Total							
	Score (%)	- mar Launi to Totul	1	40				
	Attendance							

		Activity	Total Number of	Duratio n (weekly			Total Period Work Load		
	Weekly	Theoretical Course	14	2				28	
-		Tutorial Hours							
		g Tasks							
			2	7					14
		al Design and	5	5			25		
XV1 11	Report	Preparing							
workload	Prepari	ng a Presentation							
	Present	ations							
	Midteri Prepera Exam	n Exam and tion for Midterm	I			4			4
	Final E	xam and Preperation	1			4			4
	Other (should be							
	Total W	/orkload	-	-			-		75
	Total W	/orkload / 25					75/25		
	Course	Credit (ECTS)							3
	No	Program Outcom	nes	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		Adequate knowle mathematics, scie engineering subjects to the relevant ability to use theor applied information areas to model engineering problem Ability to identify, fo	edge in nce and pertaining discipline; retical and in these and solve s.	x					
		and solve complex en problems; ability to s apply proper analysis modeling methods fo purpose.	ngineering select and s and or this			x			
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design meth	omplex ice or ic itions, in et the v to apply ods for this	x					
	4	Ability to develop, so use modern techniqu tools necessary for an solution of complex in engineering applic ability to use informatechnologies effectiv	elect and es and nalysis and problems cations; ation ely.		x				
	5	Ability to design and experiments, gather of analyze and interpret examination of engir problems or disciplir research topics.	l conduct data, results for neering ne-specific				x		

	6	Ability to work efficiently in intra-disciplinary teams.		x			
	7	Ability to work efficiently in multi-disciplinary teams.				x	
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	x				
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive				x	
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			x		
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.		x			
The Course's Lecturer(s) and Contact Informations	Prof. Dr. Adnan AKKURT aakkurt@gazi.edu.tr						

	Program Outcome 1	Program Outcome 2	Program Outcome 3	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7	Program Outcome 8	Program Outcome 9	Program Outcome 10	Program Outcome 11
TOTAL	1	2	1	2	4	2	4	1	4	3	2
Learning outcome 1	1	1	1		1		1	1	1		
Learning outcome 2		1		1	1		1		1		1
Learning outcome 3			1	1	1				1	1	
Learning outcome 4					1	1	1		1	1	
Learning outcome 5			1				1			1	1

	Course Description Form								
Course Code and Name	ETM350 SYSTEMATIC DESIGN 2								
Course Semester	6								
Catalog Content	Preparation and project selection, Introduction to Embodiment Design (ED), ED concepts and issues, ED general rules (clarity, simplicity and safety), ED principles (force distribution, separation of services, self-help, stability and bi-stability, flawless design), ST sample (Impact experimental set). ED example (Impulse-loading test rig).								
Textbook	1. Börklü, H.R. (Turkish trans.), Mühendislik Tasarımı Sistematik Yaklaşım ('Pahl, G., Beitz, W., Feldhusen, J. ve Grote, K.H, Engineering Design: A Systematic Approach, Springer, 2007'), Hatiboğlu Yayınevi, Ankara, 2010.								
Supplementary Textbooks	 Cross, Nigel. Engineering design methods: strategies for product design. John Wiley & Sons, 2021. 								
Credit	3 ECTS								
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements								
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	To have knowledge about ED concepts and issues Learning the general rules of ED (clarity, simplicity and safety) Learning the ED Principles Examine and understand ED examples To be able to perform ED of simple systems								
Course Learning Outcomes	 Ability to apply basic principles of forming design Ability to define the components of systems, determine their relationships, and evaluate the interactions between these components Ability to design systems in accordance with engineering standards and methods Ability to understand problems by seeing real-world applications of forming design 								
Instruction Methods	Face to face								

	1. Week	k Summary and evaluation of Systematic Design 1 course							
	2. Week	Selection of the term	design project	;					
	3. Week	Embodiment Design Application	(ED): Introduc	ction, Importa	nce,				
	4. Week	Concepts and issues of	of ED						
	5. Week	A checklist for ED, E	D General rul	es: (a) Clarity					
	6. Week	ED General rules: (b)	Simplicity, (c	e) Safety (gene	eral)				
	7. Week	(c) Safety (direct, ind	irect and warn	ings), Data sh	eets				
	8. Week	Material selection, Application with the use of ED ch							
Weekly Schedule	9. Week	Principles of ED: (a) force and uniform stre transmission path, Ma	Principles of ED: (a) Force transmission (Flow lines of force and uniform strength, Direct and short force transmission path, Matched deformations)						
	10. Week	Balanced forces, (b) I Sub-functions, Divisi Division of tasks for i	Division of tas on of tasks for identical funct	ks (Assignmen distinct funct ions)	nt of ions,				
	11. Week	(c) Self-help (Self-rei solutions, Self-protec	nforcing solut ting solutions)	ions, Self-bala	uncing				
	12. Week	(d) Stability and bi-st	ability, (e) Faı	ılt-free design					
	13. Week	ED example: Impulse	-loading test r	ig					
	14. Week	Examination of design projects							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 2 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 2 Presentations: 1 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2								
			Numbers	Total Weighting					
	Midterm Exar	ns	1	40	1				
	Assignment				-				
	Application Projects		1	20	-				
Assessment Criteria	Practice		1	20	-				
	Quiz				1				
	Percent of In-	erm Studies		60					
	(%) Percentage of	Final Exam to Total		40	-				
	Score (%)								
	Attendance								

		Activity Tota Num r of Wea			ration ekly r)	Total Period Work Load			
	Weekly	Theoretical Course	14	2				28	
	Weekly	Tutorial Hours							
	Readin	g Tasks							
	Studies		5		2			10	
	Materia Implem	al Design and	5		2			10	
	Report	Preparing							
Workload	Prepari	ng a Presentation	10		2			20	
	Present	ations	3	1				3	
	Midtern Prepera Exam	m Exam and ation for Midterm	1	2			2		
	Final E for Fina	xam and Preperation al Exam	1		2			2	
		snould be sized)							
	Total V	Vorkload	-	-			75		
	Total V	Vorkload / 25				75/25			
	Course	Program Outcom	les					3	
	No		105	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering		x				
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	bility to identify, formulate nd analyse complex ngineering problems using nowledge of basic science, nathematics and engineering, nd taking into account the UN ustainable Development Goals.						
	3	Ability to generate crossolutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet eds; design cesses, nder nd		X				
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, incl- estimation and model the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.		x				
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre results, to investigate engineering problems	n methods, arch, ting ng data, eting complex		x				
	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	X						
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	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.							
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).							
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).							
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and							
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.	X						
The Course's Lecturer(s) and Contact Informations		Prof. Dr. Hüseyin Rıza BÖ	RKLÜ	I					

rborklu@gazi.edu.tr

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5	Outcome6	Outcome7	çıktısı 8	Outcome9	Outcome10	Outcome11
TOTAL	2	2	2	2	2	1					1
Learnin	1	1	1	1	1						1
g											
outcome											
1											
Learnin	1	1									
g											
outcome											
2											
Learnin			1								
g											
outcome											
3											
Learnin				1	1	1					
g											
outcome											
4											

	Course Description Form
Course Code and Name	ETM351 AUTOMATIC CONTROL
Course Semester	5
Catalog Content	Learning the definition, importance and application areas of automatic control, mathematical foundations such as differential equations, Laplace Transform, function transformations, basic control concepts such as feedback control, open and closed loop systems, block diagrams, mathematical modeling of dynamic systems and control strategies of these systems by applying them through examples.
Textbook	 Özdağ, N., Dinibütün, A.T., Kuzucu, A. (1998). Otomatik kontrol temelleri. İstanbul: Birsen Yayıncılık. Kuo, B.J. (1999). Otomatik kontrol sistemleri. İstanbul: Literatür Yayıncılık.
Supplementary Textbooks	1. Raven, F. H. (1968). Automatic control engineering. McGraw-Hill.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To teach automatic control subjects and methods. To provide application skills. To give the concept of circuit and system and to be able to apply it. To teach obtaining models of physical systems. To teach how to do system design.
Course Learning Outcomes	 Ability to explain basic concepts about automatic control Ability to apply Laplace Transform and Inverse Laplace Transform to transform functions from time-domain(t) to frequency-domain(s) (or vice versa) Be able to mathematically model dynamic systems and establish system dynamics Ability to show control systems with block diagrams Ability to use the information learned within the course in solving design problems
Instruction Methods	Face to face

	1. Week	Introduction to Autor output, control, distur	natic Control: rbance variable	System, control and es);	d automatic contro			
	2. Week	Control loop and its of disadvantages of oper	components; C n-loop and clo	pen-loop control ar sed-loop.	nd closed-loop cont			
	3. Week	Gain, transfer function	n					
	4. Week	Examine and design the control loop						
	5. Week	Laplans transform						
	6. Week	Transfer function and	l characteristic					
	7. Week							
Weekly Schedule	8. Week	Experimental studies	Experimental studies					
	9. Week	System dynamics						
	10. Week	Electrical and mecha	nical system e	lements				
	11. Week	Transfer function, blo	ock diagram ar	nd signal flow diagr	am			
	12. Week	Applications						
	13. Week	Controller types						
	14. Week	Experimental studies	, closed loop c	ontrol				
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 1 Internet browsing, library work: 1 Designing and implementing materials: 1 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2							
			Numbers	Total				
				Weighting (%)				
	Midterm Exan	ns	1	40				
	Assignment		1	20				
	Application							
Assessment Criteria	Practice							
	Quiz							
	Percent of In-1	term Studies		60				
	(%)							
	Percentage of Score (%)	Final Exam to Total		40				
	Attendance							
			1	<u> </u>				

		Activity	Total Numbe r of	Dur (we hou	•ation ekly r)	l	T Pe W Lo	otal riod ork oad
	Weekly	Theoretical Course	14		2			28
	Weekly	Tutorial Hours						
	Readin	g Tasks	5		1			5
	Studies		14		1			14
	Materia	al Design and	14		1			14
	Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midtern Prepera Exam	n Exam and tion for Midterm	4		2			8
	Final E for Fina	xam and Preperation al Exam	3		2			6
	emphas	should be sized)						
	Total W	Vorkload	-		-		, ,	75
	Total W	Vorkload / 25					75/25	
	Course	Credit (ECIS)	hes					3
	No		103	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	1 In-depth knowledge of mathematics, science, basic engineering concepts, comp aided computing and specif engineering areas; ability to this knowledge effectively solving complex engineerin problems.						
	2	Ability to identify, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN				x		
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	eative to meet ds; design cesses, nder nd	x				
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, incl- estimation and model the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.				x	
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting g data, ting complex			X		

	6 Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	
	7 Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	
	8 Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).	
	9 Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	
	10 Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and x	
	11 Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes. x	
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr	

	Program Outcome	Program Outcome2	Program Outcome3	Program Outcome	Program Outcome5	Program Outcome6	Program Outcome	Program çıktısı 8	Program Outcome	Program Outcome10	Program Outcome11
	1			4			7		9		
TOTAL	1	3	1	4	3	1		1	1	2	2
Learning	1										1
outcome											
1											
Learning		1		1							
outcome											
2											
Learning		1	1	1	1	1			1	1	
outcome											
3											
Learning				1	1						
outcome											
4											
Learning		1		1	1			1		1	1
outcome											
5											

Course Description Form							
Course Code and Name	ETM352 DESIGN FOR ADDITIVE MANUFACTURING						
Course Semester	6						
Catalog Content	Additive manufacturing and application areas Materials used in additive manufacturing Additive manufacturing technologies Basic principles of Design for Additive Manufacturing Part consolidation and toptology optimization Part consolidation and generative design Multi-scale structure design						
Textbook	 Leary, Martin. Design for additive manufacturing. Elsevier, 2019. Diegel, Olaf, Axel Nordin, and Damien Motte. A practical guide to design for additive manufacturing. Singapore: Springer Singapore, 2019. 						
Supplementary Textbooks	 Ian Gibson, David Rosen, Brent Stucker "Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing", Springer, 2014 İsmail Şahin, Design for Additive Manufacturing Lecture Notes, 2023 						
Credit	3 ECTS						
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements						
Type of the Course	Elective						
Instruction Language	Turkish						
Course Objectives	Explain the industrial application areas of additive manufacturing Evaluate the advantages and limitations of different additive manufacturing technologies Integrating additive manufacturing design and manufacturing processes Developing the ability to work with different materials in additive manufacturing Integrate design for additive manufacturing methods such as topology optimization, generative design and lattice structures into designs Developing innovative solutions to various design and production problems						
Course Learning Outcomes	 To have knowledge about the basic concepts and history of additive manufacturing. Application areas of additive manufacturing and materials used are recognized. Understand metallic and non-metallic additive manufacturing technologies. Capabilities and limitations of additive manufacturing technologies can be assessed. Strategic and functional design principles can be applied to additive manufacturing. Multi-scale and multi-material design approaches can be integrated and applied. 						
Instruction Methods	Face to face						

	1. Week	Introduction to addit history	ive manufactu	uring: Definitio	ons and			
	2. Week	Application areas of	additive man	ufacuring				
	3. Week	Materials used in ad	ditive manufa	cturing				
	4. Week	Metal additive manu	facturing and	technologies				
	5. Week	Non-metallic additiv	e manufactur	ing and technol	logies			
	6. Week	Additive manufacturing technologies: Capabilities and Limitations						
Weekly Schedule	7. Week	Strategic design con	siderations for	r Additive man	ufacturing			
	8. Week	Basic principles of I (DfAM)	Design for Add	ditive Manufac	turing			
	9. Week	Methods and tools o	f the DfAM a	pproach				
	10. Week	Part consolidation a	nd topology oj	ptimization				
	11. Week	Part consolidation a	nd generative	design				
	12. Week	Multi-scale structure design						
	13. Week	Multi-material desig	n and part ass	embly				
	14. Week	Lattice structures						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 4 Designing and implementing materials: 0 Report preparing: 0 Preparing a Presentation: 0 Presentations: 2 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 5							
			Numbers	Total Weighting				
	Midterm Exar	ns	1	40				
	Assignment							
	Application Projects		1	20				
Assessment Criteria	Practice		1	20				
	Quiz							
	Percent of In-1	term Studies		60				
	Percentage of Score (%)	Final Exam to Total		40				
	Attendance							

		Activity	Total Numbe r of Weeks	Dur (we hou	ation ekly r)	l	To l Pe d	ota rio
	Weekly Hours	7 Theoretical Course	14		2		2	or 28
	Weekly	/ Tutorial Hours						
	Readin	g Tasks	5		3		1	5
	Interne	t Studies, library	4		4		1	6
	Materia Implem	al Design and nentation						
Workload	Report	Preparing						
	Prepari	ng a Presentation						
	Present	ations	4		2		8	8
	Midtern Prepera Exam	m Exam and ation for Midterm	1		5			5
	Final E for Fina	xam and Preperation al Exam	1		5			3
	emphas	sized)						
	Total V	Vorkload	-		-		75	
	Total V	Vorkload / 25		-			75/25	
	Course	Credit (ECTS)				1		3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applic information in these model and solve eng	e in e and vant use ed areas to ineering				X	
	2	ormulate, ngineering select and s and or this			x			
	4	Ability to design a co system, process, devi product under realist constraints and condi- such a way as to mee desired result; ability modern design methor Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer applications; ability to information technolo	omplex ice or ic itions, in et the v to apply ods for elect and es and nalysis olex ring to use ogies		x			x

Learnin outcome Learnin outcome Learnin	g e 1 g e 2 g e 3	1	1	1	1				1	1				1
Learnin outcome Learnin outcome	g e 1 g e 2	1	1		1				1	1				1
Learnin	g				1									
	.	4	3	2	5 1	3 1	1		4	4				3
TOTAT		Outcome	Outcome2	Outcome	Outcome4	Outcome	Outcome6	Outcome	çıktısı 8	1 Pr 01 9	ogram itcome	Outco	im me10	Outcome
		Program	Program	Program	Program	isah	in@gazi.edu	1.tr	Program	D	ogram	Progra	m	Program
	The	Course's I	Lecturer(s)	and		Pro	f. Dr. İsmail	Şahin			· · · · · ·			
							Information in engineer	n on standar ing applicat	ds used ions.					
							principles, j ethical resp	protessional onsibility;	and					
						11	Conformity	to ethical	ue to		x			•
							development	nts in scienc	e and					
							lifelong lear	rning; abilit	y to					
						10	instructions Recognition	and to rece	ive. 1 for					
							effective pr clear and ur	esentations, nderstandab	to give					
							production	reports, to r	nake					
							reports and	understand	written			Δ		
						0	one foreign	language.	7 e			v		
							orally and i knowledge	n writing; of a minim	ım of					
						8	Ability to c effectively	ommunicate in Turkish,	e both			X		
							multi-discip	olinary team	IS.					
						7	Ability to w	vork efficier	ntly in					
						6	Ability to w intra-discip	linary teams	itly in 5.	X				
								1 000 1						
							problems or research top	r discipline- pics.	specific					
							analyze and for examina	interpret reation of eng	sults incering					
						5	experiment	s, gather dat	a,		А			

Course Description Form								
Course Code and Name	ETM353 MODELMAKING AND PROTOTYPING							
Course Semester	5							
Catalog Content	Basic modeling skills Determination of the techniques used in the process of transforming product designs into physical models Ability to select and use different modeling techniques Creating models with functional properties							
Textbook	1. Hallgrimsson, B. (2012). Prototyping and modelmaking for product design. China: Laurence King Pub, Int. Ed.							
Supplementary Textbooks	1. Direct-Write Technologies for Rapid Prototyping Applications : Sensors, Electronics, and Integrated Power Sources							
Credit	3 ECTS							
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements							
Type of the Course	Elective							
Instruction Language	Turkish							
Course Objectives	To learn basic modeling techniques To have knowledge about transforming design concepts into physical models Learning rapid prototyping techniques							
Course Learning Outcomes	 Gain knowledge of basic modeling techniques to meet current needs for engineering design. Learn the techniques used in the process of transforming complex product designs into physical models under different constraints and conditions. 3Develop the ability to select and use appropriate modeling techniques for engineering design. Gain knowledge about the effects of modeling techniques on health and safety, economy, sustainability and environment. 							
Instruction Methods	Face to face							

	1. Week	General i	nformation about the aim,	content and evaluation methods								
		of the col	urse	a in decien ancinearing								
	2. Week		of modering and prototyph									
	3. Week	Basic mo	odeling tools and materials									
	4. Week	Introduct	ion to model making: Sele	ction of materials and tools, health and s	afety rules.							
	5. Week	Introduct scale and	ion to model making: Mod assembly technical inform	lel planning and design process, scaling, nation.	choosing th							
	6. Week	Simple m	nodeling techniques: Cardb	oard, model cardboard, etc. model maki	ng with mat							
Weekly Schedule	7. Week	Simple n	nodeling techniques: Mode	l making with cardboard, model cardboa	rd, etc.							
	8. Week	Simple m	nodeling techniques: Mode	l making with balsa								
	9. Week	Simple m	nodeling techniques: Mode	l making with balsa								
	10. Week	Simple m	Simple modeling techniques: Foam materials, gluing and filling materials									
	11. Week	Simple n	nodeling techniques: Foam	materials, gluing and filling materials								
	12. Week	Design and construction of models with functional features										
	13. Week	Use of 3D printers and rapid prototyping techniques										
	14. Week	Surface t	reatment and detailing									
Teaching and Learning Methods	Weekly theoret Weekly tutorial Reading Activi Internet browsi Designing and Report preparin Preparation of p Presentation: 2 Midterm and M Final Exam and	ical course hours: 0 ties: 0 ng, library implement ng: 2 presentation lidterm Exa	hours: 2 work: 2 ing materials: 0 n: 3 am: 3 on for Final Exam: 4									
			Numbers	Total Weighting (%)								
-	Midterm Exan Assignment	15	1	30								
-	Application		1	20								
Assessment Criteria	Projects			30								
-	Ouiz											
-	Percent of In-t	erm		60								
	Studies (%)											
	Percentage of	Final		40								
	Exam to Total	Score										
	Attendance											

		Activity		D n (w	ura vee	ntio kly)		Total Period Work Load
	Weekly	Theoretical Course	14	-		2			28
	Weekly	Tutorial Hours							
	Readin	g Tasks							
	Studies		8	2			16		
	Materia Implen	al Design and nentation							
Westland	Report	Preparing	5			2			10
Workload	Preparing a Presentation		4	3		12			
	Present	ations	1			2			2
	Prepera Exam	m Exam and ation for Midterm	1			3			3
	Final E for Fina Other (xam and Preperation al Exam should be	1			4			4
		sized)		-					
	Total V	Vorkload	-			-			75
	Course	Credit (ECTS)							3
	N.	Program Outcom	ies	1		2	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	No 1 2 3	In-depth knowledge o mathematics, science, engineering concepts, aided computing and s engineering areas; abi this knowledge effecti solving complex engin problems. Ability to identify, for analyse complex engin problems using knowl basic science, mathem engineering, and takin account the UN Susta Development Goals. Ability to generate cre solutions to complex of problems to meet curr future needs; design c systems, processes, de products under realisti constraints and condit	f basic computer- specific lity to use ively in neering mulate and neering ledge of natics and ag into inable eative engineering ent and omplex evices or ic ions.		2 x	3			
	4	Ability to select and u appropriate technique and modern engineeri information technolog including estimation a modelling, for the ana solution of complex en problems, recognising limitations.	se s, resources ng and yy tools, and lysis and ngineering their	x					

	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.	x		
	6	Knowledge of the effects of engineering practices on society, health and safety, economy	x		
	7	Acting in accordance with the ethical principles of the engineering profession,			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).			
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).			
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.	x		
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			
The Course's Lecturer(s) and Contact Informations		Head of Department tasarim@gazi.edu.tr			

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	outcomol	autoomo?	outcomo?	outcomol	outcomo5	autoomof	outcomo7	outcome	autoomo	outcomo 10	outcomo11
	outcomer	outcome2	outcomes	outcome4	outcomes	outcomeo	outcome/	outcomeo	outcomes	outcomero	outcomerr
TOTAL			2	1	1	1				1	
Learning			1								
outcome											
1											
Learning			1								
outcome											
2											
4											
Learning				1	1						
outcome											
2											
5											
Learning						1				1	
outcome											
4											

	Course Description Form
Course Code and Name	ETM354 AUTOMOTIVE DESIGN
Course Semester	6
Catalog Content	History of vehicle architecture in design Gain an overview of the automotive design process Learning about systems and market segments Learning motion transmission systems Basic aerodynamic body design Identify safety and accident regulations
Textbook	Macey, S., Wardle, G., The Fundamentals of Car Design and Packaging, Design Studio Press, 2009
Supplementary Textbooks	Hoadley, F.E., Automobile Design Techniques & Design Modeling: The Men, the Methods & the Materials, T a H Productions, 1999
Credit	3 AKTS
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Learning automotive design processes Basic knowledge for a good automotive design provided Learning product development and conceptual design processes
Course Learning Outcomes	 Learn how to effectively use computer-aided computing and in-depth knowledge of the automotive industry to solve complex engineering problems. Learn to design complex systems, processes, devices or products under realistic constraints and conditions. To be able to select and use appropriate techniques, resources, and modern engineering and information technology tools for the analysis and solution of complex engineering problems. To be able to work effectively as a team member or leader, both individually and in interdisciplinary teams.
Instruction Methods	Face to face

		T I I I TTI	0 1 1 1	1	•					
	1. Week	Introduction - History	v of vehicle are	chitecture in d	esign					
	2. Week	Overview of the desig	gn process							
	3. Week	Functional objectives	, Systems and	market segme	ents					
	4. Week	Size and proportion								
	5. Week	Interiors and cargo								
	6. Week	Movement transfer lin	ne							
	7. Week	Wheels and tires								
Weekly Schedule	8. Week	Suspension and Chase	sis							
	9. Week	Body								
	10. Week	Aerodynamics								
	11. Week	Safety and accident regulations								
	12. Week	Portability								
	13. Week	Design exercises								
	14. Week	A general design assignment								
	Weekly theoretical course hours: 2									
Teaching and Learning Methods	Weekly tutoria	l hours: 0								
	Reading Activi	ities: 1								
(These are examples. Please fill which	Internet brows	ing, library work: 4								
activities you use in the course)	Designing and	implementing materials	s: 6							
	Report prepari	ng: 4								
	Preparing a Pre	esentation: 0								
	Drocontations									
	Descentations.	U	E 6							
		d Deservation for Einel	Exam: 5							
		u Preparation for Final	Exam: 5	Tatal						
			Numbers	Veighting						
	Midterm Exar	ns	1	60						
	Assignment				1					
	Projects									
Assessment Criteria	Practice				1					
	Quiz]					
	Percent of In-	term Studies	60							
	Percentage of	b) recentage of Final Exam to Total 1 40								
	Score (%)									
	Attendance									

		Activity	Total Number of	D n (v	ura veel	ntio kly	1		Total Period Work Load
	Weekly	Theoretical Course	14			2			28
	Weekly	7 Tutorial Hours							
	Readin	g Tasks	5			1			5
	Studies	3			4			12	
	Implem	2			6			12	
Workload	Report	2	4				8		
W OI KIUAU	Prepari						_		
	Midter	n Exam and							
	Prepera Exam	tion for Midterm	1			5			5
		xam and Preperation al Exam	1			5			5
	Other (emphas	should be sized)							
	Total W	Vorkload							75
	Total W	Vorkload / 25							75/25
	Course	Credit (ECTS)	les	-				_	3
	No			1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		Adequate knowledge mathematics, science engineering subjects to the relevant discip ability to use theoreti applied information i areas to model and so engineering problem	e in e and pertaining line; ical and in these olve s.	х					
	2	Ability to identify, fo and solve complex en problems; ability to s apply proper analysis modeling methods fo purpose.	ormulate, ngineering select and s and or this						
	3	Ability to design a co system, process, devi product under realist constraints and cond such a way as to mee desired result; ability modern design metho	omplex ice or ic itions, in et the to apply ods for this	x					
	4	Ability to develop, so use modern techniqu tools necessary for an solution of complex in engineering applic ability to use informa technologies effectiv	elect and es and nalysis and problems cations; ation ely.	х					
	5	Ability to design and experiments, gather of analyze and interpret examination of engir problems or disciplin research topics.	l conduct data, results for neering ne-specific						

	6	Ability to work efficiently in intra-disciplinary teams.			
	7	Ability to work efficiently in multi-disciplinary teams.			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	x		
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.			
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.			
The Course's Lecturer(s) and Contact Informations		Assoc. Prof. Dr. Harun Gökçe harungokce@gazi.edu.tr			

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL	1		1	1				1			
Learning outcome 1	1										
Learning outcome 2			1								
Learning outcome 3				1							
Learning outcome 4								1			

	1	Course Description Form								
Course Code and Name	ETM355 PL	ASTICS MATERIALS AND TECHNOLOGY								
Course Semester	5									
Catalog Content	Investigation Basic princip Introduction of	of general properties of plastics. es of design with plastics and the use of design data for plastics of joining methods of plastics and learning of application areas								
Textbook	 Strong, A Prentice- Harper, C Encyclop 	A. B., Plastics: Materials and Processing, Englewood Cliffs: New Jersey, Hall, Inc., 2nd Ed., 2000. C.A. and Petrie, E.M. Plastics Materials and Processes: A Concise Joedia, John Wiley & Sons Pub. USA, 2003.								
Supplementary Textbooks	1. Callister, introduct	W. D., & Rethwisch, D. G. Materials science and engineering: an ion (Vol. 7, pp. 665-715). New York: John wiley & sons, 2007.								
Credit	3 ECTS									
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70								
Type of the Course	Elective									
Instruction Language	Turkish									
Course Objectives	To provide ar important pla To understand understanding To contribute methods and	rovide an understanding and recognition of the molecular structure, properties and ortant plastic groups of polymer materials inderstand the processing and shaping methods of plastics and to provide an rstanding of different processing processes ontribute to the development of skills in the use of plastics in design, strengthening ods and plastic joining techniques								
Course Learning Outcomes	 Develop a polymer n To unders applicabii Recogniz To develo Understant these tech 	a comprehensive understanding of the molecular structure and properties of naterials stand the processing and shaping methods of plastics and to comprehend the lity of these methods. e different types of reinforced plastics and identify their application areas. op skills in the design of plastics and to learn effective design strategies. nding the applicability of different plastic joining techniques and the role of niques in the design process.								
Instruction Methods	Face to face									
	1. Week2. Week3. Week4. Week5. Week	Introduction Polymer Materials, Molecular Structure and Blends. Introduction of Important Plastic Groups. General Properties of Plastics: Strength, Toughness, Fatigue, Hardness, Temp Flammability, Chemical Effect and Electrical Properties. Reinforced Plastics and Reinforcement Types	perature Eff							
	6. Week	Design with Plastics, Design Data for Plastics.								
Weekly Schedule	7. Week	Reinforced Plastic Designs.								
weekly Scheudle	8. Week	Injection Process.								
	9. Week	Extrusion, Pressure and Transfer Molding, Blow Molding								
	10. Week	Heat Forming, Rolling, Casting, Foaming.								
	11. Week	Joining Methods.								
	12. Week	Design examples								
	13. Week	Design examples								
	14. Week	Design examples								

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library Designing and implement Report preparing: 0 Preparing a Presentation: Presentations: 0 Preparation of Midterm an Final Exam and Preparatio Other:0	work: 3 ing mate 0 nd Midte on for F	2 erial erm inal	ls: 3 Exam: 3 Exam: 3									
				Numbers		1	Fotal We	igh	tin	g ('	%)		
	Midterm Exams Assignment Application			1				40 20					
Assessment Criteria	Projects												
	Practice	ce											
	Percent of In-term							60				-	
	Studies (%)							00					
	Percentage of Final Exam	to Total						40					
	Attendance												
			A	activity	Total Numbe of Weel	r KS	Duration (weekly hour)	n		I V I	Fot Peri Vor Loa	al od 'k d	
		Weekly Theoretical Course Hours			14		2			3			
		Hours Weekly Tutorial Hours											
		Reading	g Tas	sks	5		4				20)	
		Studies			5		3				15	5	
		Materia	l De	sign and	2		3						
		Implem	enta Dura	tion		_							
Workload		Report	Prep	aring									
		Preparit	ng a	Presentation								_	
		Midtorr	$\frac{100}{100}$	am and	1		2	3			2		
		Prepera Exam	tion	for Midterm	1								
		for Fina	ul Ex	am	1		3				3		
		Other (emphas	shou ized	ild be									
		Total W	/orkl	load							75	5	
		Total W	/orkl	load / 25						,	75/2	25	
		Course	Crec	lit (ECTS)							3		
		No		Program Outcom	les			1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-d scie com engi kno engi	lepth knowledge o nce, basic enginee uputer-aided comp ineering areas; abi wledge effectively ineering problems.	f mathem ring cond uting and lity to use r in solvir	natio cept l spo e th ng c	cs, ts, ecific is complex	x						
	2	Abi	lity to identify, for	mulate a	nd a	analyse			x				
		com	plex engineering	problems	ms using https://www.mathematics								
		and engineering, and taking into account											
-			the	UN Sustainable D	evelopme	ent (Goals.				-		
		3	Abi com	nty to generate cre plex engineering	ative sol problems	ut10 <u>to</u> 1	meet	x					

							_
		current and future needs; design complex systems, processes, devices or products					
		under realistic constraints and conditions.			\rightarrow	_	
	4	Ability to select and use appropriate		x			
		techniques, resources and modern					
		engineering and information technology					
		tools, including estimation and modelling,					
		for the analysis and solution of complex					
		limitations					
	-	A hility to use research methods, including			+		
	5	Ability to use research methods, including					
		experiments collecting data analysing and					
		interpreting results to investigate complex					
		engineering problems.					
	6	Knowledge of the effects of engineering	x				
		practices on society, health and safety,					
		economy, sustainability and environment					
		within the framework of the UN					
		Sustainable Development Goals; awareness					
		of the legal consequences of engineering					
		solutions.				_	
	7	Acting in accordance with the ethical	x				
		principles of the engineering profession,					
		awareness of ethical responsibilities;					
		impartiality and embracing diversity					
	0	Ability to work effectively as a team	x				
	0	member or leader both individually and	<u> </u>				
		within interdisciplinary teams (face-to-					
		face, distance or hybrid).					
	9	Ability to communicate effectively on					
		technical issues, both orally and in writing,					
		taking into account the various differences					
		of the target audience (e.g. education,					
		language, profession).			\square		
	10	Knowledge of business life practices such		2	٢		
		as project management and economic					
		feasibility analysis; awareness of					
	11	A hility to learn independently and		v			
		continuously to adapt to new and emerging		^			
		technologies and to think inquisitively					
		about technological changes.					
						_1	Ч
	Dr.Ö	Öğr. Üvesi Orhan ERDEN					
The Course's Lecturer(s) and Contact	0000	len@ggzi edu tr					
Informations	oerc	<u>ich(@gazi.cuu.u</u>					

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	1	3	1	2		1	1	1		3	2
Learning outcome 1	1	1		1						1	
Learning outcome 2		1		1							
Learning outcome 3										1	1
Learning outcome 4		1	1			1					
Learning outcome 5							1	1		1	1

	Course Description Form
Course Code and Name	ETM356 Plastic Mold Design
Course Semester	6
Catalog Content	Recognition and understanding of industrial plastic materials and their properties Learning different shaping methods for plastic and metal materials, such as injection molding, extrusion, blow molding, rotational molding, thermoforming Learning compression molding technologies for thermoplastics and thermoset plastics Acquiring knowledge about mold manufacturing for plastic parts, such as forging molds, volume mold production, and mold materials
Textbook	 Donald V. Rosato Plastics Technology Handbook, Vol. 2, Momentum Press, 2011 Donald V. Rosato, Marlene G. Rosato Injection Molding Handbook - 2 Volume Set, Springer, 2000 D.J. Ramazzotti, "How to Plan a Rota- tional Molding Facility", Plastics Tech- nology, Vol. 18, No. 1, January 1972
Supplementary Textbooks	Plastics manufacturing system engineering, D. Kazmer, Hanser Publications, 2009.
Credit	3 ECTS
Prerequisites of the Course (Attendance Requirements)	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Learning the knowledge and skills to make volume molds suitable for the technique Learning volume mold techniques Learning volume mold production methods Learning volume mold design
Course Learning Outcomes	 Plastic material properties are learned. Machine properties for volume molds are learned. Errors, causes, and solutions of plastic injection molds are learned; material properties used in volume mold production are learned. General properties of metal injection molds are learned; blow molding and extrusion mold parameters are learned. Mold component drawings and productions are learned; mold material analysis and cost analysis are conducted.
Instruction Methods	Face to face

	1. Week	Plastic material prope	orties						
	2. Week	Plastic material prope	orties						
	3. Week	Considerations in the Highlights	Design of Pla	stic Injection I	Mould				
	4. Week	Multiple Should Be C given to Match Angle	pened Mould	s, Moulds Pit a	and				
	5. Week	Distributor Channel t	ype, Input typ	e, Gating Sign					
	6. Week	Runner Pull Pin, Push Cam Systems and Op	Pin Back An erating Specif	d Ejector Pins	,				
	7. Week	Hot Runner Systems	and User's Go	als, air ducts					
Weekly Schedule	8. Week	Conversion Seals, Brands,							
	9. Week	Recruitment Availabl	e Material Sel	ection					
	10. Week	The materials used in	metal injection	on molding					
	11. Week	Comparison of metal	injection mole	ding and plasti	c				
	12. Week	The general acteristic	s of blow mol	ding					
	13. Week	The general acteristic	s of extrusion	mold					
	14. Week	Implementation of the Right Mold Heating and Cooling Techniques							
	Weekly theoret	ical course hours: 2							
	Weekly tutorial hours: 0								
Teaching and Learning Methods	Reading Activi	ties: 3							
(These are examples. Please fill which activities you use in the course)	Internet browsi Designing and	ng, library work: 2 implementing materials	: 3						
ucuvines you use in the course)	Report preparin	ng:							
	Preparing a Pre	esentation: 0							
	Presentations:)							
	Final Exam and	Droporation for Final	Exam: 4						
			Numbers	Total Weighting (%)					
	Midterm Exar	ns	1	60					
	Assignment								
	Application Projects								
Assessment Criteria	Practice								
	Quiz				1				
	Percent of In-	term Studies		60					
	(⁷⁰) Percentage of	Final Exam to Total		40					
	Score (%)		1	40					
	Attendance								

		Activity	Total Number of	D n (v	ura vee	ntio kly	•		Total Period Work Load
	Weekly	Theoretical Course	14	-		2			28
	Weekly	Tutorial Hours							
	Reading	g Tasks	5			3	3		15
	Studies		5	2			10		
	Materia Implem	ll Design and ientation	2			3			6
	Report	Preparing							
Workload	Prepari	ng a Presentation							
	Present	ations				4			
	Prepera Exam	tion for Midterm	2			4			
	Final E for Fina	xam and Preperation	2			4			8
	Other (should be							
	emphas Total W	Vorkload	-			-			75
	Total W	Vorkload / 25							75/25
	Course	Credit (ECTS)				_	_	_	3
	No	Program Outcom	nes	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	Adequate knowle mathematics, scie engineering subjects to the relevant ability to use theor applied information areas to model engineering problem	edge in nce and pertaining discipline; retical and in these and solve s.	x					
	2	Ability to identify, for and solve complex en problems; ability to s apply proper analysis modeling methods for purpose.	ormulate, ngineering select and s and or this			x			
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design meth	omplex ice or ic itions, in et the y to apply ods for this	x					
	4	Ability to develop, so use modern techniqu tools necessary for an solution of complex in engineering applic ability to use informa- technologies effectiv	elect and es and nalysis and problems cations; ation ely.		x				
	5	Ability to design and experiments, gather of analyze and interpret examination of engir problems or disciplir research topics.	a conduct data, results for neering ne-specific				X		

	6	Ability to work efficiently in intra-disciplinary teams.		x			
	7	Ability to work efficiently in multi-disciplinary teams.				x	
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	x				
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive				x	
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			x		
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.		x			
The Course's Lecturer(s) and Contact Informations		Prof. Dr. Adnan AKKURT aakkurt@gazi.edu.tr					

	Program Outcome 1	Program Outcome 2	Program Outcome 3	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7	Program Outcome 8	Program Outcome 9	Program Outcome 10	Program Outcome 11
TOTAL	1	3	1	2	4	2	4	1	4	3	3
Learning outcome 1	1	1	1		1	1	1	1	1		
Learning outcome 2		1		1	1		1		1		1
Learning outcome 3			1	1	1				1	1	1
Learning outcome 4		1			1	1	1		1	1	
Learning outcome 5			1				1			1	1

	Course Description Form
Course Code and Name	ETM357 GEOMETRIC DIMENSIONING AND TOLERANCING
Course Semester	5
Catalog Content	Advanced dimensioning policies Tolerances and precision dimensioning fundamentals Part measurement techniques regarding geometric dimensioning and tolerancing Tolerance control with graphic analysis
Textbook	 Çuvalcı O. Geometrik Toleranslar ve Uygulamaları. NobelAkademik Yayıncılık, 2021. Meadows, James D. Geometric dimensioning and tolerancing: applications and techniques for use in design, Manufacturing and Inspection. Routledge, 2017.
Supplementary Textbooks	1. Henzold, Georg. Geometrical dimensioning and tolerancing for design, manufacturing and inspection: a handbook for geometrical product specification using ISO and ASME standards. Elsevier, 2006.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Understanding advanced dimensioning principles Understanding the principles of geometric dimensioning and tolerancing, including tolerances and precise dimensioning applications. Learning part measurement techniques regarding geometric dimensioning and tolerancing Analysis of measurements Display of dimensioning and tolerances on the application
Course Learning Outcomes	 Understand the definition, types and application areas of geometric tolerances and be able to evaluate the importance of geometric tolerances. Ability to read and interpret engineering drawings and apply knowledge of geometric tolerances Ability to interpret tolerance symbols correctly and apply measurement techniques Ability to use different geometric measurement methods and tolerancing techniques in practical applications Ability to understand and apply quality control and quality assurance principles related to geometric tolerancing
Instruction Methods	Face to face

1. Week2. Week	General concepts Dimensions and me	easurement to	olerances					
2. Week	Dimensions and me	easurement to	olerances					
3. Week	Basic concepts in g	geometric din	nensioning and tole	rancing				
4. Week	Geometric toleranc	e symbols an	d frames					
5. Week	Material conditions	s and rules						
6. Week	6. Week Reference and reference planes							
7. Week	Shape and profile t	olerances						
8. Week	Week Example applications							
9. Week	9. Week Orientation tolerances							
10. Week	10. Week Position tolerances							
11. Week	Tolerances of faste	ner holes						
12. Week	Runout tolerances							
13. Week	Tolerancing practic	ces						
14. Week	Tolerance control v	with graphic a	analysis					
Weekly theore Weekly tutoria Reading Activi Internet brows Designing and Report preparin Preparing a Pre Presentations: Preparation of Final Exam and	tical course hours: 2 1 hours: 0 ities: 1 ing, library work: 1 implementing material ng: 0 seentation: 0 0 Midterm and Midterm d Preparation for Final	s: 2 Exam: 2 Exam: 1	Tatal					
Midterm Exar Assignment Application Projects Practice Quiz Percent of In- (%)	ns term Studies	Numbers 1 1 1	Total Weighting (%) 40 20 60					
	4. Week 5. Week 6. Week 7. Week 8. Week 9. Week 10. Week 11. Week 12. Week 13. Week 14. Week Designing and Report preparing Preparing a Preparation of Final Exam and Midterm Exam Midterm Exam Assignment Application Projects Practice Quiz Percent of In-	4. WeekGeometric tolerance5. WeekMaterial conditions6. WeekReference and refe7. WeekShape and profile t8. WeekExample application9. WeekOrientation tolerances10. WeekPosition tolerances11. WeekTolerances of faste12. WeekRunout tolerances13. WeekTolerancing praction14. WeekTolerance control wWeekly theoretical course hours: 2Weekly tutorial hours: 0Reading Activities: 1Internet browsing, library work: 1Designing and implementing materialReport preparing: 0Preparation of Midterm and MidtermFinal Exam and Preparation for FinalMidterm ExamsAssignmentApplicationProjectsPracticeQuizPercent of In-term Studies	4. Week Geometric tolerance symbols and 5. Week Material conditions and rules 6. Week Reference and reference planes 7. Week Shape and profile tolerances 8. Week Example applications 9. Week Orientation tolerances 10. Week Position tolerances 11. Week Tolerances of fastener holes 12. Week Runout tolerances 13. Week Tolerance control with graphic at Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 1 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1 Midterm Exams 1 Assignment 1 Application Projects Practice Quiz Percent of In-term Studies Percent of In-term Studies	4. Week Geometric tolerance symbols and frames 5. Week Material conditions and rules 6. Week Reference and reference planes 7. Week Shape and profile tolerances 8. Week Example applications 9. Week Orientation tolerances 10. Week Position tolerances 11. Week Tolerances of fastener holes 12. Week Runout tolerances 13. Week Tolerance control with graphic analysis Veekly theoretical course hours: 2 Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 1 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparation of Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1 Implication: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 1 40 Assignment 1 20 Application Projects Practice Quiz Precent of In-term Studies 60				

		Activity	Total Numbe r of Weeks	Dur (we hou	•ation ekly r)	l	T Pe W Lo	otal riod ork oad
	Weekly Hours	Theoretical Course	14		2			28
	Weekly	Tutorial Hours						
	Reading	g Tasks	5		1			5
	Studies	15	5		1			5
	Materia Implem	l Design and entation	14		2			28
Workload	Report	Preparing						
	Preparii	ng a Presentation						
	Presenta	ations	2		2			(
	Prepera Exam	n Exam and tion for Midterm	3		2			6
	Final Ex for Fina	xam and Preperation Il Exam	3		1			3
	Other (emphas	should be ized)						
	Total W	/orkload	-		-		,	75
	Total W	/orkload / 25					75	5/25
	Course	Credit (ECTS)						3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and s engineering areas; abi this knowledge effecti solving complex engin problems.	f basic computer- specific lity to use ively in neering	x				
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	rmulate using bience, neering, nt the UN nent Goals.	X				
	3	Ability to generate cre solutions to complex engineering problems current and future nee complex systems, pro- devices or products un realistic constraints ar	to meet ds; design cesses, nder nd			x		
	4	Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, inclu- estimation and modell the analysis and soluti complex engineering recognising their limit	se s, mation uding ling, for ion of problems, tations.	X				

	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems. Knowledge of the effects of engineering practices on society.	X X			
		health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.				
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	x			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).	X			
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	x			
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and		X		
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.		X		
The Course's Lecturer(s) and Contact Informations	De tas	partment Management arim@gazi.edu.tr				

	Program Outcome 1	Program Outcome2	Program Outcome3	Program Outcome 4	Program Outcome5	Program Outcome6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
TOTAL	1	1	3	1	1	1	1	1	1	2	2
Learning outcome 1	1	1									1
Learning outcome 2			1		1				1		
Learning outcome 3			1	1				1		1	1
Learning outcome 4			1							1	
Learning outcome						1	1				

-						
3						
·			•		•	•

Course Description Form										
Course Code and Name	ETM358 EN	TM358 ENERGY SYSTEMS DESIGN								
Course Semester	6									
Catalog Content	Understandin Understandin Professional a Ability to con Ability to use Ability to iden Ability to des	Inderstanding the importance and basic concepts of thermal and fluid systems Inderstanding the optimization of the design of thermal and fluid systems rofessional and ethical responsibility bility to communicate orally and in writing bility to use modern engineering methods bility to identify, formulate and solve problems bility to design, implement and design experiments								
Textbook	1. Hodge, B. Pub., 1999	K. and Taylor, R.P., Analysis and Design of Energy Systems, Prentice Hall								
Supplementary Textbooks	1. Tostevin, Hall Pub.,	G.M., Energy Systems Design and Operations: A Unified Method, Prentice 2011.								
Credit	3 ECTS									
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70								
Type of the Course	Elective									
Instruction Language	Turkish									
Course Objectives	 To develop the ability to analyze and evaluate system performance using computer-aided simulations To gain the ability to evaluate the efficiency and economic effectiveness of the designed systems Ability to design system components such as pipelines, heat exchangers and power generators 									
Course Learning Outcomes	 Gain the Ability to Develop Gain con systems. To be able efficiency 	Gain the ability to apply the design of thermal and fluid systems. Ability to design better and in accordance with scientific/engineering fundamentals. Develop teamwork and communication skills in Design Engineering applications. Gain competence in performing computer-aided simulations of thermal and fluid systems. To be able to evaluate the performance of designed systems and analyze their efficiency								
Instruction Methods	Face to face									
Weekly Schedule	1. Week 2. Week 3. Week 4. Week 5. Week 6. Week 7. Week 8. Week 9. Week 10. Week 11. Week 12. Week 13. Week 14. Week	Pipelines Applications Heat exchangers-I (exchangers) Applications Heat exchangers-II Applications Power generators System simulation Analysis and modeling of thermal and fluid systems Evaluate system performance Considering system economics System design optimization An example of a generic design Pipelines								

Teaching and Learning Methods	Veekly theoretical course hours: 2 Veekly tutorial hours: 0 Reading Activities: 2 nternet browsing, library work: 4 Designing and implementing materials: 5 Report preparing: 2 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 4 Other:0												
				Numbers]	Fotal Wei	igh	tin	g ('	%)		
	Midterm Exams Assignment Application			1				40 20					
Assossment Criteria	Projects												
Assessment Criteria	Practice												
	Quiz							(0)					
	Percent of In-term							60					
	Percentage of Final Exam	to Total						40					
	Score (%)												
	Attendance	1					_			r	Fot		
			A	setivity	Total Numbe of Weel	er ks	Duration (weekly hour)	1		P V I	eri Vor Load	od 'k d	
		Weekly	The	oretical Course	14		2				28	3	
		Weekly	Tut	orial Hours									
		Reading	g Tas	sks	7		2				14		
		Studies			3		4	_			2		
		Materia	l De	sign and	2		5		_		10		
		Implem	enta	tion ·	2		5				10		
Workload		Report	Prep	aring	2		2				4	-+	
		Preparii	ng a	Presentation					_				
		Midterr	ation	am and					_				
		Prepera Exam	tion	for Midterm	1		3						
		for Final	xam ıl Ex	and Preperation	1		4	4			4		
		Other (shou	ıld be									
		emphas Total W	<u>ized</u> Iorkl) oad							75		
		Total W	/orkl	oad / 25							75/		
		Course	Crec	lit (ECTS)					_		3		
		No		Program Outcom	es			1	2	2	4	5	
								1	2	3	4	2	
Contribution Level Betw	veen Course Learning	1	In-d scie com engi kno	epth knowledge o nce, basic enginee puter-aided comp neering areas; abi wledge effectively	f mathen ring con- uting and lity to us in solvin	natio cept 1 sp e th ng c	cs, ts, ecific iis complex				x		
Outcomes and Program	Outcomes	2	engi Ahi	lity to identify for	mulate a	nd	analyse	+			x	-	
			com	plex engineering	problems	s usi	ing			-	^		
			kno	wledge of basic sc	cience, mathematics								
			and the	engineering, and t UN Sustainable D	akıng ın evelonm	to a ent	ccount Goals.						
		3	Abi	lity to generate cre	ative sol	utic	ons to	\uparrow		x			
			com	plex engineering	ering problems to meet								

		current and future needs; design complex systems, processes, devices or products				
		under realistic constraints and conditions.				
	4	Ability to select and use appropriate		x		
		techniques, resources and modern				
		engineering and information technology				
		tools, including estimation and modelling,				
		for the analysis and solution of complex				
		engineering problems, recognising their				
	5	Ability to use research methods, including			X	
		avpariments, collecting data, analysing and				
		interpreting results to investigate complex				
		engineering problems				
	6	Knowledge of the effects of engineering	x			
	0	practices on society, health and safety.	^			
		economy, sustainability and environment				
		within the framework of the UN				
		Sustainable Development Goals; awareness				
		of the legal consequences of engineering				
		solutions.				
	7	Acting in accordance with the ethical	х			
		principles of the engineering profession,				
		awareness of ethical responsibilities;				
		awareness of non-discrimination,				
		A hility to work offectively on a term			_	+
	8	member or leader both individually and	X			
		within interdisciplinary teams (face-to-				
		face, distance or hybrid).				
	9	Ability to communicate effectively on	x			
		technical issues, both orally and in writing,				
		taking into account the various differences				
		of the target audience (e.g. education,				
		language, profession).				
	10	Knowledge of business life practices such				
		as project management and economic				
		teasibility analysis; awareness of				
		entrepreneurship and innovation.			\rightarrow	+
	11	Ability to learn independently and				
		technologies and to think inquisitively				
		about technological changes				
	1	acout comological enanges.				
	Цее	d of Department				
The Course's Lecturer(s) and Contact	пеа					
Informations	<u>tasa</u>	<u>rım@gazı.edu.tr</u>				

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	4	4	3	2	4	1	1		1		
Learning outcome 1	1	1	1	1	1						
Learning outcome 2	1	1	1		1						
Learning outcome 3								1	1		
Learning outcome 4	1	1		1	1		1				
Learning outcome 5		1			1	1					

Course Description Form								
Course Code and Name	ETM359 CO	MPUTER AIDED DESIGN 2						
Course Semester	5							
Catalog Content	Design 2D and 3D parts Ability to use computer software Defining problems and creating solution suggestions Adapting to new technologies							
Textbook	 Kodlab, Solidworks & Solidcam & 3D Quickpress & 3D Quickmold, 2023 Tatar, H. Catia, Pusula Yay., Ankara 2023. 							
Supplementary Textbooks	1. Say, SM., Şehri M. Bilgisayar Destekli Tasarımın Temelleri V Uygulamalar, Karahan Kitabevi, Ankara, 2013.							
Credit	3 ECTS							
Prerequisites of the Course (<i>Attendance Requirements</i>)	No Prerequisi	ites- %70 Attendance Requirements						
Type of the Course	Elective							
Instruction Language	Turkish							
Course Objectives	To teach students the basic principles of computer-aided design and 2 drawing techniques. To provide students with practical skills in solid and surface modeling improving their 3D modeling skills. Realizing the design of complex products and systems To provide knowledge and application skills on sheet metal design an processing techniques in a computer-aided design environment. Creating construction pictures of a product and/or system							
Course Learning Outcomes	 Can design functional assemblies by combining different parts Can create technical documents in accordance with engineering standards 							
Instruction Methods	Face to face							
	1. Week	Introduction and Fundamentals of Computer Aided Design						
	2. Week	2D Drawing Fundamentals and Tools						
	3. Week	Advanced 2D Drawing Techniques and applications						
	4. Week	3D Modeling Fundamentals						
	5. Week	3D Part Modeling Techniques						
	6. Week	3D Part Modeling and Application						
	7. Week	3D Part modeling and Editing						
Weekly Schedule	8. Week	Introduction to Assembly Design						
	9. Week	Assembly Design and Analysis						
	10. Week	Assembly and Motion Simulations						
	12 Week	Tachnical Drawing and Documentation at accombly low-						
	12. Week	Section of the prime and Documentation at assembly level						
	13. Week	Surface modeling Design and Modeling						
	14. week	Surface modeling Application						

Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 4 Designing and implementing materials: 6 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam:4 Final Exam and Preparation for Final Exam: 5									
				Numbers	S	T Wei	otal ghti	ng		
	Midterm	Evame		1	<u> (%)</u> <u> 40</u>				-	
	Assignm	ent		1			$\frac{40}{20}$		_	
	Applicat	ion		1			20		-	
	Projects								-	
Assessment Criteria	Practice									
	Quiz									
	Percent o	of In-ter	m Studies				60			
	(%) Doroonto	a of E	nal Evam to Total				40		-	
	Score (%	ge of FI	nai Exam to Totai				40			
	Attendar	nce							-	
			Activity	Total Number of Weeks	Du (we hou	ratio ekly r))n 7		Total Period Work Load	
		Weekly Hours	Theoretical Course	14		2			28	
		Weekly	Tutorial Hours							
		Reading	g Tasks							
		Studies		2		4			8	
		Materia	l Design and	5		6			30	
		Report	Prenaring							
Workload		Prenari	ng a Presentation					-		
		Drecent	ations							
		Midterr	n Fxam and	1		1		+	1	
		Prepera	tion for Midterm	1		7				
		Exam		1				-		
		for Fina	al Exam	1	5				3	
		Other (should be							
		emphas	lized)					+	75	
		Total W	Vorkioad / 25	_				+	75/25	
		Course	Credit (ECTS)					-	3	
		Course	Program Outcom					\rightarrow	5	
		No				2 3	4	5		
Contribution Level Between Course Learning Outcomes and Program Outcomes		1	Adequate knowledge mathematics, science engineering subjects to the relevant discip ability to use theoret applied information areas to model and sc engineering problem	e in e and pertaining line; ical and in these olve s.	ıg					

2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		X			
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this			X		
4	Ability to develop, select and use modern techniques and tools necessary for analysis and solution of complex problems in engineering applications; ability to use information technologies effectively.		x			
5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.					
6	Ability to work efficiently in intra-disciplinary teams.					
7	Ability to work efficiently in multi-disciplinary teams.					
8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.					
9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable	X				
10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	x				
11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.			x		
The Course's Lecturer(s) and Contact Informations

Head of Department tasarim@gazi.edu.tr

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	Outcome	Outcome	Outcome	Outcome	Outcome	Outcome	Outcome	çıktısı 8	Outcome	Outcome	Outcome
	1	2	3	4	5	6	7		9	10	11
TOTAL	1	2	3	2					1	1	3
Learnin	1	1	1	1							1
g											
outcome											
1											
Learnin		1	1	1						1	1
g											
outcome											
2											
Learnin			1						1		1
g											
outcome											
3											
Learnin											
g											
outcome											
4											
Learnin											
g											
outcome											
5											

	Course Description Form							
Course Code and Name	ETM360 DESIGN FOR BEHAVIOUR CHANGE							
Course Semester	6							
Catalog Content	Ability to analyze human behaviors Ability to conduct user research and interpret data Ability to recognize and forecast trends and patterns Understanding and applying user-centered design principles Ability to create and analyze behavioral models Ability to develop continuous improvement and optimization strategies Ability to collaborate and communicate effectively within a team Ability to listen to user feedback and guide it for product or service improvement							
Textbook	 Kristina Niedderer, Stephen Clune, Geke Ludden, Design for Behaviour Change - Theories and Practices of Designing for Change, Routledge; 1st edition, 2017. 							
Supplementary Textbooks	 Stephen Wendel, Designing for Behavior Change, 2nd Edition, O'Reilly Media, Inc., 2020 							
Credit	3 ECTS							
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements							
Type of the Course	Elective							
Instruction Language	Turkish							
Course Objectives	Learning behavior dynamics Improving product-human and human-human interaction Implementing effective designs focused on problems and goals Designing for behavior change							
Course Learning Outcomes	 Learning strategies to help change people's behaviors. Identifying desired behaviors to change in the target audience and the barriers that stand in the way. Developing enjoyable, effective designs. Ensuring the measurement and improvement of the product's impact. Learning to synthesize behavioral science with data science to identify problems and test potential solutions. 							
Instruction Methods	Face to face							

(
	1. Week	Introduction: Design and challenges of cha	for behavior c nge in the 21s	hange, Relation	ship
	2. Week	Introduction to mode change design	ls, methods, ar	nd tools for beha	avior
	3. Week	Design interventions	for sustainable	e behavior	
	4. Week	Design, behavior char	nge, and desig	n with intent to	olkit
	5. Week	Application			
	6. Week	Improving interaction	n by understan	ding the user	
Weekly Schedule	7. Week	Design for healthy be	havior		
	8. Week	Facilitating behavior	change throug	h mindful desig	<u></u> gn
	9. Week	Application-focused	design		
	10. Week	The hidden impact of	design		
	11. Week	Design for behavior c and well-being	hange and sus	stainability, heal	lth
	12. Week	Design for social beh	avior change		
	13. Week	Application examples	5		
	14. Week	Application			
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: Preparation of Final Exam and	l hours: 0 ities: 3 ing, library work: 2 implementing materials ng: 0 esentation: 0 0 Midterm and Midterm d Preparation for Final	s: 3 Exam: 4 Exam: 4		
			Numbers	Total Weighting	
	Midterm Exar	ns	1	40	
	Assignment				
	Application		2	20	
Assessment Criteria	Projects				
	Practice				
	Quiz	town Cto die			
	(%)	term Studies		00	
	Percentage of	Final Exam to Total		40	
	Score (%)				
	Attendance				

		Activity	Total Numbe r of Weeks	Dui (we hou	ration ekly r)	1	T Pe W Lo	otal riod ork oad
	Weekly Hours	7 Theoretical Course	14		2			28
	Weekly	Tutorial Hours						
	Readin	g Tasks	5		3			15
	Studies		5		2			10
Workload	Materia Implem	al Design and mentation	2	3			6	
	Prepari	rreparing						
	Present	ations						
	Midtern Prepera	n Exam and tion for Midterm	2		4			8
	Exam Final E for Fina	xam and Preperation al Exam	2		4			8
	Other (emphas	should be sized)					ļ ,	75
	Total W	Vorkload / 25	-		-		74	5/2.5
	Course					/-	3	
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	2	Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applic information in these model and solve eng Ability to identify, fo and solve complex en	e in e and vant use ed areas to ineering ormulate, ngineering	x				
		problems; ability to select and apply proper analysis and modeling methods for this purpose.						
	3	Ability to design a co system, process, dev product under realist constraints and cond such a way as to mee desired result; ability modern design metho	omplex ice or ic itions, in et the v to apply ods for	x				
	4	Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer applications; ability to information technolo effectively.	elect and es and nalysis blex ring to use ogies	X				

The Course's Lecturer(s) and	Prof. Dr. İsmail Şahin	
	principles, professional and ethical responsibility; Information on standards used in engineering applications.	
	10 Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to 11 Conformity to ethical	
	9 Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.	
	8 Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	
	7 Ability to work efficiently in multi-disciplinary teams.	
	6 Ability to work efficiently in intra-disciplinary teams.	
	5 Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.	

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
TOTAL	1	1	1	1	2	0					
Learning outcome 1					1						
Learning outcome 2					1						
Learning outcome 3			1								
Learning outcome 4				1							

Learning	1					
outcome 5						

	Course Description Form								
Course Code and Name	ETM416 CO	MPUTER AIDED MANUFACTURING							
Course Semester	7-8	7-8							
Catalog Content	Using comput Planning susta Using moderr Ability to con Ability to ider	rer-aided manufacturing tools ainable manufacturing processes a engineering tools amunicate verbally and in writing atify, formulate and solve problems							
Textbook	 M., Gülesin, A., Güllü, Ö., Avcı, G., Akdoğan, CNC Torna ve Freze Tezgahlarının Programlanması, Asil Yay., Ankara, 2005. Gülesin, M., Güllü, A., Avcı, Ö, SINUMERIK Kontrol Sistemi İle Torna ve Frezelerin Programlanması, Asil Yay., An, 2007. 								
Supplementary Textbooks	 Mattson USA, 199 Smid, P., 2003 	 Mattson M., CNC Programming: Principles and Applications, Delmar Publishers, USA, 1998. Smid, P., CNC Programming Handbook, Second Edition, ISBN: (0-8311-) 3134-9 2003 							
Credit	3 AKTS								
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70							
Type of the Course	Elective								
Instruction Language	Turkish	Turkish							
Course Objectives	Understandin Planning sust Learning solu Having know Gaining intere	g modern production processes ainable and economical engineering processes tion approaches to engineering problems ledge about production and engineering issues disciplinary communication skills							
Course Learning Outcomes	 Can write Gain kno Can desig 	e the necessary codes to process parts on CNC lathe and milling machines wledge about modern manufacturing processes gn engineering components suitable for manufacturing							
Instruction Methods	Face to face								
	1. Week	Introduction to computer aided manufacturing							
	2. Week	Coordinate systems Pasia components of CNC machines							
	4. Week	Cutting Tools and Cutting Parameters							
	5. Week	Design suitable for manufacturing							
	6. Week	Introduction to CAM software							
	7. Week	CNC Programming Fundamentals							
Weekly Schedule	8. Week	Programming Simple Workpieces							
	9. Week	Programming the CNC Milling machine							
	10. week	Programming the CNC lathe							
	12. Week	Part machining with CNC lathe							
	13. Week	Processing of 3D parts on CNC machines							
	14. Week	Debugging and Optimization in CNC Machines							

Teaching and Learning Methods	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 4 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2 Other:0								
			Numbers		Total Weigl	htir	ıg (°	%)	
	Midterm Exams		1		40				
	Application		1		20)			
	Projects								
Assessment Criteria	Practice								
	Quiz								
	Percent of In-term			60)				
	Percentage of Final Exam			4()				
	Score (%)				,				
	Attendance						_		
			Activity	Total Number of Weeks	Duration (weekly hour)		P V I	Fota Perio Vor Joac	al od 'k 1
		Weekly	Theoretical Course	14	2			28	
		Hours	Tutorial Haura				<u> </u>		
		Deading		5	2		<u> </u>	15	
		Studios	, Tasks	5	2		<u> </u>	13) .
		Material	Design and	0	2			12	
		Implem	entation	4	4			16	,
XX7		Report I	Preparing						
W Orkload		Preparin	ig a Presentation						
		Presenta	tions						
		Midtern Preperat Exam	n Exam and ion for Midterm	1	2		2		
		Final Ex	am and Preperation	1	2			2	
		Other (should be				<u> </u>		
		emphasi	zed)				<u> </u>	7.5	.
		Total W	orkload	-	-		<u> </u>	13))
		Course	Orkioad / 25				<u> </u>	2	25
			Program Outcor	nes			\vdash	3	╌╷╹
		No	1 logram Outcon	lies	1	2	3	4	5
Contribution Level Retween Course Learning			In-depth knowledge of science, basic engine computer-aided comp engineering areas; ab knowledge effectivel	of mathema ering conce buting and s ility to use y in solving	atics, epts, specific this g complex	х			
Outcomes and Program	Outcomes and Program Outcomes			s. rmulate an	d analyse	x	\vdash	+	
			complex engineering knowledge of basic st and engineering, and	problems u cience, mat taking into	thematics account				
		3	the UN Sustainable E Ability to generate cr complex engineering	Developmen eative solu problems t	tions to x				

		current and future needs; design complex systems, processes, devices or products					
		under realistic constraints and conditions.					
	4	Ability to select and use appropriate	x				\neg
		techniques, resources and modern					
		engineering and information technology					
		tools, including estimation and modelling,					
		for the analysis and solution of complex					
		engineering problems, recognising their					
		limitations.					
	5	Ability to use research methods, including	x				
		literature search, designing and conducting					
		experiments, collecting data, analysing and					
		interpreting results, to investigate complex					
		engineering problems.				_	-
	6	Knowledge of the effects of engineering	x				
		practices on society, health and safety,					
		economy, sustainability and environment					
		Sustainable Development Coals: awareness					
		of the legal consequences of engineering					
		solutions					
	7	Acting in accordance with the ethical			+		
	'	principles of the engineering profession.					
		awareness of ethical responsibilities;					
		awareness of non-discrimination,					
		impartiality and embracing diversity.					
	8	Ability to work effectively as a team	х				
		member or leader both individually and					
		within interdisciplinary teams (face-to-					
		face, distance or hybrid).			+	_	_
	9	Ability to communicate effectively on					
		technical issues, both orally and in writing,					
		taking into account the various differences					
		of the target audience (e.g. education,					
	10	Knowledge of husiness life prestings such			-		-
	10	s project management and economic	X	•			
		feasibility analysis: awareness of					
		entrepreneurship and innovation					
	11	Ability to learn independently and		+	x	+	
	11	continuously, to adapt to new and emerging			`		
		technologies and to think inquisitively					
		about technological changes.					
	•	· · · · · · · · · · · · · · · · · · ·	· · · ·				Τ
	Нея	d of Department					
The Course's Lecturer(s) and Contact	togo	rim@gozi edu tr					
Informations	<u>tasa</u>	mm@gazi.edu.u					

	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome
	1	2	3	4	5	6	7	8	9	10	11
TOTAL	2	2	1	1	1	2		2		2	3
Learning outcome 1	1		1	1	1			1		1	1
Learning outcome 2		1				1					1
Learning outcome 3	1	1						1		1	1
Learning outcome 4											
Learning outcome 5											

Course Description Form									
Course Code and Name	ETM432 RO	BOTICS							
Course Semester	7-8								
Catalog Content	Understanding Ability to use Classify robot Ability to ider Classifying th the process o practical appl	Inderstanding basic robotics concepts Ibility to use modern engineering methods Iassify robotic systems Ibility to identify, formulate and solve problems Classifying the types of robotic systems and analyzing their structures Understanding the process of setting up a robot and gaining the ability to realize this process with practical applications							
Textbook	 Koren, Y. Niku, S.B. Wiley & S 	 Koren, Y. (1985). Robotics for engineers. New York: McGraw-Hill Pub., Int. Ed. Niku, S.B. (2010). Introduction to robotics: analysis, control, applications. USA: John Wiley & Sons Pub. 							
Supplementary Textbooks	1. Craig, J. J Education	1. Craig, J. J. (2009). Introduction to robotics: mechanics and control, 3/E. India: Pearson Education.							
Credit	3 ECTS								
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70							
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	Understand th Having know robotic system To be able to	Understand the basic principles of robotic systems by understanding basic robotic concepts Having knowledge about sensors and intelligent robots and learning how to use them in robotic systems To be able to design and develop robot mechanisms							
Course Learning Outcomes	 Understa Examine various in Developi different Gain the sustainab To be abl 	nd basic concepts of robotics and describe the structure of robotic systems. different robotic applications and develop robotic solutions to be used in ndustrial, medical or service sectors. ng programming skills and gaining the ability to develop software for robotic applications ability to evaluate the ethical and social impacts of robotic systems and apply ility principles e to work as a team in multidisciplinary projects							
Instruction Methods	Face to face								
	1. Week	Introduction							
	2. Week 3. Week 4. Week 5. Week	Basic concepts of robotics Classification and structure of robotic systems Drive and control systems Applications							
	6. Week	Kinematic analysis and coordinate transformations							
	7. Week	Applications							
Weekly Schedule	8. Week	Robot applications							
	10 Week	Programming							
	11. Week	Applications							
	12. Week	Sensors and intelligent robots							
	13. Week	Setting up a robot							
	14. Week	Applications							

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library Designing and implement Report preparing: 5 Preparing a Presentation: Presentations: 0 Preparation of Midterm an Final Exam and Preparation Other:0	Veekly intorenear course nous: 2 Veekly tutorial hours: 0 Reading Activities: 4 nternet browsing, library work: 5 Designing and implementing materials: 6 Report preparing: 5 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3 Dther:0										
				Numbers]	Fotal Wei	ighti	ng	g (%)	
	Midterm Exams Assignment Application			1				40 20				
Assessment Criteria	Projects											
	Practice											
	Quiz Percent of In-term							60				-
	Studies (%)							00				
	Percentage of Final Exam	to Total						40				
	Attendance											
			A	etivity	Total Numbe of Weel	er ks	Duration (weekly hour)	1		To Pe W	ota rio ork ad	l d
		Weekly	The	oretical Course	14		2				28	
		Weekly	Tute	orial Hours								
		Reading	g Tas	sks	2		4				8	
		Studies			3		5				15	
		Materia	l De	sign and	2		6				12	
		Implem	enta	tion	1						12 7	_
Workload		Report I	Prep	aring	I	_	5		_		5	-
		Preparir	$\frac{1g a}{r}$	Presentation		_			+			_
		Presenta	ation	s and		_						-+
		Preperat Exam	tion	for Midterm	1		3				3	
		for Fina	<u>l Ex</u>	am	1		4				4	
		Other (shou	ild be								
		Total W	orkl	oad	-		_			,	75	
		Total W	orkl	oad / 25						75	5/2	5
		Course	Cred	lit (ECTS)							3	
		No		Program Outcom	ies			1 2	2	3 4	1 5	5
Contribution Level Between Course Learning		1	In-d scie com engi knov	epth knowledge o nce, basic enginee puter-aided comp neering areas; abi wledge effectively	f mathen ring con- uting and lity to us r in solvin	natio cept d spo e th ng c	cs, ts, ecific is complex	X		_		
Outcomes and Program Outcomes	2	Abil	lity to identify, for	mulate a	ind a	analyse	+	x	:	+	\neg	
		com	plex engineering	problems	s usi	ing						
		knowledge of basic science, mathematics										
		the 1	UN Sustainable D	Development Goals.								
		3	Abil com	lity to generate cre plex engineering	ative sol	lutic s to ⁻	ons to meet			x		

		current and future needs; design complex systems, processes, devices or products				
		under realistic constraints and conditions.				
	1	Ability to select and use appropriate			x	
	- T	techniques, resources and modern			-	
		engineering and information technology				
		tools including estimation and modelling				
		for the analysis and solution of complex				
		engineering problems, recognising their				
		limitations				
	-	Ability to use research methods, including				+
	5	Addity to use research inethods, including	х			
		experiments, collecting data, analysing and				
		intermeting regults, to investigate complex				
		anging archloma				
	-	Engineering problems.				+
	6	Knowledge of the effects of engineering	х			
		practices on society, health and safety,				
		economy, sustainability and environment				
		within the framework of the UN				
		Sustainable Development Goals; awareness				
		of the legal consequences of engineering				
		solutions.				+
	7	Acting in accordance with the ethical	х			
		principles of the engineering profession,				
		awareness of etnical responsibilities;				
		awareness of non-discrimination,				
		Al ilitie to a location of the second				+
	8	Ability to work effectively as a team		Х		
		member or leader both individually and				
		within interdisciplinary teams (lace-to-				
		A hilite to compare instance of hybrid).			_	+
	9	Ability to communicate effectively on				
		technical issues, both orally and in writing,				
		taking into account the various differences				
		longuage profession)				
	10	Regulades of husiness life prestings such			-	+
	10	Knowledge of business file practices such			x	
		as project management and economic				
		entrepreneurship and innevation				
	11	Ability to learn independently and		v		+
		continuously to adapt to new and emerging				
		technologies and to think inquisitively				
		about technological changes				
		acout comorogical enanges.				╵─└─┤
	TT.	1 - CD-months and				
The Course's Lecturer(s) and Contact	Неа	a of Department				
Informations	<u>tasa</u>	<u>rim@gazi.edu.tr</u>				

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL	2	3	4	4	1	1	1	1		3	2
Learning outcome 1	1	1	1	1	1						
Learning outcome 2	1	1	1	1						1	1
Learning outcome 3		1	1	1		1				1	1
Learning outcome 4			1	1			1			1	
Learning outcome 5								1			

	Course Description Form
Course Code and Name	ETM434 MEASUREMENT TECHNIC
Course Semester	7-8
Catalog Content	Conducting experiments, taking data, processing data, analyzing the results Examining the theoretical foundations of practical application on subjects related to some theoretically explained courses in engineering education
Textbook	1. Osman Genceli "Ölçme Tekniği" Birsen Publishing, İstanbul, 1995.
Supplementary Textbooks	 Tezcan Şekercioğlu "Ölçme Tekniği" Birsen Publishing, İstanbul, 2009. Hasan Önal "Ölçme Tekniği" İstanbul Technical University, Lecture Notes, 1993. R.J. Sweeney "Measurement Techniques in Mechanical Engineering" John Wiley, 1953.
Credit	3 AKTS
Prerequisites of the Course	No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To gain knowledge about measurement systems and processing of measurement values used in materials and mechanics, fluid mechanics and heat transfer applications
Course Learning Outcomes	 Measurement and measurement systems are defined. Information about barometers is given, and liquid column pressure measuring devices, as well as well type manometers, are discussed. Basic principles of flow measurement with cross-sectional narrowing in closed channels are explained. The basic principles of temperature measurement with meters are defined, along with thermal radiation with infrared beam cameras and liquid crystal temperature. Uncertainty analysis is conducted with experimental error types and causes.
Instruction Methods	Face to face Practical training

	1. Week	Basic Principles of M	Aeasurement 7	Technique						
	2. Week	Basic Definitions of	Measurement	Techniques						
	3. Week	Generalization of M	easurement Sy	vstems						
	4. Week	Pressure Measureme	ents							
	5. Week	Liquid Column Pres	sure Measurin	g Devices						
	6. Week	Well Tire Manomete	er, Barometer							
	7. Week	Flow Measurements								
Weekly Schedule	8. Week	Flow Measurement v Closed Channels	with Cross Sec	ction Reductio	on Reduction in					
	9. Week	hermal Radiat	l Radiation and							
	10. Week	Liquid Crystal Temp	erature Meter	s						
	11. Week	Experimental Error	Гуреs and Cau	ises						
	12. Week	Uncertainty Analysis								
	13. Week	Gaussian or Normal Error Distribution								
	14. Week	General Review of Topics								
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theored Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: (Preparation of Final Exam and	tical course hours: 2 l hours: 0 ties: 2 ng, library work: 3 implementing materia ng: 0 sesentation: 0 0 Midterm and Midterm d Preparation for Final	ls: 3 Exam: 7 Exam: 8							
			Number s	Total Weighti ng (%)						
	Midterm Exar	ns	1	60						
	Assignment									
	Application									
Assessment Criteria	Projects									
	Ouiz									
	Percent of In-1	term Studies		60						
	(%)									
	Percentage of Total Score (%	Final Exam to 6)		40						
	Attenuance									

		Activi ty	Total Numb er of Week s	D O (' y h)ur n we	•ati ekl r)			Tot al Peri od Wor k Loa
	Weekl Hours	y Theoretical Course	14	2 3 3 3 7 8 8 1 2 3 4 5		<u>d</u> 28			
	Weekl	y Tutorial Hours							
	Readin	ng Tasks	7			2			14
Workload	Studie	S	3			3			9
	Material Design and		3			3			9
	Repor	t Preparing							
	Prepar	ring a Presentation							
	Presentations								
	Midter Prepar Midter	rm Exam and ration for rm Exam	1			7			7
	Final I Prepar	Exam and ration for Final	1	8			8		
	Other	(should							
	be	verzed)							
	Total '	Workload	-			-			75
	Total	Workload / 25							75/25
	Course	e Credit (ECTS)							3
	N	Program Outco	mes	1	2	2	4	5	
	0			1			-	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	Adequate knowledg mathematics, science engineering subject pertaining to the rel discipline; ability to theoretical and appl information in these model and solve en problems.	ge in ce and s levant o use lied e areas to gineering						
	2	Ability to identify, and solve complex engineering probler to select and apply analysis and model methods for this pu	formulate, ns; ability proper ing rpose.						
	3	Ability to design a system, process, de product under realis constraints and con such a way as to me desired result; abilit apply modern desig methods for this pu	complex vice or stic ditions, in eet the ty to gn rpose.						

	4	Ability to develop select and			v	
	4	Ability to develop, select and use modern techniques and tools necessary for analysis and solution of complex problems in engineering applications; ability to use information technologies effectively.				
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.		X		
	6	Ability to work efficiently in intra-disciplinary teams.				
	7	Ability to work efficiently in multi-disciplinary teams.				
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.				
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.				
	1 0	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.				
	1 1	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.				
The Course's Lecturer(s) and Contact Informations		Assoc. Prof. Dr. Harun GÖKÇ harungokce@gazi.edu.tr	Е			

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL				4	3						
Learning outcome 1				1							
Learning outcome 2					1						
Learning outcome 3				1	1						
Learning outcome 4				1							

Learning		1	1			
outcome						
5						

		Course Description Form									
Course Code and Name	ETM436 AD	VANCED MATERIAL TECHNOLOGIES									
Course Semester	7-8										
Catalog Content	Understanding To have know Understanding Learning indu	the basic properties and behavior of materials ledge about special material types and applications the importance of material selection in the design process strial and technological applications of advanced materials									
Textbook	 Baykara, T İstanbul Ti Ekim 2005 Eker, A. A Rahaman I 	C. 'İleri Malzeme Teknolojileri', PPT, MSB-ArGe, Aralık 2009. caret Odası, "İleri Malzeme Teknolojileri Sektör Raporu", Mert Özcömert, G. ., 'İleri Teknoloji Malzemeleri', PPT, YTÜ, 2004. M.N., Ceramic Processing and Sintering, 2003.									
Supplementary Textbooks	1. Craig, J. J. Education	Craig, J. J. (2009). <i>Introduction to robotics: mechanics and control</i> , 3/E. India: Pearso Education.									
Credit	3 ECTS										
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70									
Type of the Course	Elective										
Instruction Language	Turkish										
Course Objectives	To teach the p materials and performance To understand knowledge Recognize ad communicatio Understanding	to understand the effects of their strong interrelationships on material I the importance of material selection and design by using material science vanced technology materials used in defense, aerospace, micro-electronics, ons, medical and automotive sectors g the engineering profession and ethics									
Course Learning Outcomes	 To gain ba Design be Develop t and econo Gaining av Understan 	usic knowledge and skills in material selection, design and application tter and in accordance with scientific/engineering fundamentals. he ability to develop sustainable solutions by evaluating the environmental mic impacts of various material technologies. wareness about sustainable material choices and applications d the role of materials applications in industrial and scientific fields									
Instruction Methods	Face to face										
Weekly Schedule	1. Week 2. Week 3. Week 4. Week 5. Week 6. Week 7. Week 8. Week 9. Week 10. Week 11. Week 12. Week 13. Week	Introduction- Classification of materials according to their basic properties, Advanced metallic materials (super alloys) Advanced ceramics (engineering ceramics) Advanced Polymers Advanced Glass technologies Boron Technologies Composites (polymer, metal or ceramic matrix-carbon, glass, aramid, boron Composites (polymer, metal or ceramic matrix-carbon, glass, aramid, boron Functional grade materials Superconductors / Semiconductors Magnetic, electronic and opto-electronic materials Biomaterials Nanomaterials and application areas The state of advanced materials in Turkey and the world									
	9. Week 10. Week 11. Week 12. Week 13. Week 14. Week	Functional grade materials Superconductors / Semiconductors Magnetic, electronic and opto-electronic materials Biomaterials Nanomaterials and application areas The state of advanced materials in Turkey and the w									

Teaching and Learning Methods	Weekly theoretical course Weekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library Designing and implement Report preparing: 5 Preparing a Presentation: Presentations: 0 Preparation of Midterm an Final Exam and Preparatio Other:0	Veekly tutorial hours: 0 Reading Activities: 4 Internet browsing, library work: 5 Designing and implementing materials: 6 Report preparing: 5 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Sinal Exam and Preparation for Final Exam: 3 Dther:0											
				Numbers]	Fotal Wei	ght	in	g (9	%)		
	Midterm Exams Assignment Application			1				40 20					
Assessment Criteria	Projects												
	Practice												
	Quiz Percent of In-term							60				-	
	Studies (%)							00					
	Percentage of Final Exam	to Total						40					
	Attendance												
			A	activity	Total Numbe of Weel	er ks	Duration (weekly hour)	l		P V L	Fota Perio Vor Joac	al od k l	
		Weekly	The	coretical Course	14		2				28	;	
		Weekly Tutorial Hours											
		Reading	g Tas	sks	2		4				8		
		Studies			3		5				15	;	
		Materia	l De	sign and	2		6				12	,	
		Implem	enta Dura	tion	1		5		_		- 12	·	
Workload		Bronori	Prep	Procentation	1	_	3		_		3	_	
		Prepart	ng a	Presentation		_			-				
		Midterr	n Fx	am and					_				
		Prepera Exam	tion	for Midterm	1		4				4		
		for Fina	xam ıl Ex	and Preperation	1		3				3		
		Other (shou	ıld be									
		Total W	/orkl	load	-		_				75	;	
		Total W	/orkl	load / 25						-	75/2	25	
		Course	Crec	lit (ECTS)							3		
		No		Program Outcom	es			1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-d scie com engi kno engi	lepth knowledge o nce, basic enginee uputer-aided comp ineering areas; abi wledge effectively ineering problems.	f mathem ring cond uting and lity to us in solvin	natio cept l spo e th ng c	cs, ts, ecific is complex							
	2	Abi	lity to identify, for	mulate a	nd a	analyse	+	-	x	+			
		com	plex engineering j	problems	usi	ng							
		knowledge of basic science, mathe and engineering, and taking into ac			ccount								
		the	UN Sustainable D	Development Goals.									
		3	Abi com	lity to generate cre plex engineering	ative sol	utic to 1	ons to meet				2	C	

		current and future needs; design complex systems, processes, devices or products				
		under realistic constraints and conditions.				
	4	Ability to select and use appropriate		x		
		techniques, resources and modern				
		engineering and information technology				
		tools including estimation and modelling				
		for the analysis and solution of complex				
		engineering problems recognising their				
		limitations				
		Ability to use research methods, including				
	5	Ability to use research interiods, including	X			
		interature search, designing and conducting				
		experiments, collecting data, analysing and				
		interpreting results, to investigate complex				
		engineering problems.			_	
	6	Knowledge of the effects of engineering		х		
		practices on society, health and safety,				
		economy, sustainability and environment				
		within the framework of the UN				
		Sustainable Development Goals; awareness				
		of the legal consequences of engineering				
		solutions.		_		
	7	Acting in accordance with the ethical	x			
		principles of the engineering profession,				
		awareness of ethical responsibilities;				
		awareness of non-discrimination,				
		impartiality and embracing diversity.				
	8	Ability to work effectively as a team				
		member or leader both individually and				
		within interdisciplinary teams (face-to-				
		face, distance or hybrid).				
	9	Ability to communicate effectively on				
		technical issues, both orally and in writing,				
		taking into account the various differences				
		of the target audience (e.g. education,				
		language, profession).				
	10	Knowledge of business life practices such		x		
		as project management and economic				
		feasibility analysis: awareness of				
		entrepreneurship and innovation.				
	11	Ability to learn independently and	x	\top		
	1 1	continuously, to adapt to new and emerging				
		technologies and to think inquisitively				
		about technological changes.				
	I	<u> </u>				— -
	Цаа	d of Department				
The Course's Lecturer(s) and Contact	пеа					
Informations	<u>tasa</u>	<u>rım@gazi.edu.tr</u>				

	Program outcome 1	Program outcome 2	Program outcome 3	Program outcome 4	Program outcome 5	Program outcome 6	Program outcome 7	Program outcome 8	Program outcome 9	Program outcome 10	Program outcome 11
TOTAL		3	5	3	1	3	1			3	1
Learning outcome 1		1	1	1	1						
Learning outcome 2		1	1	1		1				1	
Learning outcome 3			1	1		1				1	
Learning outcome 4			1			1	1				
Learning outcome 5		1	1							1	1

	Course Description Form
Course Code and Name	ETM438 ADVANCED MATERIAL TECHNOLOGIES
Course Semester	7-8
Catalog Content	Ability to design in accordance with innovative materials and manufacturing methods used in engineering Determination of manufacturing methods suitable for smart and functional material technologies Creation of advanced knowledge and understanding in traditional manufacturing methods Establishing basic knowledge and understanding of non-traditional manufacturing methods
Textbook	 Baykara, T. 'İleri Malzeme Teknolojileri', PPT, MSB-ArGe, Aralık 2009. İstanbul Ticaret Odası, "İleri Malzeme Teknolojileri Sektör Raporu", Mert Özcömert, Ekim 2005. Eker, A. A., 'İleri Teknoloji Malzemeleri'. PPT, YTÜ, 2004.
Supplementary Textbooks	 Rahaman M.N., Ceramic Processing and Sintering,2003. Saxl, O., Opportunities for Industry in the Application of Nanotechnology, London Office of S&T, 2000.
Credit	3 ECTS
Prerequisites of	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	To teach the properties, structures and production processes of advanced technology materials and to explain the effects of the strong relationships between them on material performance, to understand the importance of material selection and design by using material science knowledge. To introduce advanced technology materials used in defence, aerospace, micro-electronics, communication, medical and automotive sectors.
Course Learning Outcomes	 To understand the superior qualities and high technical performances of advanced technology materials in terms of mechanical, thermal, electrical, electrical, magnetic, optical, chemical, biological etc. functions and to teach their application areas. To have knowledge about advanced technology materials used in defence, aerospace, micro-electronics, communication, medical and automotive sectors Ability to design in accordance with innovative materials and manufacturing methods used in engineering
Instruction Methods	Face to face

	1. Week	Introduction - Classification of materials according to their b morphology and function						
	2 Wook	A dyonced motallia m	atorials (sur ar	callovs)				
	2. Week 3. Week	Advanced metanic m Advanced ceramics (engineering ce	eramics)				
	4. Week	Advanced Polymers						
	5. Week	Advanced glass techr	nologies					
	6. Week	Boron Technologies	-					
	7. Week	Composites (polymer ceramic fibres)	r, metal or cera	amic matrix - co	ombinations of carbo			
Weekly Schedule	8. Week	8. Week Functional grade materials						
	9. Week	Superconductors / Se	miconductors					
	10. Week	Magnetic, electronic	and opto-elect	ronic materials				
	11. Week	Biomaterials						
	12. Week	Nanomaterials and ap	oplication area	S				
	13. Week	Status of advanced m	aterials in Tur	kiye and the wo	orld			
	14. Week	Applications and uses of advanced materials						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 4 Report preparing: 3 Preparing a Presentation: 3 Presentations: 3 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 4							
			Numbers	Total Weighting (%)				
	Midterm Exan	ns	1	40				
	Assignment		1	20				
	Application Projects							
Assessment Criteria	Practice							
	Quiz							
	Percent of In-t	erm Studies		60				
	(%)			-				
	Percentage of Score (%)	Final Exam to Total	1	40				
	Attendance							

		Activity	Total Number of	Dui n (we	ratio ekly] P d	fotal erio Vork
	Weekly	7 Theoretical Course	14	-	2			28
	Hours Weekly	7 Tutorial Hours						
	Reading	g Tasks	3		3			9
	Studies		3		2			6
	Materia	l Design and	2		4			8
	Report	Preparing	2		3		+	6
Workload	Prepari	ng a Presentation	2		3			6
	Present	ations	2		3			6
	Midtern Prepera Exam	n Exam and tion for Midterm	1		2			2
	Final E for Fina Other (xam and Preperation al Exam	1		4			4
	emphas	sized)						
	Total W	Vorkload	-		-		7	75
	I otal W	Credit (ECTS)					/:	3
	NT NT	Program Outcom	nes	1	2	_		
Contribution Level Between Course Learning Outcomes and Program Outcomes	2	In-depth knowledge o mathematics, science, engineering concepts, aided computing and s engineering areas; abi this knowledge effecti solving complex engin problems. Ability to identify, for analyse complex engin problems using knowl basic science, mathem engineering, and takin account the UN Susta	f basic computer- specific lity to use ively in neering rmulate and neering ledge of natics and ag into inable	X				
	3	Ability to generate cressolutions to complex of problems to meet curr future needs; design c systems, processes, de products under realist constraints and condit	eative engineering rent and omplex evices or ic ions.					
	4	Ability to select and u appropriate technique and modern engineeri information technolog including estimation a modelling, for the ana solution of complex e problems, recognising limitations.	se s, resources ng and gy tools, and lysis and ngineering their			X		

	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.					
	6 7	Knowledge of the effects of engineering practices on society, health and cafety economy Acting in accordance with the ethical principles of the					
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).					
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).					
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.		x			
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			x		
The Course's Lecturer(s) and Contact Informations		Assoc. Prof. Dr. Hüseyin Kürş kursadsezer@gazi.edu.tr	ad SI	EZEF	Ł	_	_

	Program Outcome	Program Outcome	Program Outcome	Program Outcome	Program Outcome	Program Outcome	Program Outcome	Program Outcome	Program Outcome	Program Outcome1	Program Outcome1
	1	2	3	4	5	6	7	8	9	0	1
TOTAL		1		3						2	3
Learnin		1		1							1
g outcome											
1											
Learnin				1						1	1
g											
outcome											
Learnin				1						1	1
g outcome											
3											

Course Description Form									
Course Code and Name	ETM440 HE	AT AND MASS TRANSFER							
Course Semester	7-8								
Catalog Content	To have know To have basic Professional a Ability to use Ability to iden	ledge about the basic concepts of heat and mass transfer knowledge about the use of heat transfer in engineering applications nd ethical responsibility modern engineering methods tify, formulate and solve problems							
Textbook	 Frank P. Ir Yayıncılık Isı ve Küt (2011) 	ncropera, David P. DeWitt, Isı ve Kütle Geçişinin Temelleri, Literatür , 2001. de Transferi. Pratik Yaklaşım. Yunus A. Çengel. 3. Baskı Güven Bilimsel							
Supplementary Textbooks	 Altınışık, I Atagündüz Bayazıtoğ 	K., 'Uygulamalarla 151 transferi', Nobel Yay., Ank, 2003 r, G., Is1 Transferi, Ege Üniversitesi, İzmir, 1983 lu, Y., Elements of Heat Transfer, McGraw Hill, 1988							
Credit	3 ECTS								
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70							
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	To introduce to To provide m engineering a Develop an in evidence, To provide a transfer and n	Fo introduce the basic concepts of heat transfer, Fo provide many real engineering examples of how heat transfer can be used in engineering applications, Develop an intuitive understanding of heat transfer with an emphasis on scientific evidence, To provide an understanding of the physical mechanism of concentration and mass transfer and mass transfer by diffusion and convection							
Course Learning Outcomes	 To develor to heat tra To be able To be able To be able Understar To gain a climate ch 	p skills in approaching and finding solutions to engineering problems related nsfer e to understand and analyze heat and mass transfer mechanisms e to analyze different thermal systems ind how heat transfer can be used in engineering applications wareness about the causes of important issues such as global warming and hange							
Instruction Methods	Face to face								
	1. Week	Introduction to Heat Transfer and Basic Concepts							
	3. Week	Continuous Heat Conduction							
	4. Week	Time Dependent Heat Conduction							
	5. Week	Numerical Methods in Heat Conduction							
	6. Week	Fundamentals of Heat Transport							
	7. Week	External Forced Heat Transport							
Weekly Schedule	8. Week	Internal Forced Heat Transport							
	9. Week	Boiling and Condensation							
	10. Week	Heat Exchangers							
	11. Week	Fundamentals of Radiative Heat Transfer							
	12. Week	Kadiative Heat Transfer							
	13. Week	Iviass Iransfer							
	14. week	wass manster - sample application							

Teaching and Learning Methods	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 5 Internet browsing, library work: 5 Designing and implementing materials: 5 Report preparing: 4 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 5 Other:0 Numbers Total Weighting (%)											
				Numbers		Total W	eigh	tin	g (%	%)		
	Midterm Exams			1			40					
	Assignment											
	Application											
Assessment Criteria	Projects											
	Practice											
	Quiz						40					
	Percent of In-term						40					
	Studies (%) Percentage of Final Exam	to Tota	1	1			60					
	Score (%)	10 1014	1	1			00					
	Attendance											
			А	setivity	Total Number of Weeks	Duratio (weekly hour)	n] P V L	Fota erio Vor oac	al od k ł	
		Weekly Hours	7 The	oretical Course	14	2	2		28			
		Weekly Tutorial Hours										
		Readin	o Tas	sks	2	5				10		
		Studios	5 1 40		2	5				10		
		Mataria	1.D.	-:	Z	3	5			10	<u> </u>	
		Implem	nentat	tion	2	5		ľ		10		
		Report	Prepa	aring	2	4	4			8		
Workload		Prepari	1 ng a	Presentation								
		D	ing a	Tresentation							_	
		Present		1								
		Prepera	n Ex	am and for Midterm	1	4		ĺ		4		
		Exam			-							
		Final E	xam	and Preperation	1	5				5		
		for Fina Other (al Exa	am Id be								
		emphas	sized))								
		Total W	Vorkl	oad	-	-				75		
		Total W	Vorkl	.oad / 25					7	5/2	25	
		Course	Cred	lit (ECTS)						3		
		No		Program Outcom	es		1	2	3	1	5	
			La d	anth Imaryladaa a	f o th o o	tian	-		5	-	5	
			in-a	nce basic enginee	ring conce	uics,			2			
				puter-aided comp	uting and s	specific						
			engi	neering areas; abi	lity to use	this						
Contribution Level Betw	veen Course Learning		knov	wledge effectively	in solving	g complex						
Dutcomes and Program Outcomes			engi	ineering problems.		1 1		\square		-		
		2	Abil	ity to identify, for	mulate and	a analyse			2			
			know	wledge of basic se	ience. mat	hematics						
			and	engineering, and t	aking into	account						
			the I	UN Sustainable D	evelopmer	nt Goals.						
		3	Abil	lity to generate cre	ative solu	tions to			2	(

	4	complex engineering problems to meet current and future needs; design complex systems, processes, devices or products under realistic constraints and conditions. Ability to select and use appropriate techniques, resources and modern engineering and information technology tools, including estimation and modelling, for the analysis and solution of complex engineering problems, recognising their limitations.		
	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.		X
	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	x	
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	x	
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).		
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).		
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.		
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.		
The Course's Lecturer(s) and Contact Informations	Prof. <u>vozd</u>	Dr. Veysel ÖZDEMİR emir@gazi.edu.tr		

	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program	Program
	1	2	3	4	5	6	7	8	9	10	11
TOTAL	4	4	4	3	4	1	1				
Learning outcome 1	1	1	1	1	1						
Learning outcome 2	1	1	1	1	1						
Learning outcome 3	1	1	1		1						
Learning outcome 4	1	1	1	1	1						
Learning outcome 5						1	1				

	Course Description Form
Course Code and Name	ETM442 DESIGN OF HYDRAULICS AND PNEUMATICS SYSTEMS
Course Semester	7-8
Catalog Content	Understanding the basic principles of hydraulic and pneumatic systems, and the ability to comprehend how these systems work Learning how hydraulic and pneumatic circuits are designed and implemented, and understanding their various industrial applications Skills in diagnosing and troubleshooting faults in systems Basic knowledge and skills for industrial automation
Textbook	1. Karacan, İ., Pnömatik Kontrol, Bizim Büro Yay., Ankara, 1991.
Supplementary Textbooks	 Parr, Andrew. Hydraulics and pneumatics: a technician's and engineer's guide. Elsevier, 2011.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Understanding the basic principles and components of hydraulic and pneumatic systems Learning hydraulic and pneumatic system design Learning how to diagnose faults, perform repairs, integrate, and automate systems Developing safety awareness in complex systems
Course Learning Outcomes	 By understanding the functions of basic components used in hydraulic and pneumatic systems, complex engineering problems can be identified, formulated, and analyzed effectively, enabling effective use in solving complex engineering problems. Learning the design process of hydraulic and pneumatic systems enables the generation of creative solutions to solve complex engineering problems. Ensuring the safe and effective operation of systems. Learning to consider the impact of engineering applications on society, health, safety, and the environment. Acquiring the necessary competencies to be competitive in industrial applications.
Instruction Methods	Face to face

	1. Week	Introduction to hydra	ulics, basic pri	inciples in hyd	raulics.			
	2. Week	Standard symbols, hy	draulic pipes,	and hoses.				
	3. Week	Hydraulic pumps, mo	otors, and cylir	nders.				
	4. Week	Sealing elements, hyd	lraulic valves.					
	5. Week	Oil reservoirs, filters, fluids.	hydraulic acc	umulators, hyd	lraulic			
	6. Week	Electro-hydraulic sys hydraulic systems.	tems, faults an	nd diagnostics	in			
	7. Week	Hydraulic circuits. Ap	pplications of	hydraulics in i	ndustry.			
Weekly Schedule	8. Week	Hydraulic circuit desi	gn and application	ations.				
	9. Week	Introduction to pneum pneumatics.	natics. Physica	al principles in				
	10. Week	Generation, maintena air.	nce, and distri	bution of com	pressed			
	11. Week	Standard symbols in J	pneumatics, cy	linders, sealin	g			
	12. Week	Pneumatic motors, va	lves, pneumat	tic circuits, and	1			
	13. Week	Hydro-pneumatics. A	pplications of	pneumatic sys	stems.			
	14. Week	Fault finding. Electro installation.	-pneumatics. S	System design	and			
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 3 Internet browsing, library work: 2 Designing and implementing materials: 3 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 4 Final Exam and Preparation for Final Exam: 4							
			Numbers	Total Weighting (%)				
	Midterm Exar	ns	1	40				
	Assignment		1	20				
	Application Projects							
Assessment Criteria	Practice							
	Quiz							
	Percent of In-1	term Studies		60				
	(%)							
	Percentage of Score (%)	Final Exam to Total		40				
	Attendance							

		Activity	Total Numbe r of Weeks	Duration (weekly hour)		l	T Pe W Lo	otal riod ork oad
	Weekly Hours	7 Theoretical Course	14		2			28
	Weekly	7 Tutorial Hours						
	Readin	g Tasks	5		3			15
	Studies	10 1	5		2			10
Workload	Implem Implem	al Design and mentation	2		3		6	
	Prepari	Preparing						
	Present	ations						
	Midtern Prepera	n Exam and tion for Midterm	2		4			8
	Exam Final E for Fina	xam and Preperation al Exam	2		4			8
	Other (emphas	should be sized)						75
	Total V	-				74	5/2.5	
	Course	Credit (ECTS)					,.	3
	No	Program Outcom	nes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1 2 3 4	Adequate knowledge mathematics, science engineering subjects pertaining to the rele discipline; ability to theoretical and applie information in these model and solve eng Ability to identify, fo and solve complex en problems; ability to s apply proper analysis modeling methods fo purpose. Ability to design a co system, process, dev product under realist constraints and cond such a way as to meet desired result; ability modern design method Ability to develop, so use modern techniqu tools necessary for an and solution of comp problems in engineer	e in e and vant use ed areas to ineering ormulate, ngineering select and s and or this omplex ice or ic itions, in et the v to apply ods for elect and nalysis olex ring	X		x		
		applications; ability t information technolo effectively.	to use ogies					

	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.	X		
	6	Ability to work efficiently in intra-disciplinary teams.	X		
	7	Ability to work efficiently in multi-disciplinary teams.	x		
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.			
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.			
	10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to			
	11	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.			
The Course's Lecturer(s) and Contact Informations	Pro	f. Dr. İsmail Şahin in@gazi.edu.tr			

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
TOTAL		1	1	3	1	1	1				
Learning outcome 1		1		1							
Learning outcome 2				1							
Learning outcome 3			1								
Learning outcome 4				1			1				

Learning			1	1			
outcome 5							

Course Description Form									
Course Code and Name	ETM444 REVERSE ENGINEERING DESIGN								
Course Semester	7-8								
Catalog Content	To be able to use modern engineering methods Ability to use reverse engineering hardware and software To understand the relationship between reverse engineering and rapid prototyping Ability to perform sector-based reverse engineering applications								
Textbook	 Raja, V. and Fernandes, K.J., Reverse Engineering - An Industrial Perspective, Springer Pub., 2008. Wang, W. Reverse engineering: Technology of reinvention. Crc Press, (2010). 								
Supplementary Textbooks	 Gibson, I., Rosen, D., Stucker, B., Khorasani, M., Rosen, D., Stucker, B., & Khorasani, M. (2021). Additive manufacturing technologies (Vol. 17). Cham, Switzerland: Springer. 								
Credit	3 ECTS								
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements								
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	Learning Reverse Engineering design steps, comprehension of usage areas and purposes, use of 3D scanner and gaining the ability to apply it on a sample problem								
Course Learning Outcomes	 To be able to comprehend reverse engineering method and ethical values in engineering design Adopting reverse engineering approaches in the product development process To gain the ability to use reverse engineering hardware and software Ability to apply the reverse engineering process on a sample case 								
Instruction Methods	Face to face								

	1. Week	. Week Overview of reverse engineering approach								
	2. Week	Reverse engineering 1	methodologies	and technique	es					
	3. Week	Reverse engineering l	hardware and	software						
	4. Week	Selection criteria for 1	reverse engine	eering systems						
	5. Week	Product development	process with	reverse engine	ering					
	6. Week	Reverse engineering a	applications in	automotive ar	nd aerospa	ce industry				
	7. Week	Factors preventing the	e use of revers	e engineering	and legal a					
Weekly Schedule	8. Week	Week Reverse engineering application with 3D Optical Scanner								
Weekly Schedule	9. Week	Week Point cloud processing and data optimisation								
	10. Week	Computer-aided surfa	ice modelling	with 3D scan d	lata					
	11. Week	Computer-aided solid	l modelling wi	th 3D scan dat	a					
	12. Week	5								
	13. Week	Introduction to rapid prototyping								
	14. Week The relationship between reverse engineering and rapid prototyp									
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparit	tical course hours: 2 l hours: 0 ties: 3 ng, library work: 2 implementing materials	s: 4							
	Preparing a Pre Presentations: (Preparation of) Final Exam and	esentation: 0) Midterm and Midterm I 1 Preparation for Final I	Exam: 2 Exam: 3							
			Numbers	Total Weighting (%)						
	Midterm Exan	ns	1	30						
	Assignment		1	10						
	Projects		1	20						
Assessment Criteria	Practice		<u> </u>							
	Quiz									
	Percent of In-t	erm Studies		60						
	Percentage of Score (%)	Final Exam to Total		40						
	Auchuance									

		Activit y	Total Number of Weeks	Duration (weekly hour)			T Pe W Lo	otal riod ork oad
	Weekly	Theoretical Course	14		2			28
	Weekly	7 Tutorial Hours						
	Readin	g Tasks	4		3			12
	Studies		7		2			14
	Materia and	al Design	4		4			16
	Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midter Prepera Midter	m Exam and ition for m Exam	1	2				2
	Final E Prepera	xam and tion for Final	1		3			3
	Other (be emp	should hasized)						
	Total V	Vorkload	-		-		,	75
	Total V	Vorkload / 25					75	5/25
	Course	Credit (ECTS)				i		3
	No	Program Outco	omes	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge mathematics, scienc engineering concept computer-aided com and specific enginee ability to use this kn effectively in solving engineering problem	of e, basic s, pputing oring areas; owledge g complex ns.					
	2	Ability to identify, f and analyse complex engineering problem knowledge of basic mathematics and eng and taking into acco UN Sustainable Dev	formulate k ss using science, gineering, unt the relopment	x				
	3	Ability to generate c solutions to complex engineering problem current and future no design complex syst processes, devices o under realistic const	reative to meet eeds; ems, r products raints and		x			
	4	Ability to select and appropriate techniqu resources and moder engineering and info technology tools, in estimation and mode the analysis and solu complex engineering problems, recognisii	use nes, rn ormation cluding elling, for ttion of g ng their			X		
	5	Ability to use resear methods, including I search, designing an conducting experime collecting data, anal- interpreting results, investigate complex engineering problem	ch literature d ents, ysing and to ns.					

-							1								
						6	Knowledg	ge of the effe	ects of	x					
							engineerii	ng practices	on						
							society, h	ealth and sat	tety,						
							economy,	sustainabili	ty and						
							environm	ent within th	ie						
					framewor	k of the UN									
					Sustainab	le Developn	nent								
					Goals; aw	areness of t	he legal								
					conseque	nces of engin	neering								
							solutions.								
						7	Acting in	accordance	with the	X					
							ethical pri	inciples of th	ne						
							engineeri	ng professio	n,						
							awareness	s of ethical							
							responsib	ilities; aware	eness of						
							non-discr	imination,							
							impartiali	ty and embra	acing						
L							diversity								
						8	Ability to	work effect	ively as						
							a team me	ember or lea	der both						
							individua	lly and withi	n						
							interdisciplinary teams (face-								
							to-face, distance or hybrid).								
ŀ							9 Ability to communicate								
						ľ	effectively on technical issues,								
							both orall	, y and in wri	ting,						
							taking int	o account th	e various						
						differences of the target									
						audience (e.g. education.									
							language.	profession).							
-							V	1 /	1:6					_	
						10	Knowledg	ge of busines	ss me						
							practices	such as proje	ect .						
							managem	ent and ecor	iomic						
							feasibility	analysis; av	vareness						
-							of entrepr	eneurship ai	10					_	
						11 Ability to learn independently						х			
								luousiy, to a	idapt to						
							new and e	inerging	·1.						
							inquisitiu	les and to the	INK						
-		.	() 1				inquisitiv	ery about						<u> </u>	
	The Course	s Lecturer((s) and			As	ssist. Prof. I	Dr. Oğulcan	EREN						
	Contact Into	ormations				og	gulcaneren@	gazi.edu.tr							
L	Program	Program	Program	Program	Prog	ram_	Program	Program	Program	Prog	ram	Prog	gram	Pro	gram
	Outcome 1	Outcome2	Outcome3	Outcome 4	Oute	ome5	Outcome6	Outcome 7	çıktısı 8	Outc	come	Out	come10	Ou	tcome11
TOTAL	_	1	3	4			1	1							3
Learnin	ıg														
outcom	e		1	1			1	1							
l Locumin	NG														
Learnin	ig e	1	1	1											1
2	~	1	1	1											1
Learnin	ıg														
outcom	e		1	1											1
3															
Learnin	ng			1											1
4				1											1
	Course Description Form														
--	--														
Course Code and Name	ETM446 ENTREPRENEUR SHIP														
Course Semester	7-8														
Catalog Content	Skill in identifying individual skills and competencies Skill in career planning and goal setting Skill in business idea development and creativity Skill in understanding the concept and elements of a business plan (market research, marketing plan, production plan, management plan, financial plan) Skill in considering key points in writing and presenting a business plan Skill in workshop activities Skill in supporting modules for educational programs														
Textbook	 Gerber, M.E, Girişimcilik Tutkusu, Sistem Yayıncılık, 2011. Kolektif, Girişimcilik, Beta Basım Yayım, 2013. 														
Supplementary Textbooks	Atasoy, T., Kendinizin Patronu Olmak: Girişimcilik, ODTÜ Geliştirme Vakfı Yayınları, 2009.														
Credit	3 ECTS														
Prerequisites of the Course (<i>Attendance Requirements</i>)	No Prerequisites - %70 AttendanceRequirements														
Type of the Course	Elective														
Instruction Language	Turkish														
Course Objectives	To have entrepreneurship awareness To recognize that potential problems could be business ideas To encourage entrepreneurship and ensure the idea is turned into a plan and implemented														
Course Learning Outcomes	 Individual skills and competencies are identified. Career plan and goals are established. Ability to develop business ideas. Ability to prepare and present a business plan. Work can be done on e-commerce, logistics, and foreign trade topics. 														
Instruction Methods	Face to face														

	1. Week	Basic concepts of ent entrepreneurship	repreneurship	, the importance of	of			
	2. Week	Determination of Ind Career Plan	ividual's Skills	s - Competencies	and			
	3. Week	Business Idea Develo	pment and Cr	eativity				
	4. Week	Business Plan Concep	pt and Elemen	ts				
	5. Week	Market Research						
	6. Week	Marketing Plan, Prod	uction Plan					
	7. Week	Management Plan						
	8. Week	Financial Plan						
Weekly Schedule	9. Week	Points to Consider in a Business Plan	Writing and P	Presenting				
	10. Week	General characteristic generating business is	es of managers deas	s in Turkey,				
	11. Week	Marketing, trade, tout that can produce serv	rism, educatio ices	n and freelance b	usiness ideas			
	12. Week	Newly developing en	trepreneurial a	areas				
	13. Week	Competition in entrepreneurship and increasing competitiveness						
	14. Week	Entrepreneurship and business problems and solution suggestions						
	Weekly theoretical course hours: 2 Weekly tutorial hours: 0							
Teaching and Learning Methods	weekly tutorial hours: 0 Reading Activities: 0							
	Internet browsi	ng, library work: 0						
(These are examples. Please fill which activities you use in the course)	Designing and implementing materials: 0							
ucuvities you use in the course)	Report preparir	ng: 0						
	Preparing a Pre	esentation:45						
	Presentations: ()						
	Preparation of	Midterm and Midterm	Exam: 0					
	Final Exam and	Preparation for Final	Exam: 0					
			Numbers	Total Weighting				
	Midterm Exan	ns	1	60				
	Assignment							
	Application Projects							
Assessment Criteria	Practice							
	Quiz							
	Quiz		-	60				
	Percent of In-t	term Studies		60				
	Percent of In-t (%) Percentage of Score (%)	erm Studies Final Exam to Total	1	60 40				

		Activity	Total Number of	Duratio n (weekly					Total Period Work Load
	Weekly	/ Theoretical Course	14	2				28	
	Weekly	/ Tutorial Hours							
	Readin	g Tasks							
	Studies		4	3			12		
	Materia	al Design and							
	Report	Preparing							
Workload	Prepari	ng a Presentation							
	Present	ations							
	Midteri Prepera Exam	m Exam and ation for Midterm	5			3			15
	Final E for Fina	xam and Preperation al Exam	5			4			20
	Other (emphas	should be sized)	-			-			-
	Total W	Vorkload	-			-	_		75
	Total V	Vorkload / 25							75/25
	Course	Credit (ECTS)							3
	No	Program Outcom	nes	1	2	3	4	5	
Contribution Level Between Course Learning Outcomes and Program Outcomes		In-depth knowledge of mathematics, science, basic engineering concepts, computer- aided computing and specific engineering areas; ability to use this knowledge effectively in solving complex engineering problems.			x				
	2	Ability to identify, for analyse complex problems using known basic science, mather engineering, and to account the UN Development Goals.	rmulate and engineering owledge of matics and aking into Sustainable			x			
	3	Ability to generat solutions to complex problems to meet of future needs; desig systems, processes, products under constraints and condit	e creative engineering current and n complex devices or realistic ions.				x		
	4	Ability to select appropriate technique and modern engine information technol including estimat modelling, for the a solution of complex problems, recognis limitations.	and use s, resources eering and ogy tools, ion and nalysis and engineering ing their			x			
	5	Ability to use researce including literature designing and experiments, collec analysing and results, to investigat engineering problems	th methods, e search, conducting ting data, interpreting te complex				x		

	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.			x			
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.					x	
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).		x				
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).				x		
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.			x			
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			x			
The Course's Lecturer(s) and Contact Informations	Prof. Dr. Adnan AKKURT aakkurt@gazi.edu.tr							

	Program Outcome 1	Program Outcome 2	Program Outcome 3	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7	Program Outcome 8	Program Outcome 9	Program Outcome 10	Program Outcome 11
TOTAL	2	3	4	3	4	4	5	2	4	3	3
Learning outcome 1	1	1	1	1	1		1				
Learning outcome 2	1	1		1	1	1	1	1	1		1
Learning outcome 3			1	1	1	1	1		1	1	
Learning outcome 4			1		1	1	1		1	1	1
Learning outcome 5		1	1			1	1	1	1	1	1

	Course Description Form
Course Code and Name	ETM450 COMPUTER AIDED DESIGN 3
Course Semester	7-8
Catalog Content	Learning basic design methods Preparation of computer-aided 2D draft drawings Learning how to build computer-aided 3D models Learning the concepts of wireframe, solid modeling and surface modeling
Textbook	 Encarnacao, J. L., Lindner, R., & Schlechtendahl, E. G. (2012). Computer aided design: fundamentals and system architectures. Springer Science & Business Media.
Supplementary Textbooks	 Cozzens, R., Catia V5 Workbook R19, SDC Pub., USA, 2009. Tickoo, S., Catia V5R20 for Designers, CADCIM Technologies, USA, 2010.
Credit	3 ECTS
Prerequisites of the Course (Attendance Requirements)	No Prerequisites - %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Understand the fundamentals of element-based computer-aided design Create integration, bills of materials and technical drawings To learn the representation of manufacturing information on technical drawing To create analysis and simulations
Course Learning Outcomes	 Creative solutions to complex engineering problems are to be produced in a way that meets current and future needs. Knowledge about designing industrial models under realistic constraints and conditions is to be acquired. Appropriate three-dimensional modeling techniques are to be selected and used.
Instruction Methods	Face to face

	1. Week	Learning the interfact software	e of Compute	er Aided Desig	gn				
	2. Week	Working with basic	wireframe too	ls					
	3. Week	Working with surfac	es-I						
	4. Week	Working with surfac	es-II						
	5. Week	Smoothing surfaces							
	6. Week	Advanced surface m	odeling tools-	Ι					
Weekly Schedule	7. Week	Correction tools-I							
	8. Week	Correction tools-II							
	9. Week	Advanced surface m	odeling tools-	II					
	10. Week	Advanced modeling	and correction	n tools					
	11. Week	Advanced correction	tools						
	12. Week	Basics of plastering	(thinning)						
	13. Week	Surface evaluation a	nd painting						
	14. Week	Drawing (drafting) to	ools, student p	project					
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutoria Reading Activi Internet browsi Designing and Report preparin Preparing a Pre Presentations: 0 Preparation of Final Exam and	tical course hours: 2 1 hours: 0 ities: 2 ing, library work: 3 implementing material ng: 0 esentation: 0 0 Midterm and Midterm <u>d Preparation for Final</u>	ls: 4 Exam: 2 Exam: 4 Number	Total					
Assessment Criteria	Midterm Exar Assignment Application Projects Practice Quiz Percent of In- (%) Percentage of Total Score (% Attendance	ns term Studies Final Exam to 6)	s 1 	Weighti ng (%) 60 60 60 40					

		Activi ty	Total Numb er of Week s	Durati on (weekl y hour)					Tot al Peri od Wor k Loa
	Weekl Hours	y Theoretical Course	14			2			28
	Weekl	y Tutorial Hours							
	Readii	ng Tasks	3	2			6		
Workload	Studie	S ial Dasian	5	3			15		
	and	lai Design	3			4			20
	Implei	mentation							
	Repor	t Preparing							
	Prepar	ing a Presentation							
	Presen	itations	1			2			2
	Preper Midter	ration for rm Exam	I			2			2
	Final Exam and Preperation for Final		1			4			4
	Other	(should							
	be empha	sized)							
	Total Workload		_			-			75
	Total	Workload / 25							75/25
	Course	e Credit (ECTS)							3
	N	Program Outco	mes	1	2	3	4	5	
	0	A doquato knowlad		1	-				
Contribution Level Between Course Learning Outcomes and Program Outcomes		Adequate knowledg mathematics, science engineering subject pertaining to the rel discipline; ability to theoretical and appl information in these model and solve en problems. Ability to identify,	ce and se and levant b use lied e areas to gineering formulate,						
		and solve complex engineering problems; abilit to select and apply proper analysis and modeling methods for this purpose.							
	3	Ability to design a system, process, de product under realis constraints and con such a way as to me desired result; abilit apply modern desig methods for this pu	complex vice or stic ditions, in eet the ty to gn rpose.		x				

	4	Ability to develop, select and use modern techniques and tools necessary for analysis and solution of complex problems in engineering applications; ability to use information technologies effectively.	x		
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for examination of engineering problems or discipline-specific research topics.			-
	6	Ability to work efficiently in intra-disciplinary teams.			
	7	Ability to work efficiently in multi-disciplinary teams.			
	8	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.			
	9	Ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give clear and understandable instructions and to receive.			
	1 0	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.			_
	1 1	Conformity to ethical principles, professional and ethical responsibility; Information on standards used in engineering applications.			
The Course's Lecturer(s) and Contact Informations	Asso haru	oc. Prof. Dr. Harun Gökçe ıngokce@gazi.edu.tr			

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL			2	1							
Learning outcome 1			1								
Learning outcome 2			1								
Learning outcome 3				1							

	Course Description Form
Course Code and Name	ETM452 ANIMATION APPLICATION IN DESIGN
Course Semester	7-8
Catalog Content	Three-dimensional modeling of products in computer environment Producing photorealistic images of the product and the place where it is located, taking into account the material, color, texture and environmental light. Creating materials, lights, lighting and scenes in the virtual environment. Transferring the usage phases of the products and presenting them effectively in the digital environment. Creating animations of 3D modeled products
Textbook	 Williams, R. (2009). The Animator's Survival Kit. Faber & Faber. Avgerakis, G. (2008). Digital Animation Bible: Creating Professional Animation with 3ds Max, Lightwave, and Maya. Wiley.
Supplementary Textbooks	 Johnston, O., & Thomas, F. (1995). The Illusion of Life: Disney Animation. Disney Editions.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	 Ability to perform computer-aided 3D modeling Ability to create photorealistic images Ability to effectively create product usage phases in a digital environment Ability to use visualization and animation actively
Course Learning Outcomes	 Ability to model complex objects in a computer environment using various 3D modeling techniques and tools. Ability to produce photorealistic images using factors such as materials, color, texture, camera and light settings Ability to visualize different usage phases of products in a detailed and effective way in digital environment Ability to create dynamic and attractive visual presentations by effectively using visualization and animation techniques Ability to use different 3D modeling and visualization software
Instruction Methods	Face to face

	1. Week	Introduction and inst	allation of 3D	modeling prog	rams				
	2. Week	Installing model visu	alization utilit	ies					
	3. Week	Transferring 3D Mod	lels to Other P	rograms 3D M	odel Formats: 3ds	, dxf			
	4. Week	Material concept in virtual environment							
	5. Week	5. Week Creation of virtual materials							
	6. Week	6. Week Light and Shadow in the Virtual Environment Light Types							
	7. Week HDR Concept, Scene design in virtual environment								
Weekly Schedule	8. Week	Visualization settings	5						
	9. Week	Postproduction							
	10. Week	Camera - depth conce	ept and setting	S					
	11. Week	Motion and Virtual p	hysics in anim	ation					
	12. Week	Visualization process	ses						
	13. Week	Adding special effect	ts						
	14. Week	Using dynamic animation	ation systems						
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoret Weekly tutorial Reading Activi Internet browsi Designing and Report preparir Preparing a Pre Presentations: (Preparation of 1 Final Exam and	Veekly theoretical course hours: 2 Veekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2 Final Exam and Preparation for Final Exam: 2							
			Numbers	Total Weighting (%)					
	Midterm Exan	ns	1	40					
	Assignment		1	20					
	Application Projects								
Assessment Criteria	Practice								
	Quiz								
	Percent of In-term Studies 60								
	(%)								
	Percentage of Score (%)	Final Exam to Total		40					
	Attendance								

		Activity	Total Numbe r of	Dur (we hou	•ation ekly r)	l	T Pe W Lo	otal criod ork oad
	Weekly	Theoretical Course	14		2			28
	Weekly	7 Tutorial Hours						
	Readin	g Tasks						
	Studies		9		1			9
	Materia	al Design and	10		2			20
	Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midtern Prepera Exam	m Exam and ation for Midterm	5		2			10
	Final E for Fina	xam and Preperation al Exam	4		2			8
	emphas	sized)						
	Total V	Vorkload	-		-		,	75
	Total V	Vorkload / 25					75	5/25
	Course	Credit (ECTS)			1			3
	No		105	1	2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge of mathematics, science, engineering concepts, aided computing and engineering areas; abit this knowledge effect solving complex engine problems.	f basic computer- specific lity to use ively in neering					x
	2 Ability to identify, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN				X			
	3	Ability to generate cro solutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints an	eative to meet eds; design cesses, nder nd		X			
	4	Ability to select and u appropriate technique resources and modern engineering and infor technology tools, incl estimation and model the analysis and soluti complex engineering recognising their limi	se s, mation uding ling, for ion of problems, tations.				x	
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting gg data, eting complex		X			

	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	
	Acting in accordance with the x ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	
	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).	X
	Ability to communicate x effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).	
	Knowledge of business life x practices such as project management and economic feasibility analysis; awareness of entrepreneurship and	
	Ability to learn independently x and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.	
The Course's Lecturer(s) and Contact Informations	Department Management tasarim@gazi.edu.tr	

	Program Outcome 1	Program Outcome 2	Program Outcome 3	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7	Progra m çıktısı 8	Program Outcome 9	Program Outcome1 0	Program Outcome1 1
TOTAL	5	2	2	4	2	1	1	2	1	1	1
Learnin	1			1				1			
g											
outcome											
1											
Learnin	1	1	1	1		1					
g											
outcome											
2											
Learnin	1	1	1		1		1				
g											
outcome											
3											
Learnin	1			1				1	1		
g											
outcome											
4											
Learnin	1			1	1					1	1
g											
outcome											
5											

Course Description Form									
Course Code and Name	ETM454 OP	TIMIZATION							
Course Semester	7-8								
Catalog Content	Mathematical Learning opti Learning para Ability to us structures, and	modeling of linear and nonlinear problems mization theory and common techniques umetric design, intuitive optimization theory as shape and topology-based optimization theories, lattice d generative design methods							
Textbook	 Fred Glo Metaheur Martin P. Theory, N 	ver, Gary Kochenberger (2003) Handbook of ristics, Springer Book. . Brendsoe, Ole Sigmund (2004) Topology Optimization Methods and Applications, Springer Book.							
Supplementary Textbooks	1. Zbigniev Heuristic	Michalewicz, David Fogel, How to Solve It: Modern s.							
Credit	3 ECTS								
Prerequisites of the Course (Attendance Requirements)	No Prerequisi	tes - %70 Attendance Requirements							
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	To learn the in design Solving opt techniques To have kno different des	e basic concepts of optimization methods and optimization imization problems in mechanical systems using various owledge on how to apply optimization techniques in sign processes							
Course Learning Outcomes	 Computer areas are engineerir Creative s constraints Optimizat constraints Selection solution o 	-aided computing and knowledge of specific engineering learned to be effectively used in solving complex ag problems. olutions to engineering problems are gained to meet design s. ion of industrial products or components under realistic s and conditions is acquired. and use of appropriate techniques for the analysis and f engineering problems are learned.							
Instruction Methods	Face to face								
	1. Week	Introduction							
	2. Week	Optimization Techniques and General Approaches,							
	3. Week	Heuristic Optimization Technics							
	4. Week	Heuristic Optimization Technics (Cont.)							
	5. Week	Shape Based Optimization Theory							
	6. Week	Topology Optimization Processes							
	7. Week	Topology Optimization Processes (Cont.)							
	8. Week	Preferred Manufacturing Technologies in Topology							
	9. Week	Lattice Structures							
	10. Week	Lattice Structures (Cont.)							

	11. Week	Preferred Mar	nufacturing Te	chnologies in L	attice Struct	ture					
	12. Week	Sensitivity an	alysis with Fi	nite Element Ana	alysis metho	od					
	13. Week	Sensitivity an	alysis with Fi	nite Element Ana	alysis metho	od					
	14 Week	Application	-		-						
	14. WCCK	11									
Teaching and Learning Methods	Weekly theore	tical course hou	ırs: 2								
(These are examples. Please fill which activities you use in the course)	Weekly tutoria	l hours: 0									
	Reading Activ	ities: 2									
	Internet browsing, library work: 3 Designing and implementing materials: 4										
	Designing and implementing materials: 4 Report preparing: 0										
	Report preparing: 0 Preparing a Presentation: 0										
	Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 2										
	Presentations:	0									
	Preparation of	Midterm and M	lidterm Exam	: 2							
	Final Exam an	d Preparation fo	or Final Exam	: 4							
			Numbers	Total Weighti	ing(%)						
	Midterm Exa	ns	1	30							
	Assignment										
	Application										
	Projects		1	30							
Assessment Criteria	Practice										
	Quiz										
	Percent of In-	term		60							
	Studies (%)										
	Percentage of	Final		40							
	Exam to Tota	l Score (%)		10							
	Attendance										
	Ac	etivity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load						
	Weekly Theoret	ical Course Hour	rs 14	2	28						
	Weekly Tutorial	Hours									
	Reading Tasks		3	2	6						
	Studies		5	3	15						
Workload	Material Design implementation	and	5	4	20						
	Report Preparin	g									
	Preparing a Pres	sentation									
	Presentations										
	Midterm Exam Preparation for Exam	and Midterm	1	2	2						
	Final Exam and Final Exam	Preparation for	1	4	4						

	Other (shou emphasized	ıld be)							
	Total Work	load	-	-		+	,	75	
	Total Work	load / 25					75	5/25	5
	Course Crea	dit (ECTS)						3	
	No	Program Outcom	es		1	2	3	4	5
	1	Adequate knowledge science and engineer to the relevant discipl theoretical and applie areas to model and sc	in mathema ing subjects line; ability t ed information plye engineer	tics, pertaining to use on in these ring	x				
Contribution Level Between Course Learning Outcomes and Program Outcomes	2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.							
	3	Ability to design a co process, device or pro constraints and condi to meet the desired re modern design metho	omplex syste oduct under tions, in suc esult; ability ods for this n	m, realistic h a way as to apply urpose.		x			
	4	Ability to develop, se techniques and tools and solution of comp engineering applicati information technolo	elect and use necessary fo lex problem ons; ability t gies effectiv	modern r analysis s in o use ely.	X				
	5	Ability to design and gather data, analyze a examination of engin discipline-specific res	conduct exp and interpret eering probl search topics	periments, results for ems or 5.					
	6	Ability to work effici disciplinary teams.	ently in intra	1-					
	7	Ability to work effici disciplinary teams.	ently in mul	ti-					
	8	Ability to communica Turkish, both orally a knowledge of a minin language.	ate effective and in writin num of one	ly in g; foreign					
	9	Ability to write effect understand written re design and production effective presentation understandable instru	tive reports a ports, to pre n reports, to us, to give closed actions and to	and pare make ear and o receive.					
	10	Recognition of the ne learning; ability to ac follow developments technology, and to co	eed for lifelo cess informa in science a ontinue to ed	ng ation, to nd ucate					
	11	Conformity to ethical professional and ethic Information on stand engineering applicati	l principles, cal responsit ards used in ons.	oility;					

The Course's Lecturer(s) and Contact Informations

Assoc. Prof. Dr. Harun Gökçe harungokce@gazi.edu.tr

	Program outcome1	Program outcome2	Program outcome3	Program outcome4	Program outcome5	Program outcome6	Program outcome7	Program outcome8	Program outcome9	Program outcome10	Program outcome11
TOTAL			2	1							
Learning			1								
outcome 1											
Learning			1								
outcome 2											
Learning				1							
outcome 3											
Learning											
outcome 4											

Course Description Form									
Course Code and Name	ETM456 VIRTUAL REALITY IN DESIGN								
Course Semester	7-8								
Catalog Content	Virtual reality and applications 3D concept and 3D interactive design VR software used in design Product design and modeling with VR Working with controls Design with basic objects Concurrent design environment Develop virtual prototypes Interaction with other apps								
Textbook	 Jerald, J. (2015). <i>The VR book: Human-centered design for virtual reality</i>. Morgan & Claypool. Warwick, K., Gray, J., & Roberts, D. (1993). Virtual reality in engineering. 								
Supplementary Textbooks	 Mihelj, M., Novak, D., & Beguš, S. (2014). Virtual reality technology and applications. 								
Credit	3 ECTS								
Prerequisites of the Course (No Prerequisites - %70 Attendance Requirements								
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	To learn the basics of virtual reality technology, to recognize various VR applications and to examine usage examples in different fields. To learn the working principles of virtual reality glasses, to develop the ability to think in 3D space and to understand the basics of 3D interactive design. To learn various VR software tools, to work effectively in these tools and to apply interface and motion control techniques in virtual environment. 3D modeling with basic objects, designing products with VR and creating realistic prototypes. Working in concurrent design environments, developing projects with team collaboration, Learning virtual prototype development and working with virtual prototypes.								
Course Learning Outcomes	 The basic principles of virtual reality technology are learned, and various virtual reality applications and examples of the use of this technology in different fields are explored. The working principles of virtual reality glasses are understood. The ability to think in three-dimensional (3D) space is developed, and the basics of 3D interactive design are taught. Various VR software tools used in design processes can be utilized. 3D modeling and product design can be performed in the VR environment, and realistic virtual prototypes can be created. Collaboration with teammates on projects in real-time and interaction with virtual prototypes can be facilitated. 								
Instruction Methods	Face to face								

	1. Week	Introduction to Virtua	al Reality							
	2. Week	Virtual reality applica	ations							
	3. Week	Virtual reality headse	t and their use	;						
	4. Week	3D concept and 3D in	nteractive desig	gn						
	5. Week	VR software used in a	design							
	6. Week	6. Week Movement in the interface								
	7. Week Working with controls									
Weekly Schedule	8. Week	Design with basic obj	ects							
	9. Week	3D modeling with V	R							
	10. Week	Product design with V	/R							
	11. Week	Concurrent design en	vironment							
	12. Week	Virtual Prototyping								
	13. Week	Working with Virtual	Prototypes							
	14. Week Interaction with other aplications									
	15. Week	5. Week Final Exam								
	2 hours of theoretical lessons per week									
Teaching and Learning Methods	Weekly applied lesson 0 hours									
Touching and Dear hing Arechous	Reading activit	ies 8 hours								
(These are examples. Please fill which activities you use in the course)	Internet browsi	ng, library work 6 hour	S							
ucuvities you use in the course)	Material design	a, application 25 hours								
	Report prepara	tion 0 hours								
	Presentation pr	eparation 0 hours								
	Presentation 0	hours								
	Preparation of	Midterm and Midterm	Exam: 4							
	Final Exam and	Preparation for Final	Exam: 4							
			Numbers	Total Weighting						
	Midterm Exar	ns	1	40						
	Assignment									
	Application Projects		1	20						
Assessment Criteria	Practice									
	Quiz									
	Percent of In-	erm Studies		60						
	(%) Percentage of	Final Exam to Total								
	Score (%)			40						
	Attendance									

		Activity	Total Number of	D n (v	ura vee	atio kly	•		Total Period Work Load	
	Weekly	Theoretical Course	14	-	_	2		_	28	1
	Weekly	Tutorial Hours								٦
	Reading	g Tasks	4			2			8	٦
	Studies		3			2			6	
	Materia Implem	l Design and	5	5			25			
	Report	Preparing								1
Workload	Prepari	ng a Presentation								
	Present	ations								
	Midterr Prepera Exam	n Exam and tion for Midterm	1			4			4	
	Final E: for Fina	xam and Preperation Il Exam	1			4			4	
	Other (emphas	should be ized)								
	Total W	Vorkload	-			-			75	
	Total W	/orkload / 25							75/25	
	Course	Credit (ECTS)		_		1			3	_
	No	Program Outcom	nes	1	2	3	4	5		
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and s engineering areas; abi this knowledge effecti solving complex engin problems. Ability to identify, for analyse complex engin problems using knowl basic science, mathem engineering, and takin account the UN Susta Development Goals. Ability to generate creas solutions to complex engine problems to meet curr future needs; design c systems, processes, de products under realistic constraints and condition	f basic computer- specific lity to use ively in meering rmulate and neering ledge of natics and ng into inable eative engineering ent and omplex evices or ic ions							
	4	constraints and condit Ability to select and u appropriate techniques and modern engineerin information technolog including estimation a modelling, for the ana solution of complex en problems, recognising limitations.	ions. se s, resources ng and gy tools, und .lysis and ngineering g their					x		

	5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex engineering problems.				
	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	X			
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	X			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to- face, distance or hybrid).		x		
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).				
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and innovation.				
	11	Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			x	
The Course's Lecturer(s) and Contact Informations	Prof. isahir	Dr. İsmail ŞAHİN n@gazi.edu.tr				

	Program Outcome 1	Program Outcome2	Program Outcome3	Program Outcome 4	Program Outcome5	Program Outcome6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
TOTAL		1	4	5		1	1	3			4
Learning outcome 1				1		1					
Learning outcome 2			1								
Learning outcome			1	1							1

3								
Learning		1	1	1				1
outcome								
4								
Learning	1	1	1		1			1
outcome								
5								
Learning			1			3		1
outcome								
6								

Course Description Form									
Course Code and Name	ETM-458 AF	RTIFICIAL INTELLIGENCE IN DESIGN							
Course Semester	7-8								
Catalog Content	Artificial Inte Using artifici Artificial Inte Ability to use Problem anal Ability to des	Iligence models and areas of use al intelligence in design problems Iligence understanding of professional and ethical responsibility modern engineering methods ysis and synthesis ign and apply experiments and design							
Textbook	1. Stuart Ru edition, P	ssell and Peter Norvig, Artificial Intelligence: A Modern Approach, 3. Prentice-Hall, 2010							
Supplementary Textbooks	 Crai Vasif İstanbul, 2 Toshinori Evolutiona 2008. 	Crai Vasif Nabiyev, Yapay Zeka: İnsan Makine Etkileşimi, 3. baskı, Seçkin Yayınevi, İstanbul, 2010. Toshinori Munakata, Fundamentals of the New Artificial Intelligence: Neural, Evolutionary, Fuzzy and More (Texts in Computer Science), 2nd edition, Springer, 2008.							
Credit	3 ECTS								
Prerequisites of the Course	No Prerequisi Attendance R	tes equirements %70							
Type of the Course	Elective								
Instruction Language	Turkish								
Course Objectives	Having knowledge about new technologies Learning about artificial intelligence and design ethics Learning solution approaches to engineering problems Using modern methods in design processes								
Course Learning Outcomes	 Gains the the process Gains the constraints Develops application technologi Gain the s interdiscip artificial in 	ability to effectively use artificial intelligence techniques and algorithms in ses of defining, formulating and solving engineering problems. ability to develop innovative and effective design concepts under realistic s by using artificial intelligence-supported design tools. the ability to analyze complex problems encountered in engineering ns and produce solutions to these problems by using artificial intelligence es. kills to write effective reports, make presentations and collaborate in dinary teams in the process of developing ideas and concepts inspired by ntelligence.							
Instruction Methods	Face to face								
Weekly Schedule	Instruction Methods Face to face I. Week Introduction to artificial intelligence 2. Week The history of artificial intelligence 3. Week Artificial intelligence Scope and methods, 4. Week Fuzzy logic 5. Week Expert systems 6. Week Genetic algorithms 7. Week Evolutionary algorithms 8. Week Machine learning 9. Week Deep learning 10. Week Creating inspiration with artificial intelligence 11. Week Generating ideas and concepts with artificial intelligence 12. Week Design optimization with artificial intelligence 13. Week Design optimization with artificial intelligence 14. Week 2D/3D concept design generation with artificial intelligence								

Teaching and Learning Methods	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 5 Designing and implementing materials: 5 Report preparing: 0 Preparing a Presentation: 1 Presentations: 1 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 4 Other:0								
			Numbers		Total Weight	ing (%)			
	Midterm Exams Assignment Application		1		30				
Assessment Criterie	Projects	1		30		\neg			
Assessment Criteria	Practice								
	Quiz			<u></u>					
	Percent of In-term			60					
	Percentage of Final Exam			40		-			
	Score (%)								
	Attendance					TT - 4 - 1	┉		
			Activity	Total Number of Weeks	Duration (weekly hour)	Perio Work	d C		
		Weekly 7	Theoretical Course	14	2	28			
		Hours	Futorial Hours				$- \parallel$		
		Reading	Tacks				$- \parallel$		
		Studies	1 45K5	1	5	5	$- \parallel$		
		Material	Design and	2	5	10	$- \parallel$		
		Impleme	ntation			10			
Wardslaad		Report Pi	reparing						
w orkioad		Preparing	g a Presentation	7	1	7			
		Presentat	ions	7	1	7			
		Midterm Preperati Exam	Exam and on for Midterm	2	3	6			
		Final Exa for Final Other (sl	am and Preperation Exam hould be	3	4	12	_		
		emphasiz	zed)				$- \ $		
		Total Wo	orkload	-	-	75			
		Total Workload / 25				75/2:	>		
		Course C	Program Outcom			3	┯┻		
		No	riogram Outcom	108	1	2 3 4 5	;		
Contribution Level Between Course Learning Outcomes and Program Outcomes			n-depth knowledge o cience, basic enginee omputer-aided comp ngineering areas; abi nowledge effectively ngineering problems	f mathemat ering concep uting and sp lity to use t / in solving	ics, y pts, pecific his complex	C C			
			2 Ability to identify, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account						
		3 A	Ability to generate cro omplex engineering	UN Sustainable Development Goals.					

		current and future needs; design complex systems, processes, devices or products				
	4	Ability to select and use appropriate		x	_	
		techniques, resources and modern engineering and information technology				
		tools, including estimation and modelling,				
		engineering problems, recognising their				
	5	limitations. Ability to use research methods, including			_	
		literature search, designing and conducting				
		experiments, collecting data, analysing and interpreting results, to investigate complex				
		engineering problems.			_	
	6	practices on society, health and safety,				
		economy, sustainability and environment				
		Sustainable Development Goals; awareness				
		of the legal consequences of engineering solutions.				
	7	Acting in accordance with the ethical	x			
		awareness of ethical responsibilities;				
		awareness of non-discrimination,				
	8	Ability to work effectively as a team	x			
		within interdisciplinary teams (face-to-				
		face, distance or hybrid).			_	
	9	technical issues, both orally and in writing,	х			
		taking into account the various differences				
		language, profession).			_	
	10	Knowledge of business life practices such as project management and economic				
		feasibility analysis; awareness of				
	11	Ability to learn independently and				
		continuously, to adapt to new and emerging technologies and to think inquisitively				
		about technological changes.				
	Нея	d of Department				
The Course's Lecturer(s) and Contact Informations	tasa	rim@gazi.edu.tr				

	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome	Program outcome
	1	2	3	4	3	0	1	ð	9	10	11
TOTAL	2	2	1	2			1	1	1		
Learning outcome 1	1	1									
Learning outcome 2	1		1	1							
Learning outcome 3		1		1			1	1	1		
Learning outcome 4											
Learning outcome 5											

	Course Description Form
Course Code and Name	ETM460 INTERACTIVE PORTFOLIO DESIGN
Course Semester	7-8
Catalog Content	Definition, purpose and importance of portfolio Components of a good portfolio Evaluation of suitable platforms and tools for the portfolio Portfolio design and layout Presentation of projects Content writing and explanations Portfolio review and feedback Portfolio presentation and next steps
Textbook	 Lefteri, C. (2010). Making It: Manufacturing Techniques for Product Design. Laurence King Publishing. Rowe, R. (2012). Graphic Design Portfolio Strategies for Print and Digital Media. Fairchild Books.
Supplementary Textbooks	 Cuffaro, D., & Zaksenberg, I. (2016). The Industrial Design Reference & Specification Book: Everything Industrial Designers Need to Know Every Day. Rockport Publishers.
Credit	3 ECTS
Prerequisites of the Course (No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Associating the knowledge and skills students have acquired in their academic lives with their professional life and preparing a portfolio Having knowledge and competence in creating digital illustrations Acquiring skills for designing and implementing a portfolio in which developed products, personal working approaches and project processes can be summarized
Course Learning Outcomes	 Expressing the product idea developed with visual, written and verbal presentation skills, including 2- and 3-dimensional visualization techniques To have the motivation and learning skills necessary for personal and professional development by evaluating the knowledge and skills in the field with a critical and dialectical approach (capable of producing critical, counter-thesis and synthesis) Identifying learning needs, making and implementing plans for this Using computer software and digital technologies required by the field interactively Ability to communicate effectively verbally and in writing on technical issues; Ability to work effectively as a team member or leader within interdisciplinary teams
Instruction Methods	Face to face

	1. Week What is a portfolio and why is it important?								
	2. Week	Initial design of perso	onal identity, C	CV preparation					
	3. Week	Components of a goo	od portfolio						
	4. Week	Portfolio design and	layout						
	5. Week	5. Week Portfolio in different media							
	6. Week								
	7. Week Content writing and explanations								
Weekly Schedule	8. Week	8. Week Printed portfolio concept sketches							
	9. Week	Deciding on material	, tools and por	tfolio type.					
	10. Week	Preparation of the pop	rtfolio in detai	l. Preliminary prepar	ation for the prese				
	11. Week	Editing portfolio cont	tent						
	12. Week	Portfolio presentation	ns and correcti	ons					
	13. Week								
	14. Week	14. Week Portfolio presentation and next steps							
Teaching and Learning Methods (These are examples. Please fill which activities you use in the course)	Weekly theoretical course hours: 2 Weekly tutorial hours: 0 Reading Activities: 0 Internet browsing, library work: 1 Designing and implementing materials: 2 Report preparing: 0 Preparing a Presentation: 0 Presentations: 0 Preparation of Midterm and Midterm Exam: 3 Final Exam and Preparation for Final Exam: 3								
			Numbers	Total Weighting (%)					
	Midterm Exan	ns	1	40					
	Assignment		1	20					
	Application								
Assessment Criteria	Projects								
	Ouiz								
	Percent of In-1	term Studies		60					
	(%)								
	Percentage of Score (%)	Final Exam to Total		40					
	Attendance								

		Activity	Total Numbe r of	I Duration (weekly hour)			T Pe W Lo	otal criod fork oad
	Weekly	Theoretical Course	14		2			28
	Weekly	Tutorial Hours						
	Readin	g Tasks						
	Studies	1	14		1			14
	Materia Implem	al Design and	12		2			24
	Report	Preparing						
Workload	Prepari	ng a Presentation						
	Present	ations						
	Midtern Prepera Exam	m Exam and ation for Midterm	1		3			3
	Final E for Fina	xam and Preperation al Exam	2	3				6
	emphas	sized)						
	Total V	Vorkload	-		-		-	75
	Total V	Vorkload / 25						3
		Program Outcom	nes		_	2		
	No				2	3	4	5
Contribution Level Between Course Learning Outcomes and Program Outcomes	1	In-depth knowledge o mathematics, science, engineering concepts, aided computing and engineering areas; abi this knowledge effect solving complex engin problems.	f basic computer- specific lity to use ively in neering		X			
	2	Ability to identify, for and analyse complex engineering problems knowledge of basic sc mathematics and engi and taking into accoun Sustainable Developm	rmulate using cience, neering, nt the UN nent Goals.	x				
	3	Ability to generate crossolutions to complex engineering problems current and future nee complex systems, pro devices or products un realistic constraints ar	to meet eds; design cesses, nder nd		X			
		Ability to select and u appropriate technique resources and modern engineering and infor- technology tools, incl- estimation and model the analysis and soluti complex engineering recognising their limit	ise s, mation uding ling, for ion of problems, tations.		x			
	5	Ability to use research including literature se designing and conduc experiments, collectin analysing and interpre- results, to investigate engineering problems	n methods, arch, ting ug data, eting complex	x				

	6	Knowledge of the effects of engineering practices on society, health and safety, economy, sustainability and environment within the framework of the UN Sustainable Development Goals; awareness of the legal consequences of engineering solutions.	X			
	7	Acting in accordance with the ethical principles of the engineering profession, awareness of ethical responsibilities; awareness of non-discrimination, impartiality and embracing diversity.	x			
	8	Ability to work effectively as a team member or leader both individually and within interdisciplinary teams (face-to-face, distance or hybrid).		X		
	9	Ability to communicate effectively on technical issues, both orally and in writing, taking into account the various differences of the target audience (e.g. education, language, profession).		x		
	10	Knowledge of business life practices such as project management and economic feasibility analysis; awareness of entrepreneurship and	x			
		Ability to learn independently and continuously, to adapt to new and emerging technologies and to think inquisitively about technological changes.			X	
The Course's Lecturer(s) and Contact Informations	Depa tasa	artment Management arim@gazi.edu.tr				

	n	D	n	n	n	D	D	D	D	D	n
	Program	Program	Program	Program	Program	Program	Program	Progra	Program	Program	Program
	Outcome	Outcome	Outcome	Outcome	Outcome	Outcome	Outcome	m çıktısı	Outcome	Outcome1	Outcome1
	1	2	3	4	5	6	7	8	9	0	1
TOTAL	2	1	2	2	1	1	1	2	2	1	3
Learnin	1		1		1			1	1		1
g											
outcome											
1											
Learnin		1		1							1
g											
outcome											
2											
Learnin					1	1					1
g											
outcome											
3											
Learnin				1						1	
g											
outcome											
4											
Learnin	1		1				1	1	1		
g											
outcome											
5											
Learnin g outcome 5	1		1				1	1	1		