Course Description Form	
Course Code and Name	**ETM101 INTRODUCTION TO DESIGN ENGINEERING**
Course Semester	1
Catalog Content	Professional and ethical responsibility understanding Ability to use modern engineering methods Teamwork and leadership skills Ability to communicate verbally and in writing Problem identification, formulation, and solving skills Ability to design, implement, and design experiments
Textbook	1. Parameswaran, M.A., An Introduction to Design Engineering, Alpha Science Pub., Int. Edition, 2004 2. Cross, N., Engineering Design Methods-Strategies for Product Design, John Wiley & Sons, Ltd., New York, 2001.
Supplementary Textbooks	1. Elder, W.E. ve Hosnedl, S., Design Engineering: A Manual for Enhanced Creativity, CRC Press, Int. Edition, 2008.
Credit	**2 ECTS**
Prerequisites of the Course (*Attendance Requirements*)	No Prerequisites %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Understanding the engineering profession and ethics To learn the field of design engineering activity To learn solution approaches to engineering problems To have knowledge of basic design and engineering issues Develop teamwork skills
Course Learning Outcomes	1. The aim of the courses to be taken in design engineering education and general concepts are learned. 2. To have general information about design engineering. 3. Have knowledge about the duties and authorization areas of design engineering. 4. The importance of design engineering in innovative and sustainable development is understood. 5. The place and importance of design engineering in society is understood. 6. Design projects can be planned and executed at a basic level.
Instruction Methods	Face to face

Weekly Schedule

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
6. Week	The methodology of design and its rules
7. Week	Principles of design
8. Week	Elementary design process
9. Week	Analysing simple part designs
10. Week	Part-level design
11. Week	Simple part design applications
12. Week	Analysing simple system designs
13. Week	System-level design
14. Week	Simple system design applications

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: 5
Preparation of Midterm and Midterm Exam: 3
Final Exam and Preparation for Final Exam: 4

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours			
Reading Tasks			
Studies	1	5	5
Material Design and Implementation	1	5	5
Report Preparing			
Preparing a Presentation	1	5	5
Presentations			
Midterm Exam and Preperation for Midterm Exam	1	3	3
Final Exam and Preperation for Final Exam	1	4	4
Other (should be emphasized)			
Total Workload	-	-	50
Total Workload / 25			50/25
Course Credit (ECTS)			2

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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 model and solve engineering problems.	x				
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 purpose.					
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.			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.				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		Department Management tasarim@gazi.edu.tr							

	Program Outcome 1	**Program Outcome 2**	**Program Outcome 3**	**Program Outcome 4**	**Program Outcome 5**	**Program Outcome6**	**Program Outcome7**	**Program Outcome 8**	**Program Outcome9**	**Program Outcome 10**	**Program Outcome 11**
Contribution Level	**1**	**2**		**2**		**3**	**2**	**3**	**4**	**4**	**4**
Learning outcome 1	**1**	**3**		**3**		**2**		**2**	**2**	**2**	**3**
Learning outcome 2	**2**	**2**		**2**		**2**		**2**	**2**	**2**	**2**
Learning outcome 3	**2**	**3**				**3**	**3**	**2**	**3**	**3**	**2**
Learning outcome 4	**3**	**2**		**3**		**5**	**4**	**4**	**5**	**5**	**5**
Learning outcome 5	**3**	**4**		**2**		**4**	**2**	**2**	**4**	**4**	**3**
Learning outcome 6	**3**	**4**		**4**		**4**	**3**	**3**	**4**	**4**	**4**

COURSE DESCRIPTION FORM		
Course Code and Name	**ETM103 TECHNICAL DRAWING 1**	
Course Semester	1	
Catalog Content	Understanding and using technical drawing concepts Professional and ethical responsibility Ability to use modern engineering methods Ability to communicate orally and in writing Ability to identify, formulate and solve problems	
Textbook	1. Bağcı, M. ve Bağcı, C., Teknik Resim I ve II, Ankara, 2003. 2. Kurs, U. ve Wittel, H., Teknik Resim (Forberg Technisches Zeichnen - Çeviri: Z. Aksoy), Nobel Yayınevi, Ankara, 2012.	
Supplementary Textbooks	1. Çaylak, A., Bilgi ve Uygulama Yaprakları-I, 2005.	
Credit	**3 ECTS**	
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites %70 Attendance Requirements	
Type of the Course	Compulsory	
Instruction Language	Turkish	
Course Objectives	To provide opportunities to develop the necessary communication skills to effectively share design concepts, ideas and constraints with colleagues and manufacturers. To provide opportunities to communicate design concepts and ideas to other colleagues and manufacturers using the language of technical drawing. Understand the engineering profession and ethics To learn the field of design engineering activity To learn solution approaches to engineering problems	
Course Learning Outcomes	1. Design engineering drawings can be interpreted accurately and the information given through the drawings can be understood. 2. Design concepts, ideas and constraints can be communicated to designers and manufacturers by using the language of technical drawing effectively. 3. Have knowledge about the duties and authorities of the design engineer. 4. Provide traceability and feedback at every stage of the design process. 5. The place and importance of design engineering in society is understood.	
Instruction Methods	Face to face	
Weekly Schedule	**Hafta**	**Konular**
	1	Introduction (basic terms, tools and materials, scales, paper types)
	2	Types of writing and lines
	3	Geometric drawings
	4	Geometric drawing applications
	5	Projection and its types
	6	Appearance sticker
	7	Appearance sticker applications
	8	Sectional views
	9	Sectional view applications
	10	Measurement and dimensioning
	11	Perspectives
	12	Surface treatment marks
	13	Tolerance and exercises
	14	Production pictures

Teaching and Learning Methods

Weekly theoretical course hours: 2
Weekly tutorial hours: 1
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: 3
Final Exam and Preparation for Final Exam: 4

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	30
Assignment	1	20
Application	1	10
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	1	14
Reading Tasks			
Studies	1	5	5
Material Design and Implementation	2	5	10
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for	2	3	6
Final Exam and Preperation for Final	3	4	12
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable					
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.					

	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.					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						
	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						
	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	Head of Department tasarim@gazi.edu.tr							

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program çıktısı 11
Contribution Level	**4**			**5**			**4**	**2**		**5**	**3**
Learning outcome 1	**4**			**5**			**2**	**2**		**2**	**2**
Learning outcome 2	**3**			**4**			**3**	**3**		**3**	**3**
Learning outcome 3	**2**			**2**			**4**	**2**		**4**	**3**
Learning outcome 4	**3**			**4**			**3**	**2**		**5**	**1**
Learning outcome 5	**2**			**2**			**4**	**2**		**3**	**3**

COURSE DESCRIPTION FORM		
Course Code and Name	**ETM104 TECHNICAL DRAWING 2**	
Course Semester	2	
Catalog Content	Understanding and using technical drawing concepts Professional and ethical responsibility Ability to use modern engineering methods Ability to communicate orally and in writing Ability to identify, formulate and solve problems	
Textbook	1. Bağcı, M. ve Bağcı, C., Teknik Resim I ve II, Ankara, 2003. 2. Kurs, U. ve Wittel, H., Teknik Resim (Forberg Technisches Zeichnen - Çeviri: Z. Aksoy), Nobel Yayınevi, Ankara, 2012.	
Supplementary Textbooks	1. Çaylak, A., Bilgi ve Uygulama Yaprakları-I, 2005.	
Credit	**3 ECTS**	
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites %70 Attendance Requirements	
Type of the Course	Compulsory	
Instruction Language	Turkish	
Course Objectives	To provide opportunities to develop the necessary communication skills to effectively share design concepts, ideas and constraints with colleagues and manufacturers. To provide opportunities to communicate design concepts and ideas to other colleagues and manufacturers using the language of technical drawing. Understand the engineering profession and ethics To learn the field of design engineering activity To learn solution approaches to engineering problems	
Course Learning Outcomes	1. Design engineering drawings can be interpreted accurately and the information given through the drawings can be understood. 2. Design concepts, ideas and constraints can be communicated to designers and manufacturers by using the language of technical drawing effectively. 3. Have knowledge about the duties and authorities of the design engineer. 4. Provide traceability and feedback at every stage of the design process. 5. The place and importance of design engineering in society is understood.	
Instruction Methods	Face to face	
Weekly Schedule	**Hafta**	**Konular**
	1	Introduction (review of basic topics)
	2	Shape and position tolerances
	3	Construction painting applications
	4	Assembly pictures
	5	Standard parts and their representation in assembly
	6	Assembly numbering and letterheads editing
	7	Assembly drawing applications
	8	Drawing part (construction) drawings from assembly drawings
	9	Applications
	10	Analysis and assembly drawings of simple designs
	11	Applications
	12	Mounting elements (screw fasteners, wedges, springs) and their representation
	13	Gear wheels (spur) and cams
	14	Applications

Teaching and Learning Methods

Weekly theoretical course hours: 2
Weekly tutorial hours: 1
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: 3
Final Exam and Preparation for Final Exam: 4

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)	1	**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	1	14
Reading Tasks			
Studies	1	5	5
Material Design and Implementation	2	5	10
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for	2	3	6
Final Exam and Preperation for Final	3	4	12
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable					
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.					

	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.					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						
	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						
	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	Head of Department tasarim@gazi.edu.tr							

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program çıktısı 11
Contribution Level	**4**			**5**			**4**	**2**		**5**	**3**
Learning outcome 1	**4**			**5**			**2**	**2**		**2**	**2**
Learning outcome 2	**3**			**4**			**3**	**3**		**3**	**3**
Learning outcome 3	**2**			**2**			**4**	**2**		**4**	**3**
Learning outcome 4	**3**			**4**			**3**	**2**		**5**	**1**
Learning outcome 5	**2**			**2**			**4**	**2**		**3**	**3**

Course Description Form	
Course Code and Name	**ETM105 BASIC DESIGN 1**
Course Semester	1
Catalog Content	Teamwork and leadership skills Ability to communicate verbally and visually, taking into account the user audience Problem identification and solving skills Ability to produce creative solutions Ability to think in an inquisitive way
Textbook	1. Zelanski, P., Fiscer, M.P., 1995. Design Principles and Problems, Fort Worth: Harcourt Brace. 2. Pentak, D., Pentak, S., 2000, Design Basics, Fort Worth, Harcourt Brace.
Supplementary Textbooks	1. Karim, M., & Chen, X., 2017. Digital design: basic concepts and principles. CRC Press.
Credit	**4 ECTS**
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites - %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	To have knowledge about basic design principles and elements Learning creative solution development approaches To be able to use design principles and elements in the product development process Develop teamwork skills
Course Learning Outcomes	1. The process of generating creative solutions under specified constraints is learned. 2. Gain knowledge about research methods in problem identification and solving process. 3. Understand the importance of working both individually and in interdisciplinary teams. 4. The process of verbal and visual communication for the target audience is learned. 5. The importance of awareness, curiosity, creativity and lifelong learning is understood.
Instruction Methods	Expression, practice.

Weekly Schedule

1. Week	Introducing the aim, scope and methodology of the course
2. Week	Introduction of design elements (Point, line, plane, form, color-texture, light-shadow, measure-proportion, range)
3. Week	Introduction of design elements (Point, line, plane, form, color-texture, light-shadow, measure-proportion, range)
4. Week	Realization of two-dimensional composition studies using design elements
5. Week	Introduction of design principles (contrast, emphasis, hierarchy, rhythm, balance, unity)
6. Week	Realization of two and three dimensional abstract design studies using design principles
7. Week	Introduction of design principles (contrast, emphasis, hierarchy, rhythm, balance, unity)
8. Week	Realization of two and three dimensional abstract design studies using design principles
9. Week	Introduction of design principles (contrast, emphasis, hierarchy, rhythm, balance, unity)
10. Week	Realization of two and three dimensional abstract design studies using design principles
11. Week	Product design using design principles and elements (using creative idea generation techniques such as brainstorming and mind mapping)
12. Week	Product design using design principles and elements (creation of inspiration boards and idea sketches)
13. Week	Product design using design principles and elements (Mock-up studies)
14. Week	Product design using design principles and elements (Three-dimensional model, technical drawing and layout design preparations)

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 2
Weekly tutorial hours: 2
Reading Activities: 0
Internet browsing, library work: 2
Designing and implementing materials: 3
Report preparing: 0
Preparing a Presentation: 2
Presentations: 1
Preparation of Midterm and Midterm Exam: 3
Final Exam and Preparation for Final Exam: 3

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams		
Assignment		
Application	1	15
Projects	3	45
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	2	28
Reading Tasks			
Studies	10	2	20
Material Design and Implementation	5	3	15
Report Preparing			
Preparing a Presentation	1	2	2
Presentations	1	1	1
Midterm Exam and Preperation for Midterm Exam	1	3	3
Final Exam and Preperation for Final Exam	1	3	3
Other (should be emphasized)			
Total Workload	-	-	100
Total Workload / 25			100/25
Course Credit (ECTS)			4

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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.					
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 Development Goals.					
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.			**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.	**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.						
	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).		**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		Asst. Prof. Dr. Neslihan Top neslihantop@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
Contribution Level			**3**	**1**	**3**			**2**	**2**		**1**
Learning outcome 1			**1**								
Learning outcome 2					**1**						
Learning outcome 3								**1**			
Learning outcome 4			**1**	**1**	**1**			**1**	**1**		
Learning outcome 5			**1**		**1**				**1**		**1**

Course Description Form	
Course Code and Name	**ETM106 BASIC DESIGN 2**
Course Semester	2
Catalog Content	Teamwork and leadership skills Ability to communicate verbally and visually, taking into account the user audience Problem identification and solving skills Ability to produce creative solutions Ability to think in an inquisitive way
Textbook	1. Zelanski, P., Fiscer, M.P., 1995. Design Principles and Problems, Fort Worth: Harcourt Brace. 2. Pentak, D., Pentak, S., 2000, Design Basics, Fort Worth, Harcourt Brace.
Supplementary Textbooks	1. Karim, M., & Chen, X., 2017. Digital design: basic concepts and principles. CRC Press.
Credit	**4 ECTS**
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	To have knowledge about basic design principles and elements Learning creative solution development approaches To be able to use design principles and elements in the product development process Develop teamwork skills
Course Learning Outcomes	1. The process of generating creative solutions under specified constraints is learned. 2. Gain knowledge about research methods in problem identification and solving process. 3. Understand the importance of working both individually and in interdisciplinary teams. 4. The process of verbal and visual communication for the target audience is learned. 5. The importance of awareness, curiosity, creativity and lifelong learning is understood.
Instruction Method	Face to face

Weekly Schedule

1. Week	Introducing the aim, scope and methodology of the course
2. Week	Introducing the relationship between form and function and giving a project including single material - single function criteria
3. Week	Creating inspiration boards and idea sketches
4. Week	Evaluation of three-dimensional mock-up studies
5. Week	Realization of project presentations
6. Week	Introducing the basics of modular design and techniques for developing modular products according to user needs
7. Week	Market research and concept selection for modular product design
8. Week	Creating inspiration boards and idea sketches
9. Week	Evaluation of three-dimensional mock-up studies
10. Week	Realization of project presentations
11. Week	Introducing corporate identity and brand design (the basics of creating a brand identity)
12. Week	Market research and concept selection for modular product design
13. Week	Creating inspiration boards and idea sketches
14. Week	Evaluation of three-dimensional mock-up studies

Teaching and Learning Methods

Weekly theoretical course hours: 2
Weekly tutorial hours: 2
Reading Activities: 0
Internet browsing, library work: 2
Designing and implementing materials: 3
Report preparing: 0
Preparing a Presentation: 2
Presentations: 1
Preparation of Midterm and Midterm Exam: 3
Final Exam and Preparation for Final Exam: 3

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams		
Assignment		
Application		
Projects	3	60
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	2	28
Reading Tasks			
Studies	10	2	20
Material Design and Implementation	5	3	15
Report Preparing			
Preparing a Presentation	1	2	2
Presentations	1	1	1
Midterm Exam and Preperation for Midterm Exam	1	3	3
Final Exam and Preperation for Final Exam	1	3	3
Other (should be emphasized)			
Total Workload	-	-	100
Total Workload / 25			100/25
Course Credit (ECTS)			4

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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.					
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 Development Goals.					
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.			**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.	**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.								
	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).		**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		Asst. Prof. Dr. Neslihan Top neslihantop@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**
Contribution Level			**3**	**1**	**3**			**2**	**2**		**1**
Learning outcome 1			**3**	**1**	**2**						
Learning outcome 2			**4**		**3**						
Learning outcome 3								**2**			
Learning outcome 4			**2**						**2**		
Learning outcome			**4**								**1**

5											

Course Description Form	
Course Code and Name	**ETM107 FREE HAND SKETCHING AND DRAWING TECHNIQUES**
Course Semester	1
Catalog Content	Learning and applying basic drawing principles Ability to use different drawing techniques Ability to determine the proportions and ratios of objects accurately Ability to reflect light and shadow accurately Ability to quickly and effectively translate ideas into drawings
Textbook	1. NecatiİnceoğluMurat Soygeniş, Ela Çil, TasarımdaEskizler, YıldızTeknikÜniverstesi Yay., İstanbul, 1997. 2. NecatiİnceoğluTan Gürer, Ela Çil, DüşünmeveAnlatımAracıOlarakEskizler, Helikon Yay., İstanbul, 1995.
Supplementary Textbooks	1. Stanyer, P., The Complete Book of DRAWING TECHNIQUES (A Professional Quide for the Artist, Arcturus Pub., UK., 2003
Credit	**2 ECTS**
Prerequisites of the Course (	No Prerequisites %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Understanding the creative process of design Learning basic principles and conceptual studies Developing the ability to translate the image in the designer's mind onto paper Enhancing visual thinking skills Strengthening spontaneous expression abilities
Course Learning Outcomes	1. Understanding of the basic principles and concepts of the design process is developed, while also supporting creative thinking and problem-solving skills. 2. Introduction to the fundamental concepts of art and design, with practical application; also provides an opportunity to acquire basic knowledge of art history and theory. 3. Development of the ability to express imagination and transfer visual thoughts into drawings, thereby supporting visual communication skills. 4. Strengthening of visual reading and interpretation abilities; gaining the ability to understand and evaluate different visual styles and aesthetics. 5. Enhancement of spontaneous expression skills through rapid drawing and designing techniques, thus gaining the ability to effectively visualize desired messages.
Instruction Methods	Face to face

Weekly Schedule

1. Week	Presentation of course content, semester expectations, and grading systems.
2. Week	Overview of freehand drawing.
3. Week	Methods and techniques of freehand drawing.
4. Week	Drawing materials and techniques.
5. Week	Visualization of ideas.
6. Week	Drawing techniques - Perspective.
7. Week	Drawing techniques - Dimensions, proportions.
8. Week	Drawing techniques - Light, shadow.
9. Week	Drawing techniques - Coloring.
10. Week	Drawing techniques - Coloring.
11. Week	Product-specific diversity of expression and material representation.
12. Week	Product-specific diversity of expression.
13. Week	Quick idea sketches.
14. Week	Quick idea sketches.

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 1
Weekly tutorial hours: 1
Reading Activities: 5
Internet browsing, library work: 5
Designing and implementing materials: 6
Report preparing: 0
Preparing a Presentation: 0
Presentations: 0
Preparation of Midterm and Midterm Exam: 3
Final Exam and Preparation for Final Exam: 3

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours			
Reading Tasks	5	1	5
Studies	5	1	5
Material Design and Implementation	2	3	6
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	1	3	3
Final Exam and Preperation for Final Exam	1	3	3
Other (should be emphasized)			
Total Workload	-	-	50
Total Workload / 25			50/25
Course Credit (ECTS)			2

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.	**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.			**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.	**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.					
	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.					
	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. İsmail Şahin isahin@gazi.edu.tr					

	Program Outcome1	**Program Outcome2**	**Program Outcome3**	**Program Outcome4**	**Program Outcome5**	**Program Outcome6**	**Program Outcome7**	**Program çıktısı 8**	**Program Outcome9**	**Program Outcome10**	**Program Outcome11**
Contribution Level	**4**	**1**	**3**	**1**	**1**		**1**	**1**	**2**		**2**
Learning outcome 1	**4**	**1**	**5**	**2**	**1**		**2**	**2**	**2**		**2**
Learning outcome 2	**2**	**2**	**3**	**2**	**2**		**1**	**3**	**2**		**2**
Learning outcome 3	**3**	**3**	**4**	**3**	**3**		**2**	**1**	**3**		**3**
Learning outcome 4	**3**	**2**	**3**	**1**	**3**		**3**	**2**	**2**		**2**
Learning outcome 5	**2**	**2**	**3**	**3**	**2**		**2**	**2**	**2**		**2**

Course Description Form	
Course Code and Name	**ETM201 MATERIAL SCIENCE**
Course Semester	3
Catalog Content	Physical and chemical properties of materials Mechanical properties of materials and their measurement One-dimensional problems, two-component phase diagrams Solidification and diffusion principles in alloy systems Structure-property relationship in metal, ceramic, polymer and composite materials, types of corrosion, protection methods Application examples and industrial applications
Textbook	1. Savaşkan, T. (2001). *Malzeme bilgisi ve muayenesi eğitim bilimine giriş.* Trabzon: Derya Yayıncılık. 2. Uzun, H., Fındık, F. ve Salman, S. (2003). *Malzeme biliminin temelleri.* İstanbul: Değişim Yayıncılık.
Supplementary Textbooks	1. Callister, W.D. (2003). *An introduction to materials science and engineering*. USA: John Wiley & Sons.
Credit	**4 ECTS**
Prerequisites of the Course (	No Prerequisites %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Defining the basic physical and chemical properties of materials and understanding the importance of these properties in material selection. Understanding the mechanical properties of materials and factors such as strength, flexibility and hardness and learning methods to measure them. Understanding the properties of metal, ceramic, polymer and composite materials and evaluating the structure-property relationships of these materials. Defining corrosion, learning corrosion types and prevention methods.
Course Learning Outcomes	1. Knows simple rules about basic materials science. 2. Students can distinguish atomic relationships that affect material properties, and can clarify material density, conductivity and shaping properties. 3. They have preliminary knowledge about the strength mechanisms of materials. 4. They can use material knowledge to solve design problems by learning materials science topics and methods. 5. Selection of materials suitable for the product and being able to measure their behavior.
Instruction Methods	Face to face

Weekly Schedule

1. Week	Classification of materials
2. Week	Atomic bonds, lattice systems
3. Week	Crystal systems
4. Week	Aging
5. Week	Material testing methods
6. Week	Tensile, compression, bending, torsion, fatigue, impact
7. Week	Alloy, phase, component definition
8. Week	Phase law, cooling curves, Iron-cementite phase diagra
9. Week	Isothermal transformation and continuous cooling diag
10. Week	Heat treatments of steels, steel standards, role of alloyi
11. Week	Stainless steels, tool steels, high speed steels
12. Week	Non-metal materials
13. Week	Types of corrosion
14. Week	Corrosion protection methods

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Weekly tutorial hours: 0
Reading Activities: 1
Internet browsing, library work: 1
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

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	60
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	5	1	5
Studies	14	1	14
Material Design and Implementation			
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	4	2	8
Final Exam and Preperation for Final Exam	3	2	6
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.			**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.				**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.		**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).		**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	Department Management tasarim@gazi.edu.tr						

	Program Outcome1	**Program Outcome2**	**Program Outcome 3**	**Program Outcome4**	**Program Outcome5**	**Program Outcome6**	**Program Outcome7**	**Program çıktısı 8**	**Program Outcome9**	**Program Outcome 10**	**Program Outcome 11**
Contribution Level	**3**	**3**	**5**	**2**	**4**	**3**	**3**	**2**	**1**	**2**	**2**
Learning outcome 1	**3**	**2**	**3**	**3**	**3**	**5**	**2**	**5**	**2**	**3**	**4**
Learning outcome 2	**2**	**2**	**4**	**3**	**3**	**2**	**4**	**4**	**3**	**3**	**4**
Learning outcome 3	**2**	**2**	**4**	**4**	**4**	**4**	**4**	**4**	**3**	**3**	**3**
Learning outcome 4	**4**	**3**	**5**	**2**	**5**	**3**	**3**	**3**	**2**	**2**	**3**
Learning outcome 5	**2**	**4**	**4**	**3**	**4**	**3**	**3**	**2**	**1**	**3**	**2**

Course Description Form	
Course Code and Name	**ETM202 MANUFACTURING TECHNOLOGIES 1**
Course Semester	4
Catalog Content	Understanding of Casting, Forging, and Welding topics Measurement and control skills Machining skills Understanding of Drilling, Turning, Boring, and related processes
Textbook	1. Degarmo, E.P, Black, J.T. and Kohser, R.A. (1997). *Materials and processes in manufacturing*. USA: Prentice-Hall, Inc, Int. Ed. 2. Boothroyd, G., Knight, W. A. (1989). *Fundamentals of machining and machine cutting.* New York: Mark Dekker Inc. 3. M.P. Groover, *Fundamentals of modern manufacturing*, 3rd ed., 2007, Wiley
Supplementary Textbooks	1. Kalpakjian, S., Schmid, S. R. (2005). *Manufacturing engineering and technology*. Londra: Pearson, 5th Ed. 2. 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 (	No Prerequisites - %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Learning Casting processes (sand casting, mold sanding, pattern preparation, molding, metal casting) Learning Welding techniques (oxy-acetylene welding, arc welding, submerged arc welding) Recognizing Casting and Welding defects Learning Metal processing methods (forging, pressing, extrusion, rolling) Learning Machining methods (wire drawing, machining procedures)
Course Learning Outcomes	1. Learning basic operations and practical applications. 2. Learning casting and forging methods. 3. Learning welding techniques. 4. Learning measurement-control tool and application methods. 5. Learning machining methods.
Instruction Methods	Face to face Practical training

Weekly Schedule

1. Week	Introduction, basic concepts, hand tools and their uses
2. Week	Machining and Machining; Basic operations
3. Week	Casting: Model and core making
4. Week	Casting: Casting methods and applications
5. Week	Tattoo: Tattoo methods and applications
6. Week	Source and application methods
7. Week	Application 1
8. Week	Application 2
9. Week	Measurement - Control
10. Week	Applications
11. Week	Machining: General tools, Machine tools and their uses
12. Week	Hole drilling, Drilling tools and drilling with different metho
13. Week	Machining: Turning, Turning processes and applications
14. Week	Machining: Milling, Milling processes and applications

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 2

Weekly tutorial hours: 1

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

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	60
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	1	14
Reading Tasks			
Studies	2	5	10
Material Design and Implementation	3	5	15
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	1	4	4
Final Exam and Preperation for Final Exam	1	4	4
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.			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.				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.			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).		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
Contribution Level	**2**	**3**	**4**	**3**	**4**	**4**	**5**	**2**	**4**	**3**	**3**
Learning outcome 1	**4**	**2**	**2**	**2**	**2**	**3**	**5**	**2**	**3**	**3**	**3**
Learning outcome 2	**3**	**2**	**3**	**2**	**2**	**4**	**3**	**3**	**2**	**2**	**2**
Learning outcome 3	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**2**	**2**	**2**
Learning outcome 4	**3**	**4**	**2**	**3**	**4**	**3**	**4**	**4**	**4**	**2**	**3**
Learning outcome 5	**2**	**4**	**4**	**4**	**5**	**3**	**3**	**3**	**5**	**4**	**4**

Course Description Form		
Course Code and Name	**ETM203 STATICS**	
Course Semester	3	
Catalog Content	General principles. Vector operations. Force vectors. Particle equilibrium. Concept of moment. Equilibrium of rigid bodies. Structural analysis. Truss systems, support systems, and machines. Internal forces. Friction. Centroid and center of gravity. Moment of inertia. Virtual work method.	
Textbook	Hibbeler, "Engineering Statics"	
Supplementary Textbooks	1. Hibbeler, Engineering Mechanics 2. Ferdinand P. Beer, "Engineering Statics"	
Credit	**3 ECTS**	
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites - %70 Attendance Requirements	
Type of the Course	Compulsory	
Instruction Language	Turkish	
Course Objectives	Learning the concepts of Force and Moment. Learning the concept of Static Equilibrium. Acquiring the ability to perform structural system analysis. Learning the concept of Internal Load. Understanding the concept of Friction. Learning the concepts of Geometric Center and Moment of Inertia.	
Course Learning Outcomes	1. Acquiring the ability to draw Free Body Diagrams in mechanics and perform force-moment analyses. 2. Acquiring the ability to perform internal load analyses. 3. Learning the theory and application of engineering mechanics applied to solid bodies under the influence of planar forces. 4. Learning the theory and application of engineering mechanics applied to bodies under the influence of three-dimensional force systems. 5. Developing the ability to calculate geometric properties of cross-sections.	
Instruction Methods	Face to face	
Weekly Schedule	**Weeks**	**Subjects**
	1	Introduction to Statics and Solid Mechanics, Fundamental Concepts and Principles. Unit Systems.
	2	Vectors, Decomposition of Vectors, Vector Operations.
	3	Force Vectors in Plane and Space, Equilibrium of particle, Free Body Diagram (FBD).
	4	Rigid Bodies, Internal and External Forces, Equivalent Forces, Types of Supports.
	5	Resultant Force Systems, Concept of Moment, Moment of a Force about an Axis, Equilibrium of Rigid Bodies.
	6	Structural Analysis, Support Systems, Truss Systems, Analysis and Calculation, Node and Section Method.
	7	Application and Calculation of Support Systems to Machines.
	8	Internal Forces, Distributed Forces, Bending Moment in Beams.
	9	Shear Force and Bending Moment Diagrams.
	10	Friction, Laws of Dry Friction, Coefficients of Friction, Rolling Friction.
	11	Belt-Pulley Friction.
	12	Center of Gravity and Centroid, Mass Center and Centroid, Composite bodies.
	13	Moments of Inertia, Area and Mass Moments of Inertia, Parallel Axis Theorem.
	14	Principle of Virtual Work.

Teaching and Learning Methods
(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Weekly tutorial hours: 0
Reading Activities: 0
Internet browsing, library work: 0
Designing and implementing materials: 2
Report preparing: 0
Preparing a Presentation: 0
Presentations: 0
Preparation of Midterm and Midterm Exam: 10
Final Exam and Preparation for Final Exam: 15

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	30
Assignment	3	15
Application		
Projects		
Practice		
Quiz	3	15
Percent of In-term Studies (%)		60
Percentage of Final Exam to Total Score (%)		40
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks			
Studies			
Material Design and Implementation	4	2	8
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for	1	10	10
Final Exam and Preperation for Final	1	15	15
Other (should be emphasized)			
Total Workload			75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.				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.			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.				x				
5	Ability to use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate 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.	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	Prof. Dr. Ahmet TAŞKESEN taskesen@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**
Contribution Level	**3**	**4**	**3**	**4**		**1**	**1**	**1**	**1**	**1**	**2**
Learning outcome 1	**3**	**4**	**4**	**5**		**1**	**2**	**3**	**3**	**3**	**3**
Learning outcome 2	**2**	**3**	**3**	**4**		**2**	**2**	**2**	**3**	**2**	**3**
Learning outcome 3	**3**	**4**	**2**	**4**		**2**	**1**	**2**	**3**	**3**	**2**
Learning outcome 4	**4**	**5**	**3**	**4**		**2**	**3**	**2**	**2**	**1**	**3**
Learning outcome 5	**2**	**3**	**2**	**3**		**2**	**2**	**1**	**1**	**2**	**4**

Course Description Form	
Course Code and Name	**ETM204 STRENGTH OF MATERIALS**
Course Semester	4
Catalog Content	Fundamental principles of statics and mechanics, concepts of stress and strain, mechanical properties of materials, stress-strain relationship (Hooke's Law), elastic constants, tension, compression, shear, torsion, bending stresses, bending and deflection in beams. Elastic curve equation, stresses due to temperature changes, buckling, stability of structures; compound loading, stress and strain transformation, principal stresses.
Textbook	1. Russell C. Hibbeler, Mechanics of Materials, Pearson
Supplementary Textbooks	1. Gere, J., Mechanics of materials, 2. Ferdinand P. Beer, Mechanics of Materials, McGraw-Hill
Credit	**3 ECTS**
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites - %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Stress analysis in elements subjected to axial or direct shear force Concept of strain Displacement in axially loaded bars Stress and angle of rotation in elements subjected to torsion Bending stress in beams Shear stress in beams subjected to transverse shear Stress analysis in elements subjected to compound loading Stress transformation equations and concepts of principal stress and maximum shear stress with Mohr's Circle
Course Learning Outcomes	1. Ability to calculate stresses for elastic objects 2. Ability to calculate unit deformations in elastic objects 3. Ability to calculate the stress state at a point under combined loading for mechanical design 4. Understand the concepts of principal stress and be able to apply stress transformation
Instruction Methods	Face to face

Weekly Schedule

Weeks	Subjects
1	Introduction - Concept and types of stresses.
2	Normal stress, Shear stress. Bearing stresses in fasteners.
3	Allowable stress, safety factor. Concept of Strain.
4	Mechanical properties of materials. Relationship between Stress and Strain. Tensile test. Hooke's Law; Modulus of Elasticity and material constants.
5	Axial loading. Principle of superposition. Stresses and strains due to temperature changes.
6	Torsion. Stresses and strains in circular shafts. Angle of twist in elastic region. Design of power transmission shafts.
7	Torsion in non-circular elements. Torsion formula for thin-walled shafts.
8	Pure bending condition. Shear force and bending moment diagrams.
9	Bending and deflection in beams. Equation of elastic curve.
10	Shear stress in beams subjected to bending; Stress and Strain transformations.
11	Stress state due to compound loading.
12	Stress transformations in plane stress condition. Principal stresses. Maximum shear stress.
13	Mohr's Circle in plane stress condition.
14	Buckling. Stability of structures; Euler's Formula.

Teaching and Learning Methods
(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Weekly tutorial hours: 0
Reading Activities: 1
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: 9

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	30
Assignment	3	15
Application		
Projects		
Practice		
Quiz	3	15
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	5	1	5
Studies	5	1	5
Material Design and Implementation	4	2	8
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for	3	2	6
Final Exam and Preperation for Final	1	9	9
Other (should be emphasized)			
Total Workload			75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.				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.				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.			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).		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. Ahmet TAŞKESEN taskesen@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
Contribution Level	**4**	**4**	**4**	**3**		**1**	**1**	**2**	**2**	**2**	**4**
Learning outcome 1	**4**	**4**	**4**	**3**				**2**			**4**
Learning outcome 2	**4**	**4**	**4**	**3**						**2**	**4**
Learning outcome 3	**4**	**4**	**4**	**3**					**2**	**2**	**4**
Learning outcome 4	**4**	**4**	**4**			**1**	**1**	**2**	**2**		**4**

Course Description Form	
Course Code and Name	**ETM205 ENGINEERING DESIGN TOOLS AND ELEMENTS**
Course Semester	3
Catalog Content	Recognition of mechanical design elements (gears, cams, bearings, etc.) and understanding their functions Skill in constructing simple systems using mechanical design elements Ability to solve problems related to motion transmission Utilization of appropriate modeling methods
Textbook	1. Makine Teknolojileri için Birimler, Formüller ve Çizelgeler, M., Gülesin, A., Güllü, B.B., Buldum, Seçkin kitabevi, 2003, Ankara 2. Makine Tasarımı Temel İlkeler / Prof. Dr. Tezcan Şekercioğlu Birsen Yayınevi, 2023.
Supplementary Textbooks	Makine Meslek Resmi, Nejat Kıraç, Dora Yayınevi, 2019.
Credit	**4 ECTS**
Prerequisites of the Course (	No Prerequisites - %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Learning mechanical tools and components used in design according to Turkish and World standards Conducting studies on the modeling of mechanical science elements and their use in systems Learning common problems and practical approaches that industrial design engineers need to know during project design Learning approaches to solving engineering problems Acquiring knowledge about basic design and engineering topics Developing teamwork skills
Course Learning Outcomes	1. Learning engineering design and components. 2. Being able to evaluate the functions of components used in mechanical systems within the design. 3. Developing the ability to generate ideas and solutions by using components used in mechanical systems within a given problem. 4. Utilizing, modeling, and if necessary, conducting prototype work for components used in mechanical systems within the system, individually or as a group, and presenting them.
Instruction Methods	Face to face Practical training

Weekly Schedule

1. Week	Introduction, Basic concepts
2. Week	Gear wheel mechanisms
3. Week	Gear wheel mechanisms
4. Week	Gear wheel mechanisms, belt pulley and chain mechanisms
5. Week	Gear, pulley and chain mechanisms and their applications in design systems
6. Week	Gear, pulley and chain mechanisms and their applications in design systems
7. Week	Wedges, pins, pins, shims, circlips
8. Week	Rivets and welds
9. Week	Springs and cams
10. Week	Practice
11. Week	Practice
12. Week	Bearings
13. Week	Bearings
14. Week	Construction examples

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 2
Weekly tutorial hours: 2
Reading Activities: 0
Internet browsing, library work: 2
Designing and implementing materials: 4
Report preparing: 2
Preparation of Midterm and Midterm Exam: 0
Final Exam and Preparation for Final Exam: 4

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams		
Assignment		
Application		
Projects		
Practice		
Quiz	3	60
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	2	28
Reading Tasks			
Internet browsing, library	3	2	6

Workload

Material Design and Implementation	5	4	20
Report Preparing	5	2	10
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam			
Final Exam and Preperation for Final Exam	2	4	16
Other (should be emphasized)	-	-	-
Total Workload	-	-	100
Total Workload / 25			100/25
Course Credit (ECTS)			4

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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 model and solve engineering problems.		x			
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 purpose.			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 use research methods, including literature search, designing and conducting experiments, collecting data, analysing and interpreting results, to investigate complex		x			
6	Knowledge of the effects of engineering practices on			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).		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	1. Prof. Dr. Hüdayim BAŞAK, hbasak@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
Contribution Level	**2**	**2**	**3**	**3**	**2**	**3**		**2**	**3**		**4**
Learning outcome 1	**2**	**3**	**2**	**2**							**2**
Learning outcome 2	**3**	**2**	**3**	**2**	**2**			**2**			**2**
Learning outcome 3			**3**	**3**	**2**			**2**	**2**		**3**
Learning outcome 4				**3**		**3**			**3**		**4**

Course Description Form	
Course Code and Name	**ETM206 DESIGN FOR X**
Course Semester	4
Catalog Content	Design skills in accordance with traditional production methods Ability to design in accordance with design criteria such as ergonomics, reliability and cost Understanding of sustainability and product life cycle concepts Ability to comprehend product development processes in accordance with customer expectations and design targets Ability to redesign a sample industrial product by considering the basic design criteria
Textbook	1. Eastman, C. M. Design for X: concurrent engineering imperatives. Springer Science & Business Media, 2012. 2. Blokdyk G. DFX design for X: A Project-Based Tutorial. Independent Publishing Platform, 2017.
Supplementary Textbooks	1. Beitz, W., Pahl, G., & Grote, K. (1996). Engineering design: a systematic approach. Mrs Bulletin, 71.
Credit	**4 ECTS**
Prerequisites of the Course (	No Prerequisites - %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	To learn design approaches suitable for customer expectations and target audience To understand manufacturing methods and design approaches suitable for manufacturing To be able to apply quality control, integration, packaging and reliable design criteria To learn different systematic approaches to achieve design goals To learn design approaches to increase product efficiency Knowledge of different industry expectations, design standards and practical approach
Course Learning Outcomes	1. To be able to define the product and identify possible design variables, 2. To be able to determine appropriate design methods for mechanical structures, 3. To be able to determine manufacturability analysis, measurability and assembly process, 4. Functionality, determination of functional properties and determination of material characteristics of the product, 5. To be able to define the ideal life cycle of the product, 6. To be able to design basic mechanical elements, mechanisms and machines
Instruction Methods	Face to face Practical training

Weekly Schedule

1. Week	Introduction, Basic concepts
2. Week	Defining and analysing the design problem
3. Week	Design criteria for forming
4. Week	Design criteria for machining
5. Week	Design criteria for casting
6. Week	Design criteria in accordance with quality and standards
7. Week	Design approaches for weight and cost
8. Week	Design criteria for shaft hub
9. Week	Design criteria suitable for bearing elements
10. Week	Design criteria for ease of maintenance
11. Week	Design criteria for reliability
12. Week	Design criteria for ergonomics
13. Week	Design approaches for sustainability
14. Week	Design applications

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 2
Weekly tutorial hours: 2
Reading Activities: 0
Internet browsing, library work: 2
Designing and implementing materials: 2
Report preparing: 2
Preparing a Presentation: 0
Presentations: 0
Preparation of Midterm and Midterm Exam: 4
Final Exam and Preparation for Final Exam: 6

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams		
Assignment		
Application		
Projects	1	30
Practice		
Quiz	2	30
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	2	28

Workload

Reading Tasks			
Studies	5	2	10
Material Design and Implementation	5	2	10
Report Preparing	2	5	10
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	2	4	8
Final Exam and Preperation for Final Exam	1	6	6
Other (should be emphasized)			
Total Workload			100
Total Workload / 25			100/25
Course Credit (ECTS)			4

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.			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.				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.					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, awareness						
	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	Assist. Prof. Dr. Oğulcan Eren ogulcaneren@gazi.edu.tr							

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
Contribution Level	**2**	**3**	**4**	**5**	**2**	**1**				**2**	**2**
Learning outcome 1	**2**	**3**	**2**	**2**							
Learning outcome 2		**2**	**3**	**3**	**2**						
Learning outcome 3			**3**	**3**						**2**	**2**
Learning outcome 4			**4**	**3**						**3**	
Learning outcome 5	**2**	**2**				**1**					
Learning outcome 6				**5**	**2**						**2**

Course Description Form	
Course Code and Name	**ETM208 MECHANISMS**
Course Semester	4
Catalog Content	Engineering Basic concepts, Degrees of Freedom Crank Slider Mechanism 4 bar Mechanism Movement analysis Connecting Rod Curve Position, Speed, Acceleration Analysis
Textbook	1. Eres Söylemez, Makina Teorisi-I Mekanizma Tekniği, 2017 2. İbrahim Deniz Akçalı, Mekanizma Tekniği 3. Ahmet Özdemir, Ulvi Şeker, Mekanizmalar, 1995 4. J. E. Shigley, Shigley's Mechanical Engineering Design 10th Edition, McGraw Hill, 2014 5. Robert Norton Machine Design: An Integrated Approach, 6th Edition, Pearson, 2019
Supplementary Textbooks	1. Sclater, Neil; Chironis, Nicholas, Mechanisms and Mechanical Devices Sourcebook, Fourth Edition. 2. Neil Sclater, Mechanisms and Mechanical Devices Sourcebook, 5th Edition 5th Edition.
Credit	**3 ECTS**
Prerequisites of the Course (	No Prerequisites %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Learning the field of design engineering activity Learning solution approaches to engineering problems Having knowledge of basic design and engineering issues In order for students to realize basic Machine Design, they learn the types of movements and which mechanism approaches can provide these movements. They have the ability to determine the movement types and mechanism types required for the design.
Course Learning Outcomes	1. The purpose of the courses to be taken in design engineering education and general concepts are learned. 2. Knows what engineering skills a design engineer should have. 3. Learns engineering calculation approaches. 4- Recognizes mechanisms and knows where to use them. 5- Place of use of mechanisms - gain calculation and design ability according to working conditions.
Instruction Methods	Face to face

Weekly Schedule

1. Week	Basic concepts: Mathematics and Physics approaches
2. Week	Introduction of the General Concept and basic mechanisms
3. Week	Degrees of Freedom
4. Week	Degrees of Freedom Applications
5. Week	Classification of mechanisms
6. Week	Crank – Slider (3 bar) mechanism motion analysis
7. Week	4 bar mechanism motion analysis
8. Week	Crank – Slider (3 bar) mechanism Connecting rod curve
9. Week	4 bar mechanism Connecting rod curve
10. Week	Synthesis of mechanisms (3 bar mechanism)
11. Week	Synthesis of mechanisms (4 bar mechanism)
12. Week	Kinematic analysis, position, velocity and acceleration analysis approaches (Mathematical theorems and applications)
13. Week	Kinematic analysis, position, velocity and acceleration analysis approaches (3 rod mechanism)
14. Week	Kinematic analysis, position, velocity and acceleration analysis approaches (4 rod mechanism))

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 2
Weekly tutorial hours: 1
Reading Activities: 3
Internet browsing, library work: 1
Designing and implementing materials: 3
Report preparing: 0
Preparing a Presentation: 0
Presentations: 0
Preparation of Midterm and Midterm Exam: 8
Final Exam and Preparation for Final Exam: 8

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	30
Assignment		
Application		
Projects	1	30
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	1	14
Reading Tasks	2	3	6
Studies	5	1	5
Material Design and Implementation	2	3	6
Report Preparing			
Preparing a Presentation			
Presentations			

Midterm Exam and Preperation for Midterm Exam	1	8	8
Final Exam and Preperation for Final Exam	1	8	8
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.					**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.			**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.			**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.					

	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).						
	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. Dr. Murat Tolga ÖZKAN tozkan@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**
Contribution Level	**5**	**5**	**3**	**3**	**2**			**1**			
Learning outcome 1	**2**	**2**	**2**					**1**			
Learning outcome 2	**2**	**2**	**2**								
Learning outcome 3	**4**	**4**	**3**								
Learning outcome 4	**3**	**3**		**3**	**2**						
Learning outcome 5	**5**	**5**		**3**	**2**						

COURSE DESCRIPTION FORM

Course Code and Name	**ETM210 ELECTRONICS FOR PRODUCT AND SYSTEM DESIGN**
Course Semester	4
Catalog Content	Having a basic knowledge of electricity and electronics Ability to perform electrical circuit analysis Ability to use modern engineering methods Teamwork and leadership skills Ability to communicate verbally and in writing Ability to design, implement, and conduct experiments
Textbook	1. Çelebi, H.H. (1999). *Elektrik bilgisi*. İstanbul: Yüce Yayınları. 2. Özkan T. (1995). *Temel elektronik*. İstanbul: Kayhan Matbaası
Supplementary Textbooks	1. Demirel, H. (2012). *Elektronik devre elemanları elektronik devreler*. İstanbul: Birsen Yayınevi
Credit	**2 ECTS**
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	To be able to understand electrical circuits and instruments and use them in designs To be able to use electronic systems in industrial products To learn solution approaches to engineering problems
Course Learning Outcomes	1. Gain knowledge about the use of electrical and electronic systems in industrial design. 2. To have general knowledge about basic electrical and electronic systems. 3. Understand the importance of electrical and electronic systems in design engineering. 4. Basic electrical circuit analysis can be performed. 5. Simple design examples of electronic elements can be realized.
Instruction Methods	Face to face
Weekly Schedule	

Hafta	**Konular**
1	Introduction
2	The meaning and importance of design
3	Historical development of design
4	The importance of design for the national and industrial development
5	Important designs and innovations
6	The methodology of design and its rules
7	Fundamentals of design
8	Elementary design process
9	Analysing simple part designs
10	Component design
11	Applications of component designs
12	Analysing simple system designs
13	System design
14	Applications of system designs

Teaching and Learning Methods

Weekly theoretical course hours: 2
Weekly tutorial hours: 0
Reading Activities: 0
Internet browsing, library work: 1
Designing and implementing materials: 2
Report preparing: 3
Preparing a Presentation: 2
Presentations: 2
Preparation of Midterm and Midterm Exam: 2
Final Exam and Preparation for Final Exam: 3

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	1	10
Application	1	10
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours			
Reading Tasks			
Studies	4	1	4
Material Design and Implementation	2	2	4
Report Preparing	1	3	3
Preparing a Presentation	1	2	2
Presentations	1	2	2
Midterm Exam and Preperation for Midterm Exam	2	2	4
Final Exam and Preperation for Final	1	3	3
Other (should be emphasized)			
Total Workload	-	-	50
Total Workload / 25			50/25
Course Credit (ECTS)			2

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable				**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.					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.			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	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						
	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.						
The Course's Lecturer(s) and Contact Informations	Head of Department tasarim@gazi.edu.tr							

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program çıktısı 11
Contribution Level	**4**	**4**	**5**	**3**	**4**	**1**	**2**			**1**	
Learning outcome 1	**2**	**2**	**4**								
Learning outcome 2	**2**	**2**	**2**	**2**			**2**				
Learning outcome 3	**4**	**3**	**4**			**1**	**2**				
Learning outcome 4			**2**	**3**	**3**						
Learning outcome 5	**3**	**4**	**5**	**3**	**4**					**1**	

Course Description Form	
Course Code and Name	**ETM212 COMPUTER AIDED DESIGN 1**
Course Semester	4
Catalog Content	Design 2D and 3D parts Ability to use computer software Defining problems and creating solution suggestions Adapting to new technologies
Textbook	1. Lombard, M., Solidworks 2013 Bible, Willey Pub., USA, 2013. 2. Taşkesen, A., Mendi, F, Toktaş, İ. ve Eldem, C. AutoCAD ile Çizim ve Modelleme, Gazi Kitabevi, Ankara, 2008. 3. Başak, H. AutoCAD ve Uygulamaları, Nobel Yay., Ankara 2007.
Supplementary Textbooks	1. Mendi, F., Kişioğlu, Y. ve Teşkesen, A., SolidWorks: Çizim – Modelleme – Analiz, Gazi Kitabevi, Ankara, 2012.
Credit	**2 ECTS**
Prerequisites of the Course (*Attendance Requirements*)	No Prerequisites- %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	To teach students the basic principles of computer-aided design and 2D drawing techniques. To provide students with practical skills in solid and surface modeling by improving their 3D modeling skills. Realizing the design of complex products and systems To provide knowledge and application skills on sheet metal design and processing techniques in a computer-aided design environment. Creating construction pictures of a product and/or system
Course Learning Outcomes	1. Students can accurately and effectively create 2D drawings and 3D models using computer-aided design tools 2. Can design functional assemblies by combining different parts 3. Can create technical documents in accordance with engineering standards
Instruction Methods	Face to face
Weekly Schedule	**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 **8. Week** Introduction to Assembly Design **9. Week** Assembly Design and Analysis **10. Week** Assembly and Motion Simulations **11. Week** Part-level Drawing and Documentation **12. Week** Technical Drawing 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: 1
Reading Activities: 4
Internet browsing, library work: 10
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

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	1	14
Reading Tasks			
Studies	2	2	4
Material Design and Implementation			
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	1	2	2
Final Exam and Preperation for Final Exam	1	2	2
Other (should be emphasized)			
Total Workload	-	-	50
Total Workload / 25			50/25
Course Credit (ECTS)			2

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.		**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.			**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.		**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.						
	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).	**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	Head of Department tasarim@gazi.edu.tr

	Program Outcome1	Program Outcome 2	Program Outcome 3	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7	Program çıktısı 8	Program Outcome 9	Program Outcome 10	Program Outcome 11
Contribution Level	**1**	**2**	**3**	**2**					**1**	**1**	**3**
Learning outcome 1	**1**									**1**	**3**
Learning outcome 2			**3**						**1**	**1**	
Learning outcome 3		**2**		**2**							

COURSE DESCRIPTION FORM		
Course Code and Name	**ETM301 THERMODYNAMICS**	
Course Semester	5	
Catalog Content	Developing the ability to understand and comprehend basic thermodynamic concepts Professional and ethical responsibility Ability to use modern engineering methods Ability to identify, formulate and solve problems	
Textbook	1. Çengel, Y. ve Boles, M., Mühendislik Yaklaşımıyla Termodinamik, (Çe. T. Derbentli), McGraw-Hill, İst., 1996. 2. Çengel, Yunus A. Fundamentals of thermal-fluid science, McGraw-Hill	
Supplementary Textbooks	1. Öztürk, A. and Kılıç, A., Thermodynamics with Solved Problems, Çağlayan Kitabevi, 1998.	
Credit	**3 ECTS**	
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites %70 Attendance Requirements	
Type of the Course	Compulsory	
Instruction Language	Turkish	
Course Objectives	Understanding the engineering profession and ethics To develop the ability to define complex engineering problems and analyze them with the principles of thermodynamics. To learn solution approaches to engineering problems To develop the ability to produce solutions in terms of energy efficiency and sustainability using thermodynamic principles.	
Course Learning Outcomes	1. To gain the ability to solve thermodynamic problems by mathematical and analytical methods 2. To gain the ability to explain and apply the principles and laws of thermodynamics 3. To gain the ability to transform thermodynamic topics into practical applications and adapt them to industrial problems. 4. Develop the ability to describe and analyze the behavior of thermodynamic systems. 5. To develop the ability to associate knowledge in the field of thermodynamics with current research and to produce innovative solutions	
Instruction Methods	Face to face	
Weekly Schedule	**Hafta**	**Konular**
	1	Basic concepts and definitions. Dimension and units. System properties. Equilibrium state. State changes and cycles. Pressure. Temperature. The zeroth law of thermodynamics.
	2	Pure matter and its properties. Pure matter and phase change stages. Shape properties and tables.
	3	Ideal gas and equation of state. Real gases. Compressibility factor and generalized graph. Other equations of state. Introduction to the first law of thermodynamics.
	4	First law of thermodynamics (for closed systems). Heat and work. Specific heat. Internal energy, enthalpy, specific heat of ideal gases. Specific heats of solids and liquids.
	5	First law of thermodynamics (for open systems). Conservation of mass. Conservation of energy. Flow work. Open systems with continuous flow
	6	Discontinuity in open systems. Steady state, steady flow systems. Second law of thermodynamics. Heat machines. Cooling systems and heat pumps.
	7	Reversible and irreversible processes. Carnot cycle and its principles. Thermodynamic temperature scale.

	8	Clausius inequality. Entropy. The principle of entropy increase. Third law of thermodynamics. Entropy change of pure matter. Temperature-Entropy (T-s) diagram.
	9	Entropy change of perfect gases. Reversible continuous flow work. Adiabatic efficiencies of some machines. Exergy and second law solution.
	10	Second law solution of closed and open systems. Power cycles with gas flow: Air standard assumptions.
	11	Otto and Diesel cycles. Brayton cycle. Brayton cycle with regeneration. Ideal jet propulsion cycles. Steam power cycles: Rankine cycle. Ideal Rankine cycle with reheating, ideal regenerative Rankine cycle. Cogeneration.
	12	Refrigeration cycles: Cooling machines and heat pumps. Reverse Carnot cycle. Vapor compression refrigeration cycle. Heat pump systems. Gas refrigeration cycle.
	13	Ideal gas mixtures. Air-vapor mixture.
	14	Exercises.

Teaching and Learning Methods

Weekly theoretical course hours: 3
Weekly tutorial hours: 0
Reading Activities: 2
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: 2
Final Exam and Preparation for Final Exam: 2

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment		
Application		
Projects		
Practice		
Quiz	1	20
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	5	2	10
Studies	6	2	12
Material Design and Implementation	1	3	3
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for	2	2	4
Final Exam and Preperation for Final	2	2	4
Other (should be emphasized)			
Total Workload			75
Total Workload / 25			75/25

	Course Credit (ECTS)					3	
Contribution Level Between Course Learning Outcomes and Program Outcomes	No	Program Outcomes	1	2	3	4	5
	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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable			**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.				**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.		**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					
	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					
	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.					
The Course's Lecturer(s) and Contact Informations	Prof. Dr. Veysel Özdemir vozdemir@gazi.edu.tr						

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program çıktısı 11
Contribution Level	**4**	**3**	**4**	**2**	**5**		**4**			**1**	
Learning outcome 1	**4**	**4**	**3**	**3**	**4**						
Learning outcome 2	**3**	**2**	**3**		**5**						
Learning outcome 3	**4**	**4**	**4**				**3**				
Learning outcome 4	**3**	**3**	**2**	**2**							
Learning outcome 5	**3**	**3**					**4**			**1**	

COURSE DESCRIPTION FORM	
Course Code and Name	**ETM302 FLUID MECHANICS**
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	1. Akışkanlar Mekaniği (Temelleri Ve Uygulamalari), Y. A. Çengel, J.M. Cimbala, 1. Baskı, Güven Bilimsel, 2008 2. Munson, B.R., Young, D.F., Okiishi, T.H. and Huebsch, W.W., Fundemantals of Fluid Mechanics, Wiley Pub. 2009. 3. White, F.M., Fluid Mechanics, McGraw-Hill Pub., Int. Ed., 2011.
Supplementary Textbooks	1. Akışkanlar Mekaniği ve Hidrolik Problemleri, C. Ilgaz, M.E.Karahan, A.Bulu, Çağlayan Kitabevi, 1. Baskı, 1993 2. Akışkanlar Mekaniği ve Hidrolik, RV.Giles, Güven Kitabevi, 1980
Credit	**3 ECTS**
Prerequisites of the Course (*Attendance Requirements***)**	No Prerequisites %70 Attendance Requirements
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Understanding the engineering profession and ethics To gain the ability to comprehend and analyze static and dynamic properties of fluids. To learn solution approaches to engineering problems To have knowledge of basic design and engineering issues
Course Learning Outcomes	1. Mastering the basic topics of fluid mechanics 2. Develop the ability to analyze complex problems related to fluid flows. 3. Gain the ability to understand and apply kinematic properties of fluids 4. Acting in accordance with the ethical principles of the engineering profession, gaining awareness about ethical responsibilities 5. To develop the ability to follow research in the field of fluid mechanics and to produce innovative solutions.
Instruction Methods	Face to face
Weekly Schedule	**Hafta** / **Konular**
	1 — Introduction
	2 — Fluid statics
	3 — Basic fluid dynamics - Bernolli equation
	4 — Fluid kinematics
	5 — Controllable volume analysis
	6 — Differential analysis of fluid flow
	7 — Dimensional analysis, simulation and modeling
	8 — Viscous flow in pipes
	9 — Flow over immersed objects
	10 — Applications
	11 — Flow in open channel
	12 — Compressible flow
	13 — Applications
	14 — Turbo machines

Teaching and Learning Methods

Weekly theoretical course hours: 3
Weekly tutorial hours: 0
Reading Activities: 5
Internet browsing, library work: 5
Designing and implementing materials: 5
Report preparing: 2
Preparing a Presentation: 0
Presentations: 0
Preparation of Midterm and Midterm Exam: 4
Final Exam and Preparation for Final Exam: 5

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	40
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	1	5	5
Studies	2	5	10
Material Design and Implementation	1	5	5
Report Preparing	2	2	4
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for	1	4	4
Final Exam and Preperation for Final	1	5	5
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable				**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.					**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.	**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	**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							
	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.							
The Course's Lecturer(s) and Contact Informations	Prof. Dr. Veysel Özdemir vozdemir@gazi.edu.tr								

	Program Outcome1	**Program Outcome2**	**Program Outcome3**	**Program Outcome4**	**Program Outcome5**	**Program Outcome6**	**Program Outcome7**	**Program çıktısı 8**	**Program Outcome9**	**Program Outcome10**	**Program çıktısı 11**
Contribution Level	**4**	**4**	**5**	**1**	**4**	**1**	**1**			**1**	
Learning outcome 1	**4**	**3**	**4**		**3**						
Learning outcome 2	**3**	**4**	**4**	**1**	**3**						
Learning outcome 3			**5**		**4**						
Learning outcome 4						**1**	**1**				
Learning outcome 5										**1**	

Course Description Form	
Course Code and Name	**ETM303 MACHINE ELEMENT 1**
Course Semester	5
Catalog Content	Engineering Basic concepts Principal Stresses Material Behaviors Loading types Connectors Riveted Joints Welded Joints Bolted Joints
Textbook	1. M. Tolga ÖZKAN Makine Elemanları Ders notları, 2024 2. Mustafa Akkurt, Makina Elemanları Birsen Yayınevi, 2018. 3. J. E. Shigley, Shigley's Mechanical Engineering Design 10th Edition, McGraw Hill, 2014. 4. Robert Norton Machine Design: An Integrated Approach, 6th Edition, Pearson, 2019.
Supplementary Textbooks	1. Fatih C. Babalık, Kadir Çavdar, Makine Elemanları ve Konstrüksiyon Örnekleri, Dora Yayınları, 2021. 2. Atila Bozacı, Makina Elemanları, Literatür Yayıncılık, 2023.
Credit	**3 ECTS**
Prerequisites of the Course (	Attendance Requirements 70%
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Learning the field of design engineering activity Learning solution approaches to engineering problems Having knowledge of basic design and engineering issues By explaining the calculation approaches of basic Machine Elements to the students, it is aimed to enable them to learn and synthesize which machine elements will be used in the design process and the engineering approaches required for the design of these machine elements.
Course Learning Outcomes	1.The purpose of the courses to be taken in design engineering education and general concepts are learned. 2. Knows what engineering skills a design engineer should have 3. Learns engineering calculation approaches 4- Knows the Machine Elements and knows the places where they will be used. 5- Place of use of Machine Elements - gain calculation and design ability according to working conditions
Instruction Methods	Face to face

Weekly Schedule

1. Week	Basic concepts; Basic Mathematics and Physics approaches
2. Week	Principal stresses
3. Week	Hooke's law; Material approach and behavior
4. Week	Material strength
5. Week	Stress hypothesis, static, dynamic loading types
6. Week	Riveted Joints
7. Week	Riveted Joints
8. Week	Welded Joints
9. Week	Welded Joints
10. Week	Welded Joints
11. Week	Welded Joints
12. Week	Bolted Joints
13. Week	Bolted Joints
14. Week	Bolted Joints

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Weekly tutorial hours: 0
Reading Activities: 3
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: 5
Final Exam and Preparation for Final Exam: 5

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment		
Application	1	20
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	4	3	12
Studies	5	1	5
Material Design and Implementation	6	1	6
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	1	5	5

Final Exam and Preperation for Final Exam	1	5	5
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.					**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.			**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.			**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.					
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).					
	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. Dr. Murat Tolga ÖZKAN tozkan@gazi.edu.tr						

	Program Outcome1	**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**
Contribution Level	**5**	**5**	**3**	**3**	**2**			**1**			
Learning outcome 1	**4**			**2**	**2**						
Learning outcome 2	**5**	**4**		**3**	**3**			**1**			
Learning outcome 3	**4**	**5**		**2**							
Learning outcome 4			**3**								
Learning outcome 5		**4**	**4**								

Course Description Form	
Course Code and Name	**ETM304 MACHINE ELEMENT 2**
Course Semester	6
Catalog Content	Engineering Basic concepts, Principal Stresses, Material Behaviors, Loading types, Power and Motion transmission Shaft Design Belt Pulley Mechanisms Gear Design Spur wheel Helical Gear Wheel Bevel Gear Wheel Worm Screw Wheel Bearing Design
Textbook	1. M. Tolga ÖZKAN Makine Elemanları Ders notları, 2024 2. Mustafa Akkurt, Makina Elemanları Birsen Yayınevi, 2018. 3. J. E. Shigley, Shigley's Mechanical Engineering Design 10th Edition, McGraw Hill, 2014.
Supplementary Textbooks	1. Robert Norton, Design of Machinery with Student Resource DVDMcGraw-Hill Education, 2011. 2. Fatih C. Babalık, Kadir Çavdar, Makine Elemanları ve Konstrüksiyon Örnekleri, Dora Yayınları, 2021. 3. Atila Bozacı, Makina Elemanları, Literatür Yayıncılık, 2023.
Credit	**4 ECTS**
Prerequisites of the Course (	Attendance Requirements 70%
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Learning the field of design engineering activity Learning solution approaches to engineering problems Having knowledge of basic design and engineering issues By explaining the calculation approaches of basic Machine Elements to the students, it is aimed to enable them to learn and synthesize which machine elements will be used in the design process and the engineering approaches required for the design of these machine elements.
Course Learning Outcomes	1. Ability to learn the purpose and general concepts of the courses to be taken in design engineering education 2. Having engineering skills 3. Ability to learn engineering calculation approaches 4. Being able to recognize and use Machine Elements 5. Use of Machine Elements - gaining the ability to calculate and design according to working conditions
Instruction Methods	Face to face

Weekly Schedule

1. Week	General concepts
2. Week	Power and movement
3. Week	Design of shafts I
4. Week	Design of shafts II
5. Week	Powertrains
6. Week	Belt pulley design
7. Week	Spur gear design I
8. Week	Spur gear design II
9. Week	Helical gear design
10. Week	Bevel gear design I
11. Week	Bevel gear design II
12. Week	Worm and gear design
13. Week	Bearing design I
14. Week	Bearing design II

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 3
Weekly tutorial hours: 0
Reading Activities: 1
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: 10
Final Exam and Preparation for Final Exam: 10

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment		
Application	1	20
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	2	1	2
Studies	12	1	12
Material Design and Implementation	12	2	24
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	1	10	10
Final Exam and Preperation for Final Exam	1	10	10
Other (should be emphasized)			

Total Workload	-	-	100	
Total Workload / 25			100/25	
Course Credit (ECTS)			4	

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.					**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.			**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.			**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.					
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).					
	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. Dr. Murat Tolga ÖZKAN tozkan@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**
Contribution Level	**5**	**5**	**3**	**3**	**2**			**1**			
Learning outcome 1				**2**				**1**			
Learning outcome 2	**2**	**2**		**3**	**1**						
Learning outcome 3	**5**	**4**	**3**								
Learning outcome 4	**3**	**5**									
Learning outcome 5		**3**									

COURSE DESCRIPTION FORM	
Course Code and Name	**ETM305 PRODUCT DESIGN AND DEVELOPMENT**
Course Semester	5
Catalog Content	Ability to use modern engineering tools Teamwork and leadership skills Ability to design and implement experiments Ability to identify problems and make designs Sustainable designs Developing innovative products
Textbook	1. Keinonen, T. and Takala, R., Product Concept Design: A Review of the Conceptual Design of Products in Industry, Springer, 2006. 2. Morris, R., Fundamentals of Product Design, AVA Pub., 2009.
Supplementary Textbooks	1. Bordegoni, M. and Rizzi, C., Innovation in Product Design: From CAD to Virtual Prototyping, Springer, 2011.
Credit	**5 ECTS**
Prerequisites of the Course	No Prerequisites Attendance Requirements %70
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Generating innovative design ideas Solving and implementing a complex engineering project Using computer programs effectively Developing designs suitable for the target audience Improving teamwork ability Creating and implementing a design project
Course Learning Outcomes	1. Students taking this course can prepare sketches, three-dimensional model creation, structural analyses, technical drawings and prototypes required in the process of developing a new product. 2. Students taking this course can identify design problems and develop solution suggestions. 3. Students taking this course can create a detailed report including research, design process, user needs analysis, analysis processes and final design recommendations. 4. Students taking this course gain skills in working as a team by communicating effectively and collaborating. 5. They gain the ability to effectively present the designed product or system
Instruction Methods	Face to face
Weekly Schedule	

Week	Subjects
1	Introduction to the Product Design Process
2	Product Design Specifications
3	Planning and Scheduling
4	Conceptual Design
5	Detail Design
6	Detail Design
7	Presentation of project
8	Design for Manufacturing (DFM)
9	Design for Assembly (DFA)
10	Design for Reliability
11	Human Factors in Design
12	Model and Prototyping
13	Design for Environment and Sustainability
14	Presentation of project

Teaching and Learning Methods

Weekly theoretical course hours: 2
Weekly tutorial hours: 2
Reading Activities: 1
Internet browsing, library work 2
Designing and implementing materials: 2
Report preparing: 2
Preparing a Presentation: 1
Presentations: 1
Preparation of Midterm and Midterm Exam:
Final Exam and Preparation for Final Exam: 5

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams		
Assignment		
Application		
Projects	1	60
Practice		
Quiz		
Percent of In-term Studies (%)		60
Percentage of Final Exam to Total Score (%)	1	40
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	2	28
Reading Tasks	5	1	5
Studies	5	2	10
Material Design and Implementation	12	2	24
Report Preparing	8	2	16
Preparing a Presentation	6	1	6
Presentations	3	1	3
Midterm Exam and Preperation for			
Final Exam and Preperation for Final	1	5	5
Other (should be emphasized)			
Total Workload	-	-	125
Total Workload / 25			5
Course Credit (ECTS)			5

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable			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.			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.				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.							
	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			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		Dr. Nurullah Yüksel nurullahyuksel@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 çıktısı 8**	**Program Outcome 9**	**Program Outcome10**	**Program Outcome11**
Contribution Level	**3**	**3**	**3**	**4**	**4**			**3**	**4**	**3**	**3**
Learning outcome 1	**3**		**2**							**3**	
Learning outcome 2		**3**	**3**	**2**	**2**						**2**
Learning outcome 3	**2**	**2**	**3**	**4**	**4**				**3**		
Learning outcome 4									**4**	**3**	**3**
Learning outcome 5					**3**			**3**			

COURSE DESCRIPTION FORM		
Course Code and Name	**ETM306 APPLIED PRODUCT ANS SYSTEM DESIGN**	
Course Semester	6	
Catalog Content	Ability to use modern engineering tools Teamwork and leadership skills Ability to design and implement experiments Ability to identify problems and make designs Sustainable designs Developing innovative products	
Textbook	1. Keinonen, T. and Takala, R., Product Concept Design: A Review of the Conceptual Design of Products in Industry, Springer, 2006. 2. Morris, R., Fundamentals of Product Design, AVA Pub., 2009.	
Supplementary Textbooks	1. Bordegoni, M. and Rizzi, C., Innovation in Product Design: From CAD to Virtual Prototyping, Springer, 2011.	
Credit	**5 ECTS**	
Prerequisites of the Course	No Prerequisites Attendance Requirements %70	
Type of the Course	Compulsory	
Instruction Language	Turkish	
Course Objectives	Generating innovative design ideas Solving and implementing a complex engineering project Using computer programs effectively Developing designs suitable for the target audience Improving teamwork ability Creating and implementing a design project	
Course Learning Outcomes	1. Students taking this course can prepare sketches, three-dimensional model creation, structural analyses, technical drawings and prototypes required in the process of developing a new product. 2. Students taking this course can identify design problems and develop solution suggestions. 3. Students taking this course can create a detailed report including research, design process, user needs analysis, analysis processes and final design recommendations. 4. Students taking this course gain skills in working as a team by communicating effectively and collaborating. 5. They gain the ability to effectively present the designed product or system	
Instruction Methods	Face to face	
Weekly Schedule	**Week**	**Subjects**
	1	Project introduction and discussion
	2	Idea generation
	3	Needs analysis and evaluation
	4	Market and Literature research
	5	concept creation
	6	concept development
	7	Part modeling using CAD tools
	8	System modeling using CAD tools
	9	Simulation and analysis using CAE tools
	10	Creating technical documentation
	11	Prototyping
	12	Prototyping and testing
	13	Create a project report
	14	Layout and presentation preparation techniques

Teaching and Learning Methods

Weekly theoretical course hours: 2
Weekly tutorial hours: 2
Reading Activities: 1
Internet browsing, library work 2
Designing and implementing materials: 2
Report preparing: 2
Preparing a Presentation: 1
Presentations: 1
Preparation of Midterm and Midterm Exam:
Final Exam and Preparation for Final Exam: 5

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams		
Assignment		
Application		
Projects	1	60
Practice		
Quiz		
Percent of In-term Studies (%)		60
Percentage of Final Exam to Total Score (%)	1	40
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	2	28
Reading Tasks	5	1	5
Studies	5	2	10
Material Design and Implementation	12	2	24
Report Preparing	8	2	16
Preparing a Presentation	6	1	6
Presentations	3	1	3
Midterm Exam and Preperation for			
Final Exam and Preperation for Final	1	5	5
Other (should be emphasized)			
Total Workload	-	-	125
Total Workload / 25			5
Course Credit (ECTS)			5

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable			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.			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.				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.								
	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).				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		Dr. Nurullah Yüksel nurullahyuksel@gazi.edu.tr								

	Program Outcome1	**Program Outcome2**	**Program Outcome3**	**Program Outcome4**	**Program Outcome5**	**Program Outcome6**	**Program Outcome7**	**Program çıktısı 8**	**Program Outcome9**	**Program Outcome10**	**Program Outcome11**
Contribution Level	**3**	**3**	**3**	**4**	**4**			**3**	**4**	**3**	**3**
Learning outcome 1	**3**	**3**		**3**						**3**	
Learning outcome 2		**2**	**3**	**4**	**4**						**2**
Learning outcome 3	**2**	**3**	**2**	**13**	**3**				**3**		
Learning outcome 4								**3**	**4**		**3**
Learning outcome 5					**4**			**3**			

Course Description Form	
Course Code and Name	**ETM307 COMPUTER PROGRAMMING**
Course Semester	5
Catalog Content	The understanding of the concept of matrices, the history of programming languages, their applications, and the working environment. Understanding of data types and variables. Understanding basic operations, basic commands, and functions. Ability to create iterative processes and loops. Ability to use decision (conditional) statements. Programming skills with MATLAB.
Textbook	1. Attaway, Dorothy C. MATLAB: A Practical Introduction to Programming and Problem Solving. Butterworth-Heinemann, 2013. 2. Dukkipati, Rao V. MATLAB: An Introduction with Applications. New Age International, 2008.
Supplementary Textbooks	1. Mueller, John Paul, and Jim Sizemore. MATLAB for Dummies. John Wiley & Sons, 2021.
Credit	**3 ECTS**
Prerequisites of the Course (	No Prerequisites %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Learning computer programming concepts through applications in a programming language.
Course Learning Outcomes	1. Learning computer programming topics and methods. 2. Acquiring comprehensive and fundamental coding skills.
Instruction Methods	Face to face

Weekly Schedule

1. Week	Introduction
2. Week	Concept of Matrices
3. Week	MATLAB Programming Environment
4. Week	Data Types - 1
5. Week	Data Types - 2
6. Week	Variables
7. Week	Basic and Arithmetic Operations
8. Week	Basic Commands and Functions
9. Week	Iterative Processes and Loops - 1
10. Week	Iterative Processes and Loops - 2
11. Week	Decision (Conditional) Statements
12. Week	Using Conditional Statements with Loops
13. Week	Programming with MATLAB
14. Week	Creating Function Files

Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)

Weekly theoretical course hours: 2
Weekly tutorial hours: 1
Reading Activities: 0
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: 7
Final Exam and Preparation for Final Exam: 3

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	60
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	1	14
Reading Tasks			
Studies	7	2	14
Material Design and Implementation	2	3	6
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	1	7	7
Final Exam and Preperation for Final Exam	2	3	6
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.					
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.		**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.		**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.					
	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).					
	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. Dr. İsmail Şahin isahin@gazi.edu.tr					

	Program Outcome1	**Program Outcome2**	**Program Outcome3**	**Program Outcome4**	**Program Outcome5**	**Program Outcome6**	**Program Outcome7**	**Program çıktısı 8**	**Program Outcome9**	**Program Outcome10**	**Program Outcome11**
Contribution Level	**2**		**2**	**2**				**1**			**2**
Learning outcome 1	**2**		**2**	**1**							**1**
Learning outcome 2	**2**		**2**	**2**				**1**			**2**

Course Description Form	
Course Code and Name	**ETM308 CREATIVITY AND INNOVATION**
Course Semester	6
Catalog Content	Introduction, Creativity and innovation, Innovative and creative designs, Creative thinking techniques, Problem solving approaches, Introduction, history and philosophy of TRIZ, The history and description of TRIZ (TIPS), 40 principles and their use in design, The contradiction matrix and its use in design, The other TRIZ tools (material field analysis), Design applications of TRIZ, Examination of term course projects.
Textbook	1. Goldenber, J. and Mazarsky, D., Creativity in Product Innovation, Cambridge Univ. Press, Int. Ed., 2002. 2. Altshuller, G., 40 Principles: TRIZ Keys to Technical Innovation, TrizTools, V.1, Tech. Innovation Center, Worcester-MA, USA, 2005.
Supplementary Textbooks	1. Niku, S.B., Creative Design of Products and Sysetms, John Wiley & Sons, Inc., Int. Ed., 2009. 2. Le Masson, Pascal, Benoit Weil, and Armand Hatchuel. Strategic management of innovation and design. Cambridge Univ. Press, 2010.
Credit	**3 ECTS**
Prerequisites of the Course (	No Prerequisites %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Learning about creativity and innovation Learning creative thinking techniques Getting to know problem solving approaches Learning the TRIZ approach, contradiction matrix and 40 solution principles Getting to know other TRIZ tools Gain the ability to solve design problems using TRIZ
Course Learning Outcomes	1. They learn different creative thinking techniques and the ability to apply these techniques to real world problems 2. Ability to develop creative and innovative approaches to solve complex problems 3. Ability to apply problem solving approaches 4. The ability to look at problems from different perspectives, think flexibly and take risks 5. Ability to learn leadership and communication strategies that support creativity in business environments and apply these strategies in their future careers
Instruction Methods	Face to face

Weekly Schedule

1. Week	Introduction
2. Week	Creativity and innovation
3. Week	Innovation types
4. Week	Innovative and creative designs
5. Week	Creative thinking techniques
6. Week	Problem solving approaches
7. Week	Traditional methods that increase creativity
8. Week	The history and description of TRIZ (TIPS)
9. Week	TRIZ philosophy and methods
10. Week	40 principles and their use in design
11. Week	The contradiction matrix and its use in design
12. Week	The other TRIZ tools (material field analysis)
13. Week	Design applications of TRIZ
14. Week	Examination of term course 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: 0
Report preparing: 0
Preparing a Presentation: 3
Presentations: 1
Preparation of Midterm and Midterm Exam: 3
Final Exam and Preparation for Final Exam: 3

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment	1	20
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours			
Reading Tasks			
Studies	12	2	24
Material Design and Implementation			
Report Preparing			
Preparing a Presentation	4	3	12
Presentations	5	1	5
Midterm Exam and Preperation for Midterm Exam	1	3	3
Final Exam and Preperation for Final Exam	1	3	3
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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.					
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 Development Goals.	**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.			**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.		**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.					
	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).					
	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. Hüseyin Rıza BÖRKLÜ rborklu@gazi.edu.tr						

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome9	Program Outcome10	Program Outcome11
Contribution Level		**1**	**3**	**1**	**3**			**1**		**1**	**2**
Learning outcome 1					**2**						
Learning outcome 2			**3**		**3**						
Learning outcome 3		**1**									
Learning outcome 4			**2**	**1**							**2**
Learning outcome 5								**1**		**1**	

Course Description Form	
Course Code and Name	**ETM309 SYSTEMATIC DESIGN 1**
Course Semester	5
Catalog Content	Introduction, Fundamentals of technical systems, Fundamentals of systematic approach, Product planning, Solution finding methods, Methods of selection and evaluation, Clarification of task (design specification), Conceptual design process, The application of conceptual design, Conceptual design examples.
Textbook	1. Börklü, H.R. (Türkçeye çeviri), 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, 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	Compulsory
Instruction Language	Turkish
Course Objectives	To have knowledge about engineering design, culture and history Learning the Systematic Design process and stages Learning methods to find solutions to design problems Understand the preparation and application of a requirement list Learning the conceptual design process and its implementation
Course Learning Outcomes	1. Ability to analyze and design complex systems 2. Ability to define the components of systems, determine their relationships, and evaluate the interactions between these components 3. Ability to design systems in accordance with engineering standards and methods 4. Ability to evaluate designs according to criteria such as efficiency, reliability, security and sustainability 5. Ability to take sustainability and ethical principles into account in design processes
Instruction Methods	Face to face

Weekly Schedule

1. Week	Introduction: Importance of the course, Definition and descr
2. Week	Design methodology, Historical background, Similar metho
3. Week	Fundamentals and properties of technical systems
4. Week	Fundamentals of systematic approach, Good designer charac methodology
5. Week	Product Planning, Solution Finding and Evaluation: Product Application rules
6. Week	Solution finding methods: (a) Conventional methods, (b) Int
7. Week	(c) Discursive methods, Methods of combining solutions, Se
8. Week	Product Development: General problem solving, Systematic
9. Week	Clarification of Task: Requirements list (design specificatio
10. Week	Conceptual Design Process: Problem formulation, Abstracti principle, Variants
11. Week	Design catalogues, Classification schemes, Morphological m methods
12. Week	Conceptual design example-I: Impulse-loading test rig
13. Week	Conceptual design example-II: Water mixing tap
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: 3
Weekly tutorial hours: 0
Reading Activities: 0
Internet browsing, library work: 2
Designing and implementing materials: 2
Report preparing: 0
Preparing a Presentation: 1
Presentations: 1
Preparation of Midterm and Midterm Exam: 3
Final Exam and Preparation for Final Exam: 3

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	40
Assignment		
Application		
Projects	1	20
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks			
Studies	5	2	10
Material Design and Implementation	5	2	10
Report Preparing			
Preparing a Presentation	5	1	5
Presentations	2	1	2
Midterm Exam and Preperation for Midterm Exam	1	3	3
Final Exam and Preperation for Final Exam	1	3	3
Other (should be emphasized)			
Total Workload	-	-	75
Total Workload / 25			75/25
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.		**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.		**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.		**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.					
	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.	**x**				
The Course's Lecturer(s) and Contact Informations	Prof. Dr. Hüseyin Rıza BÖRKLÜ rborklu@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 çıktısı 8**	**Program Outcome 9**	**Program Outcome10**	**Program Outcome11**
Contribution Level	**2**	**2**	**2**	**2**	**3**	**1**					**1**
Learning outcome 1	**2**	**2**	**2**	**2**	**3**						**1**
Learning outcome 2		**2**									
Learning outcome 3			**2**								
Learning outcome 4				**2**	**2**	**1**					
Learning outcome 5					**3**						

COURSE DESCRIPTION FORM	
Course Code and Name	**ETM310 GRADUATION PROJECT PREPARATION**
Course Semester	6
Catalog Content	The skill of determining the graduation project The skill of examining selected topics related to industrial design engineering The skill of analyzing theoretical, experimental, and/or computer-based final projects The skill of creating project plans for the determined project The skill of creating and reporting the necessary infrastructure for the graduation project course
Textbook	1. Blessing, L.T.M and Chakrabarti, A., DRM, a Design Research Methodology, Springer, 2009. 2. Keinonen, T. and Takala, R., Product Concept Design: A Review of the Conceptual Design of Products in Industry, Springer, 2006.
Supplementary Textbooks	1.Kerzner, H., Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Wiley, 2013.
Credit	**2 ECTS**
Prerequisites of the Course	No Prerequisites Attendance Requirements %70
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Making preparations for the graduation project Determining the project topic and method Creating the necessary scientific and technical infrastructure
Course Learning Outcomes	1. Accessible information can be obtained and research can be conducted, utilizing databases and other sources of information. 2. The subject of study is determined, and awareness about project management, risk management, and change management is provided. 3. Fundamental professional engineering knowledge is acquired. 4. The ability to write effective reports in compliance with writing standards is attained.
Instruction Methods	Oral presentation, project structuring and weekly checks, making necessary corrections and completing the project preparation file
Weekly Schedule	**Week** / **Subjects** 1 Project preparation techniques 2 Literature search 3 Review related posts 4 Learning/developing scientific writing rules 5 Basic industrial product design strategies 6 Problems encountered in industrial product design 7 Work on sample projects 8 Discription of project topics 9 Discussion on project topics 10 Determining the project subject and method 11 Completion of preliminary preparations for the determined project 12 Creation of action plans. 13 Creation of action plans. 14 Making transaction cost calculations

Teaching and Learning Methods

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: 2
Presentations: 3
Preparation of Midterm and Midterm Exam: 0
Final Exam and Preparation for Final Exam: 2

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams		
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		
Percentage of Final Exam to Total Score (%)	1	100
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours			
Reading Tasks	5	1	5
Studies	5	1	5
Material Design and Implementation	5	1	5
Report Preparing			
Preparing a Presentation	1	2	2
Presentations	1	3	3
Midterm Exam and Preperation for	-	-	-
Final Exam and Preperation for Final	1	2	2
Other (should be emphasized)			
Total Workload			50
Total Workload / 25			50/25
Course Credit (ECTS)			2

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.			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.		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,		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						
	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).			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		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 çıktısı 8	Program Outcome 9	Program Outcome10	Program Outcome11
Contribution Level	**3**	**3**	**2**	**2**	**2**			**3**	**3**	**3**	**3**
Learning outcome 1	**3**	**3**									
Learning outcome 2								**3**		**3**	**2**
Learning outcome 3			**2**	**2**	**2**				**3**	**2**	**3**
Learning outcome 4									**3**		

COURSE DESCRIPTION FORM		
Course Code and Name	**ETM402 FINITE ELEMENT ANALYSIS**	
Course Semester	7-8	
Catalog Content	To be able to solve engineering problems by numerical analysis methods Ability to analyse spring, rod elements of finite element approach Ability to perform plate and surface, 3D elasticity analysis and design optimisation using finite element analysis software	
Textbook	1. Xiaolin Chen, Yijun Liu, Finite Element Modelling and Simulation with ANSYS Workbench, Taylor & Francis Group, ISBN, 13: 978-1-4398-7385-4, 2015. 2. Saeed Moaveni , Finite Element Analysis—Theory and Application with ANSYS, Prentice Hall, 2008.	
Supplementary Textbooks	1. Hughes, Thomas JR. The finite element method: linear static and dynamic finite element analysis. Courier Corporation, 2012.	
Credit	**5 ECTS**	
Prerequisites of the Course	No Prerequisites Attendance Requirements %70	
Type of the Course	Compulsory	
Instruction Language	Turkish	
Course Objectives	To teach basic Finite Element Analysis (FEA) theory and commercial FEA software applications for modelling and simulation of engineering problems and fundamentals of computer aided engineering and to gain the ability to apply them.	
Course Learning Outcomes	1. To understand the theory of finite element methods 2. To be able to explain the basic steps of finite element methods 3. To be able to model structural elements using finite element method 4. To be able to analyse an engineering structure using finite element method.	
Instruction Methods	Face to face	
Weekly Schedule	**Week**	**Subjects**
	1	Basic principles of finite elements
	2	Obtaining basic finite element equations with spring and rod element analogy
	3	One dimensional elasticity theory
	4	Computer applications - Modelling of bar and truss systems
	5	Two dimensional elasticity theory
	6	Computer applications - Modelling of two dimensional bar and truss systems
	7	Beam theory; Beam and frame modelling
	8	Computer applications - Beam and frame modelling
	9	Finite element algorithm and its application to finite element package programme
	10	Mesh concept and mesh optimisation
	11	Plate and surface model analyses
	12	3-D theory of elasticity - Mechanics of rigid bodies problems
	13	Nonlinear structural analyses and dynamic analyses
	14	Design optimisation by finite element fitting

Teaching and Learning Methods

Weekly theoretical course hours: 2
Weekly tutorial hour: 1
Reading Activities: 2
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: 6
Final Exam and Preparation for Final Exam: 8

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	50
Assignment	2	10
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	**Total Number of Weeks**	**Duration (weekly hour)**	**Total Period Work Load**
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours	14	1	14
Reading Tasks	5	2	10
Studies	5	5	25
Material Design and Implementation	4	5	20
Report Preparing			
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for	2	6	12
Final Exam and Preperation for Final	2	8	16
Other (should be emphasized)			
Total Workload	-	-	125
Total Workload / 25			125/25
Course Credit (ECTS)			5

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable			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.				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,				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.							
	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 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	Assist. Prof. Dr. Oğulcan EREN ogulcaneren@gazi.edu.tr								

	Program Outcome1	**Program Outcome2**	**Program Outcome3**	**Program Outcome4**	**Program Outcome5**	**Program Outcome6**	**Program Outcome7**	**Program çıktısı 8**	**Program Outcome9**	**Program Outcome10**	**Program Outcome11**
Contribution Level	**3**	**3**	**4**	**4**							
Learning outcome 1	**3**	**3**	**4**	**4**							
Learning outcome 2	**2**										
Learning outcome 3	**2**		**3**	**3**							
Learning outcome 4		**2**	**2**	**2**							

Course Description Form	
Course Code and Name	**ETM404 DESIGN PROJECT MANAGEMENT**
Course Semester	7-8
Catalog Content	Project planning skills Project risk management skills Ability to establish cost control Design budget control skills Ability to prepare project work-time schedule Project team and client management skills Project quality control skills
Textbook	1. Ramroth, W.G., Project Management for Design Professionals, AEC Ed., Int. Ed., 2006. 2. Santos, J. M. D., Project Management Absolute Beginner's Guide, QUE Publishing, 2012.
Supplementary Textbooks	1. Kerzner, H., Project Management: A Systems Approach to Planning, Scheduling and Controlling, 2013.
Credit	**4 ECTS**
Prerequisites of the Course	No Prerequisites - %70 Attendance Requirements
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	To learn the use of human and physical resources in accordance with the budget determined in the process of developing a project Project planning skills and knowledge of project risk management To have knowledge about project team and customer management
Course Learning Outcomes	1. The process of project planning and risk management in the project development process is learnt. 2. The process of collecting data, analysing results and using research methods for design budget control in the project development process is learned. 3. To have knowledge about business life applications such as project management and economic feasibility analysis.
Instruction Methods	Face to face

Weekly Schedule

1. Week	Introduction and basic concepts
2. Week	A brief history of project and design management
3. Week	Objectives and activities of project management
4. Week	Design firm and project management
5. Week	How and what kind of features a good project manager should have
6. Week	Project planning
7. Week	Project risk management
8. Week	Creating cost control
9. Week	Design budget control
10. Week	To prepare project work-time schedule
11. Week	Project team and client management
12. Week	Project quality control
13. Week	Basic rules and checklist of project management
14. Week	Project management tools and software

Teaching and Learning Methods

Weekly theoretical course hours: 2

Weekly tutorial hours: 0

Reading Activities: 2

Internet browsing, library work:5

Designing and implementing materials: 0

Report preparing: 8

Preparing a Presentation: 0

Presentations: 0

Preparation of Midterm and Midterm Exam: 2

Final Exam and Preparation for Final Exam: 4

Assessment Criteria

	Numbers	**Total Weighting (%)**
Midterm Exams	1	30
Assignment		
Application		
Projects	1	30
Practice		
Quiz		
Percent of In-term Studies (%)		**60**
Percentage of Final Exam to Total Score (%)		**40**
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	2	28
Weekly Tutorial Hours			
Reading Tasks	8	2	16
Studies	4	5	20
Material Design and Implementation			
Report Preparing	3	8	24
Preparing a Presentation			
Presentations			
Midterm Exam and Preperation for Midterm Exam	2	2	4
Final Exam and Preperation for Final Exam	2	4	8
Other (should be emphasized)			
Total Workload			100
Total Workload / 25			100/25
Course Credit (ECTS)			4

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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.					
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 Development Goals.					
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.					
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.	**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.								
	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 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	Department administration tasarım@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
Contribution Level				**1**	**1**					**1**	
Learning outcome 1				**1**							
Learning outcome 2					**1**						
Learning outcome 3										**1**	

COURSE DESCRIPTION FORM	
Course Code and Name	**ETM410 GRADUATION PROJECT**
Course Semester	7-8
Catalog Content	Skill in determining the topic of the graduation thesis Skill in literature review and information gathering related to the topic Skill in preparing calculations, analysis, designs, and sketch drawings (considering aesthetic, ergonomic, technological aspects, etc.) Skill in preparing computer-aided drawings, models, analyses, and animations
Textbook	1. Keinonen, T. and Takala, R., Product Concept Design: A Review of the Conceptual Design of Products in Industry, Springer, 2006. 2. Morris, R., Fundamentals of Product Design, AVA Pub., 2009.
Supplementary Textbooks	Bordegoni, M. and Rizzi, C., Innovation in Product Design: From CAD to Virtual Prototyping, Springer, 2011.
Credit	**12 ECTS**
Prerequisites of the Course	No Prerequisites Attendance Requirements %70
Type of the Course	Compulsory
Instruction Language	Turkish
Course Objectives	Acquiring the ability to design industrial systems, products, or product families that fulfill specific tasks Gaining the skill to design with realistic constraints Developing the ability to design by utilizing the knowledge acquired during Industrial Design Engineering education Acquiring the skill to analyze the designed products Gaining the capability to create prototypes of designed products or systems.
Course Learning Outcomes	1. Industrial Design Engineering problems are identified, defined, formulated, and solved. 2. Modeling techniques are applied using appropriate engineering methods. 3. Experimental or numerical designs are created, data is collected, results are analyzed, and interpreted. 4. Proficiency in effective report writing and presentation is attained, adhering to writing standards.
Instruction Methods	Face to face

Weekly Schedule

Week	Subjects
1	Determination of the graduation thesis topic
2	Determination of literature review topics related to the subject
3	Literature review on the subject
4	Detailed literature review
5	Detailed literature review I
6	Detailed literature review II
7	Preparation of calculation, analysis, design and sketch pictures(according to aesthetics/ergonomic/technological etc.)
8	Preparation of computer aided pictures, models, analysis and animations
9	Prototype manufacturing and testing
10	Determining and writing the contents of the thesis Critical I
11	Determining and writing the contents of the thesis Critical II
12	Determining and writing the contents of the thesis Critical III
13	Determining and writing the contents of the thesis Critical IV

	14 Submission of the final thesis
Teaching and Learning Methods	Weekly theoretical course hours: 3 Weekly practical hours: 3 Reading Activities: 7 Internet browsing, library work: 5 Material design, application: 2 Report preparation: 5 Presentation preparation: 7 Presentation: 3 Midterm exam and preparation for midterm exam: 0 Final exam and preparation for final exam: 5

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams		
Assignment		
Application		
Projects		
Practice		
Quiz		
Percent of In-term Studies (%)		
Percentage of Final Exam to Total Score (%)	1	100
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours	14	3	42
Reading Tasks	10	7	70
Studies	12	5	60
Material Design and Implementation	4	2	8
Report Preparing	10	5	50
Preparing a Presentation	1	7	7
Presentations	2	3	6
Midterm Exam and Preperation for			
Final Exam and Preperation for Final	3	5	15
Other (should be emphasized)			
Total Workload			300
Total Workload / 25			300/25
Course Credit (ECTS)			12

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
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, formulate and analyse complex engineering problems using knowledge of basic science, mathematics and engineering, and taking into account the UN Sustainable Development Goals.				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.					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.					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.						
	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).					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		Head of Department tasarim@gazi.edu.tr						

	Program Outcome1	Program Outcome2	Program Outcome3	Program Outcome4	Program Outcome5	Program Outcome6	Program Outcome7	Program çıktısı 8	Program Outcome 9	Program Outcome 10	Program Outcome 11
Contribution Level	**4**	**4**	**5**	**4**	**4**			**4**	**5**	**4**	**4**
Learning outcome 1	**4**	**4**	**5**	**4**	**4**						
Learning outcome 2			**4**						**3**	**4**	**4**
Learning outcome 3									**3**	**4**	**4**
Learning outcome 4								**4**	**5**		**2**