2017

YEDİTEPE UNIVERSITY

FACULTY OF ENGINEERING

BOLOGNA

UNDERGRADUATE

MECHANICAL ENGINEERING PROGRAMME INFORMATION PACKET

YEDITEPE UNIVERSITY

FACULTY OF ENGINEERING –

MECHANICAL ENGINEERING PROGRAMME INFORMATION PACKET (2017)

GOALS & OBJECTIVES

The objective of the Mechanical Engineering Programme is to become an engineering department respected at national and international levels, whose graduates are sought by industry and research institutions and which conducts R&D projects in close collaboration with national and international industrial and research organizations, generates knowledge, disseminates it and develops technology products.

The goal of the Mechanical Engineering Programme is to educate and train mechanical engineers who have a firm understanding of modern engineering tools and methods, a solid foundation of relevant knowledge, ability for analytical thinking, diagnosing engineering problems, generating solutions and applying them, a solid notion of engineering ethics and responsibility, awareness of and ethical stance toward major issues such as environment, global climate change, hunger and human rights; to maintain close relations with national and international institutions of scientific knowledge and technology to enable our graduates to continue their personal development and career; to carry out R&D projects on contemporary and advanced topics and to generate knowledge and technology; to work toward a common goal of promoting joint R&D activities at the University; to contribute to national and global development via these activities.

PROGRAM LEARNING OUTCOMES	
PLO1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.
PLO2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.
PLO3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.
PLO4	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.
PLO5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.
PLO6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.
PLO7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.
PLO8	Ability to work individually.
PLO9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.
PLO10	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.
PLO11	Awareness of professional and ethical responsibility.
PLO12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.
PLO13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.
PLO14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.
PLO15	Ability to verify and validate numerical solutions to engineering problems.

Teaching & Learnig Methods

The teaching & learning methods used in the Mechanical Engineering Department are listed below:

Teaching & Learning Methods	**Major Learning Activities**	**Tools**
Lecture	Listening and interpretation, critical thinking	Classware, multimedia, data projector, computer, overhead projector
Problem session	Specific predetermined skill	Classware, multimedia, data projector, computer, overhead projector
Homework	Research skills, writing, reading, IT Skills	Databases, e-mail
Project	Observation/manipulation situations, IT Skills, organizational skills, creative teamwork, Research skills, reading	Classware, specific hardware
Lab	Observation/manipulation situations, IT Skills, organizational skills, creative teamwork	Specific hardware, databases
In-class practice	Listening and interpretation, writing, reading, IT Skills, critical thinking, question posing	Classware, multimedia, data projector, computer, overhead projector
Teamwork	Listening and interpretation, Observation/manipulation situations, critical thinking, question posing, creative teamwork	Classware, multimedia, data projector, computer, overhead projector
Summer practice	Observation/manipulation situations, Research skills, writing, reading	
Seminar	Listening and interpretation, Observation/manipulation situations	Classware, multimedia, data projector, computer, overhead projector, specific hardware
Guest lecturer	Listening and interpretation, Observation/manipulation situations	Classware, multimedia, data projector, computer, overhead projector, specific hardware
Demonstration	Listening and interpretation, Observation/manipulation situations	Tools that allow observation followed by virtual application
Case study	Specific predetermined skill	

DEPARTMENT OF MECHANICAL ENGINEERING

		FIRST SEMESTER	T	U	L	Y	E
ME	101	Introduction to Mechanical Engineering	1	0	2	2	7
CHEM	101	General Chemistry	3	1	1	4	6
AFEA	111	English Conversation Course I	3	0	0	3	3
MATH	131	Calculus I	3	2	0	4	6
PHYS	101	Physics I	3	0	2	4	6
						17	28

		SECOND SEMESTER	T	U	L	Y	E
ME	182	Engineering Graphics & Solid Modeling	2	0	2	3	8
AFE	131	Academic English I	2	2	0	3	4
MATH	132	Calculus II	3	2	0	4	6
PHYS	102	Physics II	3	0	2	4	6
HUM	103	Humanities	2	0	0	2	3
ES	117	Introduction to Scientific Computing	2	0	2	3	5
						19	32

		THIRD SEMESTER	T	U	L	Y	E
ME	211	Thermodynamics I	2	1	1	3	6
ME	241	Statics	3	0	0	3	6
MATH	221	Linear Algebra	2	2	0	3	6
MATH	241	Differential Equations	3	2	0	4	6
AFE	132	Academic English II	2	2	0	3	4
TKL	201	Turkish I	2	0	0	2	2
						18	30

		FOURTH SEMESTER	T	U	L	Y	E
ME	212	Thermodynamics II	3	0	0	3	5
ME	244	Dynamics	2	2	0	3	6
ME	246	Strength of Materials	2	2	0	3	6
ME	264	Material Science for Mechanical Engineers	3	0	0	3	4
ME	266	Solid Mechanics Laboratory	1	0	2	2	3
ES	222	Fundamentals of Electrical and Electronics Eng.	3	0	0	3	4
TKL	202	Turkish II	2	0	0	2	2
						19	30

		FIFTH SEMESTER	T	U	L	Y	E
ME	331	Fluid Mechanics	2	2	0	3	6
ME	333	Fluid Mechanics Laboratory	1	0	2	2	3
ME	343	Machine Elements I	2	2	0	3	5
ME	363	Manufacturing Processes	3	0	0	3	5
ME	371	Numerical Methods in Mechanical Eng.	2	0	2	3	6
ES	301	Engineering Management	3	0	0	3	4
						17	29

		SIXTH SEMESTER	T	U	L	Y	E
ME	324	Heat Transfer	2	2	2	4	8
ME	344	Machine Elements II	2	2	0	3	6
ME	352	System Dynamics and Control	3	1	1	4	7
ME	XX1	Restricted Elective I	3	0	0	3	5
FE	XXX	Free Elective I	3	0	0	3	5
						17	31

		SEVENTH SEMESTER	T	U	L	Y	E
ME	403	Instrumentation and Experiment Design	2	0	2	3	6
ME	427	Thermal System Design	2	2	0	3	6
ME	445	Mechanical Vibrations	3	0	0	3	5
ME	XX2	Restricted Elective II	3	0	0	3	5
ME	XX3	Restricted Elective III	3	0	0	3	5
HTR	301	History of Turkish Revolution I	2	0	0	2	2
ME	400	Summer Practice	0	2	0	0	1
						17	30

		EIGHTH SEMESTER	T	U	L	Y	E
ME	482	Design of Mechanical Systems	2	2	0	3	5
ME	492	Engineering Project	1	0	4	3	8
ME	XX4	Restricted Elective IV	3	0	0	3	5
ME	XX5	Restricted Elective V	3	0	0	3	5
FE	XXX	Free Elective II	3	0	0	3	5
HTR	302	History of Turkish Revolution II	2	0	0	2	2
						17	30

ACCEPTED BY FACULTY BOARD : May 2016 ; BY SENATE:

T : Theoretical L: Laboratory
U: Practice, problem solving, application

Y: Yeditepe Credit, E: ECTS

Minimum Degree Requirements	
Credits	141
ECTS	240
Number of Courses	47
Number of Summer Practices	1

COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
INTRODUCTION TO MECHANICAL ENGINEERING	**ME 101**	**1**	**1 + 2**	**2**	**7**

Prerequisites	---

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programme)
Course Type	Compulsory
Course Coordinator	
Instructors	Prof. Dr. Mehmet A. Akgün
Assistants	
Goals	To equip students with an understanding of what mechanical engineering is and what mechanical engineers do and what the main disciplines in this field are. To let students gain an awareness of ethics, contemporary issues, engineers' responsibilities and some legal issues related to engineering. To inform students of the University and Faculty rules and regulations.
Content	Orientation, rules and regulations at the University. Introduction to mechanical engineering, its history and related professional organizations. Engineering ethics. Engineering communications. Engineering codes and standards. Problem solving, approximations and uncertainty, computing tools. Introduction to engineering design.

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) An adequate understanding of mechanical engineering	1	1	A, H
2) A very basic knowledge of the disciplines in mechanical engineering and what they involve.	1	1	A, H
3) An awareness of engineering ethics.	11	1, 10	A, H
4) An awareness of business world, project management, risk management, entrepreneurship, innovation	12	10	H
5) Knowledge about contemporary issues and the effects of engineering practices on the society; awareness of the some legal consequences of engineering solutions.	13	10	H
6) Ability to do a small project, prepare a presentation and present it.	9	4	E

Teaching Methods:	1: Lecture, 4) Project, 10) Guest lecturer
Assessment Methods:	A: Written exam, E: Presentation, H: Attendance record

COURSE CONTENT

Week	Topics	Study Materials
1	Introduction to engineering and mechanical engineering.	Textbook
2	Yeditepe ME curriculum, the University rules and regulations.	University web site
3	Units, problem solving and communication skills.	Textbook
4	Int. to engineering materials, manufacturing technics	Textbook
5	Int. to stress, strain and strength	Lecture notes
6	Int. to fatigue and fracture mechanics	Lecture notes
7	Ethics; midterm exam.	Lecture notes
8	Int. to thermo-fluids engineering	Textbook
9	Int. to microelectromechanical systems (MEMS)	Lecture notes
10	Int. to engineering design, computer aided engineering	Lecture notes
11	Int. to robotics and mechatronics.	Lecture notes
12	Int. to business world, project management, risk management.	Lecture notes
13	Entrepreneurship, innovation	Lecture notes
14	Global and societal effects of engineering practices on health, environment, and safety; the legal consequences of engineering solutions.	Lecture notes

RECOMMENDED SOURCES

Textbook	An Introduction to Mechanical Engineering, Jonathan Wickert
Additional Resources	Foundations of Engineering, Holtzapple and Reece

MATERIAL SHARING

Documents	
Assignments	
Exams	

ASSESSMENT

IN-TERM STUDIES	NUMBER	PERCENTAGE
In-term exam	1	30
Attendance	42 class hrs	5
Project	1	25
Final exam	1	40
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.		**X**				
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**					
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.			**X**			
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.				**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	Awareness of professional and ethical responsibility.					**X**	
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.				**X**		
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.				**X**		

14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Hrs per Quantity	Total Workload (Hour)
Course Duration (13 weeks excluding 1 week for exams)	13	3	39
Off-the-classroom study (pre-study, practice for 14 weeks)	14	6	84
In-term exam	1	1	1
Project	1	40	40
Final examination	1	2	2
Total Work Load			166
Total Work Load / 25 (h)			6.6
ECTS Credit of the Course			7

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Engineering Graphics and Introduction to Design	ME 182	Spring	2 + 2	3	8

Prerequisites	

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Required
Course Coordinator	Fethi Okyar
Instructors	Fethi Okyar, Nezih Topaloğlu
Assistants	Cem Tutcu
Goals	This course serves three major goals of introducing the students with the concepts from solid modeling theory, the language of technical drawing and design practice.
Content	Engineering design principles, graphics language. Geometric constructions, parallelism, perpendicularity, intersection and tangency. Sketching using a CAD system. Manufacturing processes and features in solid modeling. Multiview projection, sectional views, auxiliary views. Working with design drawings, dimensioning, tolerancing. Working with assemblies.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) visualize, project and sketch using the free-hand technique, three-dimensional objects, compose missing lines and views in multiview drawings.	1	1,6	C,G
2) develop solid modeling skills by constructing 2D sketches, use them to create three dimensional objects via solid modeling techniques, assemble these parts, and finally create their technical drawings.	5	4,5	A,D,G
3) recognize the fundamentals of geometric dimensioning and tolerancing concepts, relate part	1	1	A,D

tolerances with manufacturing processes.			
4) develop design skills by decomposing a product via reverse engineering practice, search for its patents, and then by reconstructing it in the virtual domain.	4,7,9	1,5	D,E

Teaching Methods:	1: Lecture, 4: Project work; 5: Laboratory; 6: In-class practice
Assessment Methods:	A: Midterm and final exams, C: Homework, D: Report, E: Presentation, G: In-class practice

COURSE CONTENT

Week	Topics	Study Materials
1	Engineering design concepts	textbook
2	Phases of design and dimensional measurement	textbook
3	Free-hand sketching and other preliminary concepts	textbook
4	Practices in reverse engineering	textbook
5	Parallel projections and pictorial sketching	textbook
6	Multiview Drawings and Sketching in Multiview	textbook
7	Object Visualization based on Multiview Drawings	textbook
8	Multiview Drawings, missing lines and views.	textbook
9	Auxiliary views	textbook
10	Section views	textbook
11	Creating working drawings	textbook
12	Dimensioning of drawings	textbook
13	Overview of geometric dimensioning and tolerancing	textbook
14	Project presentations	

RECOMMENDED SOURCES

Textbook	James Leake, Jacob Borgerson, Engineering Design Graphics: Sketching, Modeling and Visualization, Wiley 2008.
Additional Resources	Brian Griffiths, Engineering Drawing for Manufacture, Kogan Page Science, 2003.

MATERIAL SHARING	
Documents	Lecture notes, weekly lab assignments
Assignments	Project documents, timeplan
Exams	Final exam is not shown in the website

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Sketch book	10	50
Lab performance	10	50
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF FINAL PROJECT REPORT AND PRESENTATION TO OVERALL GRADE		20
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		40
Total		**100**

COURSE CATEGORY	Expertise/Field Courses

COURSE'S CONTRIBUTION TO PROGRAM								
No	Program Learning Outcomes	Contribution						
		NA	1	2	3	4	5	
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.					x		
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**						
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**						
4	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such			x				

	a way as to meet the desired result; ability to apply modern design methods for this purpose.			
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.			x
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**		
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.		x	
8	Ability to work individually.	**X**		
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.			**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	Awareness of professional and ethical responsibility.	**X**		
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**		
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**		
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**		
15	Ability to verify and validate numerical solutions to engineering problems.	**X**		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	4	64
Hours for off-the-classroom study (Pre-study, practice)	16	5	80

Project	1	40	40
Final examination	1	12	12
Total Work Load			196
Total Work Load / 25 (h)			7.84
ECTS Credit of the Course			8

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Thermodynamics I	**ME 211**	**1**	**3 + 1**	**3**	**6**

Prerequisites	MATH 152, PHYS 101

Language of Instruction	English
Course Level	Sophomore students for Bachelor's Degree
Course Type	Compulsory
Course Coordinator	
Instructors	Associate Prof. Erdem An
Assistants	Efe Ünal
Goals	The goal of this course is to introduce the fundamental concepts of thermodynamics, and the first and second laws of thermodynamics.
Content	Fundamental concepts of thermodynamics, properties of pure substances, the first law of thermodynamics, open and closed systems, the second law of thermodynamics, entropy, experiments in labs.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Understanding fundamental concepts of thermodynamics	1,2,8	1,2,3,5	A,C,D
2) Understanding the first law of thermodynamics	1,2,8	1,2,3,5	A,C,D
3) Understanding the second law of thermodynamics	1,2,8	1,2,3,5	A,C,D
4) Ability to conduct thermodynamic experiments	1,2,5,6,7,9,11	5,7	D

Teaching Methods:	1: Lecture, 2: Solving problems, 3: Homework, 5: Lab, 7: Working in group
Assessment Methods:	A: Exam, C: Homework, D: Report

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction and basic concepts	Ch. 1

2	Properties of pure substances	Ch. 3
3	Properties of pure substances	Ch. 3
4	Energy analysis of closed systems	Ch. 4
5	Midterm exam	
6	Energy analysis of closed systems	Ch. 4
7	Mass and energy analysis of control volume	Ch. 5
8	Mass and energy analysis of control volume	Ch. 5
9	Mass and energy analysis of control volume	Ch. 5
10	Midterm exam	
11	The second law of thermodynamics	Ch. 6
12	The second law of thermodynamics	Ch. 6
13	Entropy	Ch. 7
14	Entropy	Ch. 7

RECOMMENDED SOURCES	
Textbook	Yunus Çengel & Michael Boles, Thermodynamics – An Engineering Approach, 7th edition, 2010, McGraw Hill
Additional Resources	

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	57
Lab reports	3	29
Assignment	6	14
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70

Total		**100**

COURSE CATEGORY	Basic Engineering Courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.			**X**			
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.					**X**	
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.					**X**	
8	Ability to work individually.			**X**			
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.				**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	Awareness of professional and ethical responsibility.		**X**				
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)

Course Duration (Including the exam week: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	2	28
Laboratory	3	1	3
Lab report	3	7	21
Mid-term	2	10	20
Homework	6	4	24
Final examination	1	10	10
Total Work Load			148
Total Work Load / 25 (h)			5.92
ECTS Credit of the Course			6

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Thermodynamics 2	ME212	2	3 + 0	3	5

Prerequisites	ME211 Thermodynamics 2

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	Asst. Prof. Esra Sorgüven Öner
Instructors	Asst. Prof. Esra Sorgüven Öner; Assoc. Prof. Erdem An
Assistants	
Goals	Purpose of this course is that students gain the knowledge and ability to apply 1st and 2nd laws of thermodynamics to power, refrigeration and air conditioning cycles, and chemical reactions.
Content	Vapor power and refrigeration cycles. Air standard power and refrigeration cycles. Thermodynamic relations. Ideal gas mixtures. Gas and vapor mixtures. Chemical reactions. Chemical equilibrium.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Ability to model and solve engineering problems via mass, energy, entropy and exergy balance equations	1,2	1,3	A,B,C
2) Ability to identify, formulate, and solve complex engineering problems involving power cycles, refrigeration cycles, air conditioning systems and chemical reactions; ability to select and apply proper analysis and modeling methods for this purpose.	1,2	1,3,10	A,B,C
3) Ability to design a power cycle (Diesel, Otto, Ericsson, Stirling etc.) conceptually	14	1,4	D

Teaching Methods:	1: Lecture, 3: Homework, 4: Project work; 10: Guest lecturer
Assessment Methods:	A: Midterm and final exams, B: Quiz, C: Homework, D: Report

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Review of the mass, energy and entropy equations, explanation of the exergy concept	Textbook
2	Derivation of exergy equation and application to engineering problems	Textbook
3	Introduction to power cycles; standard air assumption; Carnot cycle	Textbook
4	Otto, Diesel, Stirling and Ericsson Cycles	Textbook
5	Simple Brayton cycle; Brayton cycle with reheating, intercooling and regeneration	Textbook
6	Ideal simple Rankine cycle; losses in actual Rankine cycles; ideal reheat Rankine cycle	Textbook
7	Ideal Rankine cycle with regeneration, coregeneration; binary vapor cycles	Textbook
8	Ideal and actual gas compressor refrigeration cycles; heat pump systems; gas refrigeration systems	Textbook
9	Properties of gas mixtures	Textbook
10	Gas-vapor mixtures; thermodynamic properties of dry and atmospheric air	Textbook
11	Psychrometric chart	Textbook
12	Comfort conditions; air heating, cooling, humidifying and dehumidifying applicaitons	Textbook
13	Chemical reactions; fuels and combustion; theoretical and actual combustion processes	Textbook
14	Analyzing combustion with the 1st and 2nd laws of thermodynamics	Textbook

RECOMMENDED SOURCES	
Textbook	
Additional Resources	Thermodynamics: An Engineering Approach; Y.A. Çengel and M.A. Boles, 6th edition (textbook) Introduction to Thermodynamics; R. Sonntag and G. van Wylen

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**

Midterms	4	60
Homeworks	2	2.5
Quizzes	2	2.5
Report	1	5
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Basic Engineering Courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.					**X**	
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.					**X**	
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.			**X**			

15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding exam weeks: 12x Total course hours)	12	3	36
Hours for off-the-classroom study (Pre-study, practice)	14	3	42
Midterms	4	1.5	6
Homework	2	4	8
Quiz	2	3	6
Project	1	10	10
Final examination	1	10	10
Total Work Load			118
Total Work Load / 25 (h)			4.7
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
STATICS	ME 241	Fall	3 + 0	3	6

Prerequisites	PHYS 101

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Mehmet A. Akgün, Ali Gökşenli, A. Fethi Okyar, Nezih Topaloğlu
Assistants	A. Çağrı Develi
Goals	To teach students fundamental knowledge of mechanics of stationary systems and structures and educate them to apply this knowledge in the solution of engineering problems.
Content	Principles of mechanics. Fundamental vector algebra. Classification and equivalence of force systems. Rigid body equilibrium. Centroids of lines, areas and volumes. Analysis of structures, trusses, beams, cables and chains. Friction.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1. Knowledge of static force systems, statical indeterminacy and the geometric properties of structural elements (centroid, moment of inertia).	1	1, 3	A, C
2. Ability to solve engineering problems related to equilibrium of stationary mechanical systems.	2, 3	1, 3	A, C

Teaching Methods:	1: Lecture, 3: Homework
Assessment Methods:	A: Midterm and final exam, C: Homework

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction to mechanics, force	Textbook
2	Vectors in mechanics, particle equilibrium	Textbook
3	Review: C.O.G. and centroid	Textbook
4	Moment of a force, equivalency	Textbook

5	Resultant of force systems	Textbook
6	Rigid body equilibrium (planar)	Textbook
7	Rigid body equilibrium (spatial)	Textbook
8	Structural analysis: trusses	Textbook
9	Structural analysis: frames & machines	Textbook
10	Internal forces (stress) in bodies	Textbook
11	Effect of dry friction	Textbook
12	Friction in mating parts	Textbook
13	Work & energy	Textbook
14	Moment of inertia	Textbook

RECOMMENDED SOURCES	
Textbook	Beer and Johnston, Vector Mechanics for Engineers: Statics, 7th ed, McGraw Hill, 2002.
Additional Resources	Anthony Bedford, Engineering mechanics statics, Prentice Hall, 2002

MATERIAL SHARING	
Documents	Syllabus
Assignments	Homework assignments
Exams	Exams

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterms	2	25
Homeworks	8-10	20
Total		**70**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Basic engineering courses

COURSE'S CONTRIBUTION TO PROGRAM								
No	Program Learning Outcomes	Contribution						
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						X
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						X
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	X					
4	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					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	X					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	X					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	X					
8	Ability to work individually.	X					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	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	Awareness of professional and ethical responsibility.	X					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	X					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	X					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	X					
15	Ability to verify and validate numerical solutions to engineering problems.	X					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	4	64
Hours for off-the-classroom study (Pre-study, practice)	16	4	64
Mid-terms	2	4	8
Final examination	1	8	8
Total Work Load			144
Total Work Load / 25 (h)			5.76
ECTS Credit of the Course			6

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
DYNAMICS	ME 244	Spring	4 + 0	3	6

Prerequisites	ME 241 STATICS

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Koray K. Şafak, Nezih Topaloğlu, Mehmet A. Akgün
Assistants	A. Çağrı Develi
Goals	• To teach the two fundamental subjects of dynamics, namely; kinematics (relations between position/velocity/acceleration and time) and kinetics (relations between force, mass, acceleration and time) of dynamic bodies with engineering examples. • To teach students the notion of inertia, at the university level, and its importance in engineering systems in motion. • To give them the ability to analyze forces and motion.
Content	Dynamics of particles: Rectilinear and curvilinear motion. Newton's laws, momentum and angular momentum methods. Work and energy. System of particles. Dynamics of rigid bodies in plane motion; kinematics and kinetics. Work and energy method and the momentum principles for rigid bodies.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
3. An ability to analyze motion of particles and rigid bodies, with examples from engineering.	1, 2	1, 3	A, B, C
4. An ability to analyze forces/moments and their relations with motion.	1, 2	1, 3	A, B, C
5. Concepts of power, energy, linear and angular momentum as applied to engineering systems in motion.	1, 2	1, 3	A, B, C

Teaching Methods:	1: Lecture, 3: Homework
Assessment Methods:	A: Midterm and final exam, B: Quiz, C: Homework

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Kinematics of particles	Textbook

2	Kinematics of particles	Textbook
3	Kinematics of particles	Textbook
4	Kinetics of particles: force and acceleration	Textbook
5	Kinetics of particles: force and acceleration	Textbook
6	Kinetics of particles: work and energy	Textbook
7	Kinetics of particles: work and energy	Textbook
8	Kinetics of particles: impulse and momentum	Textbook
9	Planar kinematics of a rigid body	Textbook
10	Planar kinematics of a rigid body	Textbook
11	Planar kinetics of a rigid body: force and acceleration	Textbook
12	Planar kinetics of a rigid body: force and acceleration	Textbook
13	Planar kinetics of a rigid body: work and energy	Textbook
14	Planar kinetics of a rigid body: impulse and momentum	Textbook

RECOMMENDED SOURCES	
Textbook	R.C. Hibbeler, Engineering Mechanics: Dynamics, 12th ed. In SI units, Prentice Hall, 2010.
Additional Resources	

MATERIAL SHARING	
Documents	Syllabus, Attendance, Grading
Assignments	Homework assignments
Exams	None

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterms	2	20
Homeworks and quizzes	8-10	20
Total		**60**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Basic engineering courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						X
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						X
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	X					
4	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					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	X					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	X					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	X					
8	Ability to work individually.	X					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	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	Awareness of professional and ethical responsibility.	X					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	X					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	X					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	X					
15	Ability to verify and validate numerical solutions to engineering problems.	X					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	4	64
Hours for off-the-classroom study (Pre-study, practice)	16	4	64
Mid-terms	2	4	8
Final examination	1	8	8

Total Work Load	144
Total Work Load / 25 (h)	5.76
ECTS Credit of the Course	6

COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
STRENGTH OF MATERIALS	**ME 246**	**2**	**4 + 0**	**3**	**6**

Prerequisites	ME 241 – STATICS

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programme)
Course Type	Compulsory
Course Coordinator	
Instructors	Prof. Dr. Mehmet A. Akgün, Asst. Prof. Dr. A. Fethi Okyar
Assistants	
Goals	The aim of this course is to enable students to relate the notion of internal load and deformation to stress and strain, namely, to teach students the concepts of stress and strain and the relations between them, in particular, to teach stress and strain analysis in slender (1-D) structural elements under various types of external loads and in thin-walled cylinders and spheres under pressure; furthermore, to teach deformation analysis in statically determinate and indeterminate axially and torsionally loaded systems, and to teach the concepts of stress and strain transformation.
Content	Analysis of stress and strain. Axially loaded bars; mechanical and thermal loading. Torsion. Statically indeterminate axial and torsional problems. Bending of beams and transverse loading of beams. Stress concentrations under various types of loads. Stresses in combined bending, torsion, shear and axial loading. Stress and strain transformation. Mohr's circle. Column buckling.

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) A good understanding of stress and strain and their relation to internal loads and deformations, respectively.	1	1,2,3	A,C,H
2) Adequate knowledge of material behavior in terms of stress-strain relations.	1	1,2,3	A,C,H
3) Ability to perform stress and strain analyses in slender structural elements under various types of external loading and in thin-walled cylinders and spheres under pressure.	1,2	1,2,3	A,C,H
4) Ability to perform deformation analysis for simple staticaly determinate and indeterminate slender systems.	1,2	1,2,3	A,C,H

5) Ability to transform stresses and strains between different coordinate systems.	1,2	1,2,3	A,C,H

Teaching Methods:	1: Lecture, 2: Problem session, 3: Homework.
Assessment Methods:	A: Written exam,, C: Homework, H: Attendance record

COURSE CONTENT

Week	Topics	Study Materials
1	Introductıon, internal load resultants, normal and shear stress.	Textbook
2	Allowable stress, simple design examples, strain.	Textbook
3	Mechanical properties of materials, ductile and brittle materials, Hooke's law, strain energy, Poisson's ratio.	Textbook
4	Axial loading, statically indeterminate bars, stress concentrations.	Textbook
5	Thermal stress; midterm exam 1.	Textbook
6	Torsional loading, the torsion formula, power transmission.	Textbook
7	Statically indeterminate torsion bars, stress concentrations; bending	Textbook
8	Bending, shear and moment diagrams, bending deformations, strain, the flexure formula, stress concentrations	Textbook
9	Unsymmetric bending; midterm exam 2.	Textbook
10	Transverse loading of beams, shear formula, shear flow	Textbook
11	Combined loading, thin-walled pressure vessels, stress analysis of beams under combined loading.	Textbook
12	Stress transformations; midterm exam 3	Textbook
13	Stress and strain transformations, column buckling.	Textbook
14	Column buckling, design of beams.	Textbook

RECOMMENDED SOURCES

Textbook	Mechanics of Materials, R. C. Hibbeler, McGraw Hill.
Additional Resources	

MATERIAL SHARING

Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
In-term exams	2	50
Assignment	10	20
Attendance	56 class hrs	0
Final exam	1	30
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes		Contribution				
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					

13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Hrs per Quantity	Total Workload (Hour)
Course Duration (12.5 weeks excluding 1.5 weeks for exams)	12.5	4	50
Off-the-classroom study (pre-study, practice for 14 weeks)	14	5	70
In-term exams	3	2	6
Homework	5	2	10
Final examination	1	3	3
Total Work Load			139
Total Work Load / 25 (h)			5.6
ECTS Credit of the Course			6

COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Materials Science for Mechanical Engineering	**ME264**	**2**	**3**	**3**	**4**

Prerequisites	

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Assoc.Prof. Mustafa Bakkal
Assistants	
Goals	1. To introduce the structures and properties of metals, ceramics, polymers and composites as engineering materials, 2. To introduce the relationships between the structural properties of materials and their mechanical, physical and chemical properties, 3. To emphasize the importance of material selection in design process.
Content	Introduction to engineering materials. Structural and physical properties of materials. Crystal structure and imperfections in materials. Solid-state diffusion. Mechanical properties of engineering materials. Phase equilibrium and binary phase diagrams. Kinetics of phase transformation. Heat treatment of metals and alloys. Engineering materials. Corrosion of metals and prevention methods.

Course Learning Outcomes At the end of this course, students should be able to:	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Predict the physical properties of materials by considering their chemical compositions and atomic bonding characteristics,	1	1,2	A,C
2)Know crystalline defects and appreciate their probable effects on properties of materials,	1,3	1,2	A,C
3) Understand the concept of phase and determine the existing phases, percentages and chemical compositions by using binary phase diagrams,	1,2	1,2	A,C
4) Understand mechanical properties of materials and their measurement techniques, Know and make comments on microstructure-property	2,3	1,2	A,C

relations of metals, ceramics, polymers and composite materials,			

Teaching Methods:	1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study
Assessment Methods:	A: Testing, B: Experiment, C: Homework, D: Project

COURSE CONTENT

Week	Topics	Study Materials
1	Introduction to engineering materials. Atomic structure and bonding	Textbook
2	Crystalline structure. Structure of metals, polymers and ceramics.	Textbook
3	Crystal defects, point defects, solid-state diffusion	Textbook
4	Linear defects, dislocations and plastic deformation of crystals, planar defects	Textbook
5	Mechanical properties of materials, tensile properties	Textbook
6	Hardness, fracture, fatigue and creep properties	Textbook
7	Phase equilibrium, solid solutions, binary phase diagrams (Midterm Exam-1)	Textbook
8	Kinetics of phase transformations. Eutectic, eutectoid and peritectic phase transformations	Textbook
9	Fe-C phase diagram and other important binary diagrams	Textbook
10	Kinetics of phase transformations, TTT diagrams, heat treatment of metals and alloys	Textbook
11	Ferrous and nonferrous metals and alloys (Midterm Exam-2)	Textbook
12	Ceramics, polymeric materials and their properties	Textbook
13	Composite materials and their properties	Textbook
14	Wear, corrosion and prevention methods, magnetic, electrical and thermal properties	Textbook

RECOMMENDED SOURCES	
Textbook	*Materials Science and Engineering-An Introduction*, W. D. Callister Jr., John Wiley & Sons,
Additional Resources	*Introduction to Materials Science for Engineers,* J.F. Shackelford, McMillan Pub. Co., *The Science and Engineering of Materials*, D.R. Askeland, PWS Pub. Co.,

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	50
Assignment	5	8
Quizes	5	42
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Expertise/Field Courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		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.						

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 devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.		**X**			
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.					
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.					**X**
7	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.					
8	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.					
9	Awareness of professional and ethical responsibility.					
10	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.					
11	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 12x Total course hours)	12	3	36
Hours for off-the-classroom study (Pre-study, practice)	12	3	36
Midterm examination	2	3	6
Homework	5	4	20
Final examination	1	3	3
Total Work Load			101
Total Work Load / 25 (h)			4.0
ECTS Credit of the Course			4

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Solid Mechanics Laboratory	ME 266	Spring	1 + 2	2	3

Prerequisites	ME 246 (co-requisite)

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Required
Course Coordinator	Fethi Okyar
Instructors	Fethi Okyar, Mehmet Akgun
Assistants	Riza Bayoglu
Goals	This course serves the two major goals of observing mechanical properties of materials pertinent to mechanics of solids; and gaining hands-on practice and confidence as well as learning the limitations of computational solid mechanics methods.
Content	Bending strength of long and slender structural members, tension test and its virtual counterpart, metallography, hardness test and its virtual counterpart, three-point bending test.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Observe and assess uncertainty in mechanical measurements and describe its causes.	2,6	1,5	A,D
2) operate and collect data using standard and non-standard experimental apparatus and procedures.	6,7	5	B,D
3) Interpret, organize and present the results of acquired data, and discuss the outcome of experiments.	2,6,9	1,5	D
4) Employ computational techniques and tools necessary for simulating physical experiments,	5,15	5	B,D

gain confidence with and explore boundaries of these tools.

Teaching Methods:	1: Lecture; 5: Laboratory
Assessment Methods:	A: Midterm and final exams; B: Quiz; D: Report

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction to report writing	Handout
	An overview of analyzing mechanics of solids using the FEA	Lecture notes
3	The bending strength of pasta	Lab manual
4	Measurement and uncertainty	Lab manual
5	Modeling the tensile test conditions	Lab manual
6	Theory of tensile tests	Lab manual
7	Analyzing raw data from the tensile test	Lab manual
8	Metallurgical examination via optical microscopy	Lab manual
9	On the microstructure of metals	Lab manual
10	Theory of Hardness Testing	Lab manual
11	Data analysis and reduction ın hardness	Lab manual
12	Modeling the Rockwell test conditions	Lab manual
13	Theory of the three-point bending test	Lab manual
14	More about the three-point bending test	Lab manual

RECOMMENDED SOURCES	
Textbook	N/A
Additional Resources	.

MATERIAL SHARING	
Documents	Lecture notes, Lab Manuals

Assignments	Experimental Data
Exams	Final exam is not shown in the website

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Quizzes	7	15
Lab Reports	5	85
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.	x					
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.				x		
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.						**X**
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.						**X**

7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.		**X**	
8	Ability to work individually.	**X**		
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.			**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	Awareness of professional and ethical responsibility.	**X**		
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**		
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**		
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**		
15	Ability to verify and validate numerical solutions to engineering problems.			**X**

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	2	32
Hours for off-the-classroom study (Pre-study, practice)	16	1	16
Report writing	5	7	35
Final examination	1	4	4
Total Work Load			87
Total Work Load / 25 (h)			3.48
ECTS Credit of the Course			3

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Heat Transfer	**ME 324**	**2**	**4 + 2**	**4**	**8**

Prerequisites	- ME 331 Fluid Mechanics

Language of Instruction	English
Course Level	Junior or senior students for Bachelor's Degree
Course Type	Compulsory
Course Coordinator	
Instructors	Associate Prof. Erdem An
Assistants	Serkan Zeren, Efe Ünal
Goals	The goal of this course is to teach fundamentals of three heat transfer modes, and let students have hands-on experience on heat transfer experiments and numberical analysis.
Content	Steady and unsteady, one-dimensional conduction, with special applications to extended surfaces with fin design in mind. Forced and natural convection heat transfer with both analytical and empirical approaches. Fundamentals of radiation heat transfer and its application to radiations in daily life.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Understanding basic concepts and governing equations of three modes of heat transfer	1,2,8,14	1,2,3	A,C
2) Ability to conduct numerical analysis on heat conduction problems using Matlab and to write an individual report	1,2,5,8,9,15	1,4	D, H
3) Ability to conduct, analyze and discuss experiments in a group and to write a group/individual report	5,6,7,9,11,14	5,7	D, H
4)			

Teaching Methods:	1: Lecture, 2: Solving problems, 3: Homework, 4: Project, 5: Lab, 7: Working in group
Assessment Methods:	A: Exam, C: Homework, D: Report, H: Attendance

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction to heat transfer	Ch. 1
2	Basic equations of heat conduction	Ch. 2, Ch.3
3	Heat transfer to the extended surface	Ch. 3
4	Numerical analysis on heat conduction	Ch. 5
5	Transient heat conduction	Ch. 4
6	Review of fluid mechanics	Lecture note
7	Fundamentals of convection heat transfer / midterm exam #1	Ch. 6
8	Convection heat transfer to external flows	Ch. 7
9	Convection heat transfer to internal flows	Ch. 8
10	Natural convection heat transfer	Ch. 9
11	Fundamentals of thermal radiation	Ch. 12
12	Fundamentals of thermal radiation / midterm exam #2	Ch. 12
13	Radiation heat transfer	Ch. 13
14	Radiation heat transfer	Ch. 13

RECOMMENDED SOURCES	
Textbook	Yunus A. Çengel, Heat and Mass Transfer, Fundamentals and Applications, 4th ed., McGraw Hill, 2011
Additional Resources	

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	50
Labs	3	35
Assignment	6	15

Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.						**X**
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.				**X**		
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.				**X**		
8	Ability to work individually.			**X**			
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.				**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	Awareness of professional and ethical responsibility.		**X**				
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.			**X**			
15	Ability to verify and validate numerical solutions to engineering problems.			**X**			

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 14x Total course hours)	14	4	56
Hours for off-the-classroom study (Pre-study, practice)	14	2	28
Experımental labs	2	2	4
Lab reports	2	8	16
Numerical analysis sessions	3	1	3
Numerical project	1	8	8
Mid-terms	2	20	40
Homework	6	5	30
Final examination	1	10	10
Total Work Load			195
Total Work Load / 25 (h)			7.80
ECTS Credit of the Course			8

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Fluid Mechanics	ME331	1	4 + 0	3	6

Prerequisites	MATH241, ME211, ME244

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	Asst. Prof. Ali Bahadır Olcay
Instructors	Asst. Prof. Ali Bahadır Olcay; Assoc. Prof. Erdem An
Assistants	
Goals	The course aims to provide basic understanding in fluid mechanics and background knowledge to higher-level courses in fluid mechanics.
Content	Fundamental principles of fluid mechanics and their application to engineering problems. Fluid statics. Fluid flow concepts. Control-volume analysis. Conservation equations and applications. Dimensional analysis and similitude. Flow of viscous fluids, simple laminar flow systems, turbulence, internal and external flow applications.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Adequate knowledge on properties of fluids, pressure distribution in hydrostatic systems, integral and differential forms of momentum balance and laminar and turbulent flows	1	1,3	A,B,C
2) Ability to identify, formulate, and solve complex engineering problems involvinglaminar and turbulent flows; ability to select and apply proper analysis and modeling methods for this purpose.	1,2	1,3	A,B,C

Teaching Methods:	1: Lecture, 3: Homework
Assessment Methods:	A: Midterm and final exams, B: Quiz, C: Homework

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Properties of fluids, basic concepts	Textbook
2	Pressure, hydrostatics and its application	Textbook
3	Hydrostatic force and moment calculations	Textbook
4	Flow kinematics	Textbook
5	Conservation of mass, Bernoulli equation	Textbook
6	Applications of Bernoulli equation	Textbook
7	Conservation of momentum	Textbook
8	Applications of integral momentum equation	Textbook
9	Dimensionless analysis, laws of similarity and scaling	Textbook
10	Flows in pipes, friction factor	Textbook
11	Moody chart	Textbook
12	Differential mass and momentum balance equations	Textbook
13	Analytic solutions of Navier-Stokes equations	Textbook
14	External flows, lift and drag forces	Textbook

RECOMMENDED SOURCES	
Textbook	
Additional Resources	Fluid Mechanics Fundamentals and Applications, Cengel and Cimbala (Ders kitabı) Fluid Mechanics, F. White A First Course in Fluid Mechanics, R.H. Sabersky, A.J. Acosta, E.G. Hauptmann Fluid Mechanics with Applications, A. Esposito Introduction to fluid mechanics, R.W. Fox

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT

IN-TERM STUDIES	NUMBER	PERCENTAGE
Midterms	2	50
Homeworks	2	10
Quizzes	2	10
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.					**X**	
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.					**X**	
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					

15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding exam weeks: 12x Total course hours)	12	4	48
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Midterms	2	3	12
Homework	2	4	8
Quiz	2	3	6
Final examination	1	10	10
Total Work Load			138
Total Work Load / 25 (h)			5.6
ECTS Credit of the Course			6

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Fluid Mechanics Laboratory	ME333	1	1+2	2	3

Prerequisites	ME331

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	Asst. Prof. Ali Bahadır Olcay
Instructors	Asst. Prof. Ali Bahadır Olcay; Assoc. Prof. Erdem An
Assistants	
Goals	Goals are that the students gain a hands-on experience in fluid mechanics, adequate knowledge on the fundamental concepts of measurement techniques and numerical analysis, experimental data analysis, technical report writing and work in teams.
Content	Laboratory demostrations of basic types of flows. Various fluid mechanics experiments. A brief overview of the Computational Fluid Dynamics approach. Virtual experimentation via (CFD) software

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Adequate knowledge on pressure, flow rate and velocity measurement techniques	2	1	A,B
2) Ability to measure pressure, velocity and flow rate	5,6	5	A,D
3) Ability to perform flow simulations for laminar, turbulent and time-dependent flows	5	5	A,D
4) Ability to compare experimental and numerical flow data	15	1,5	A,D
5) Ability to select the appropriate measurement or simulation technique for various flow problems	3	1,5	A,B
6) Ability to work in teams	7	5,7	D
7) Ability to present experimental or numerical results in form of a written report	9	1	D

Teaching Methods:	1: Lecture, 5: Laboratory, 7: Team work

Assessment Methods:	A: Midterm and final exams, B: Quiz, D: Report

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Basic concepts of measurement systems	Textbook
2	Cont'd.	Textbook
3	Pressure Measurement Devices	Textbook
4	Velocity Measurement Devices	Textbook
5	Cont'd.	Textbook
6	Introduction to Computational Fluid Dynamics (CFD)	Textbook
7	Mesh preperation for CFD	Textbook
8	Numerical methods in CFD	Textbook
9	Post-processing in CFD	Textbook
10	Flow rate measurement	Textbook
11	Cont'd	Textbook
12	Modern velocity measurement techniques	Lecture notes
13	Particle image velocimetry	Lecture notes
14	Particle image velocimetry	Lecture notes

RECOMMENDED SOURCES	
Textbook	
Additional Resources	Figliola, R.S. and Beasley D.E., Theory and Design for Mechanical Measurements, 4th ed., Wiley, 2006 (text book)

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterms	1	20

Lab reports	7	40
Quizzes	7	10
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.	**X**					
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.					**X**	
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.					**X**	
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.						**X**
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.						**X**
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.					**X**	
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.				**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.					**X**	

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding exam weeks: 13x Total course hours)	13	1	13
Hours for off-the-classroom study (Pre-study, practice)	14	1	14
Midterms	1	3	3
Laboratory	7	2	14
Report writing	7	3	21
Quiz	7	1	7
Final examination	1	10	10
Total Work Load			82
Total Work Load / 25 (h)			3.3
ECTS Credit of the Course			3

COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
MACHINE ELEMENTS I	**ME 343**	**Fall**	**4 + 0**	**3**	**5**

Prerequisites	ME 246 – Strength of Materials

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Program)
Course Type	Compulsory
Course Coordinator	
Instructors	Asst. Prof. Dr. Namık Çıblak
Assistants	
Goals	This class is a continuation of ME 246 (Strength of Materials). The main objective of this course is to teach modern and classical approaches to design of standard and common mechanical components. In this class students learn about applications of knowledge of statics, dynamics, strength of materials, introductory fluid mechanics, heat transfer, and design theories to particular mechanical components. This course makes the student able to perform analyses of standard mechanical components, select satisfactory components to be used in particular design cases, obtain an introductory perspective on the overall design of complex mechanical subsystems. A more important result is to develop skills, understanding, and methods that can be used in the design of any mechanical element, including those not covered in this class.
Content	Introduction to mechanical engineering design. Materials. Load and stress analysis, stress concentrations. Deflection and stiffness. Failure of ductile and brittle materials under static loading. Failure of ductile and brittle materials under variable loading. Shafts and shaft components.

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Ability to construct a design strategy for common mechanical elements.	1	1,2,3,4	A,C,D,H
2) Ability to perform strain and stress analysis, introductory fluid dynamics analysis in mechanical components and relate design variables with the strength and the cost of the component.	1	1,2,3,4	A,C,D,H
3) A good understanding of roles of mechanical components in functioning machines.	1,2	1,4,11	H,G
4) Ability to perform analysis of shafts, permanent and non-permanent joints, springs, bearings,	1,2	1,2,3,4	A,C,D,H

lubrication, gears, clutches, breaks, couplings and flywheels and flexible mechanical systems.			
5) Gaining a perspective on the overall design of complex mechanical subsystems.	1,2	1,4,11	A,C,D,H

Teaching Methods:	1: Lecture, 2: Problem session, 3: Homework,4: Project, 11: Demonstration
Assessment Methods:	A: Written exam, C: Homework, H: Attendance record

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction to Mechanical Design	Textbook
2	Introduction to Mechanical Design	Textbook
3	Materials	Textbook
4	Materials	Textbook
5	Deflection and Stiffness Midterm exam 1.	Textbook
6	Load and Stress Analysis	Textbook
7	Load and Stress Analysis	Textbook
8	Deflection and Stiffness	Textbook
9	Deflection and Stiffness	Textbook
10	Failures Resulting from Static Loadings	Textbook
11	Failures Resulting from Static Loadings	Textbook
12	Fatigue Failure Resulting from Variable Loading	Textbook
13	Fatigue Failure Resulting from Variable Loading	Textbook
14	Shafts and Shaft Components	Textbook

RECOMMENDED SOURCES	
Textbook	Shigley's Mechanical Engineering Design, Budynas & Nisbett, 8.ed, SI Edition, McGraw-Hill.
Additional Resources	

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
In-term exams	2	30
Project	1	25
Attendance	56 class hrs	5
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**					
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						**X**
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gathers data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.						**X**
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.						**X**

13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.					**X**	
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Hrs per Quantity	Total Workload (Hour)
Course Duration (12.5 weeks excluding 1.5 weeks for exams)	12.5	4	50
Off-the-classroom study (pre-study, practice for 14 weeks)	14	4	56
In-term exams	2	2	4
Homework	5	2	10
Final examination	1	3	3
Total Work Load			123
Total Work Load / 25 (h)			4.92
ECTS Credit of the Course			5

COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
MACHINE ELEMENTS II	**ME 344**	**2**	**4 + 0**	**3**	**6**

Prerequisites	ME 343 – Machine Elements I

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Program)
Course Type	Compulsory
Course Coordinator	
Instructors	Asst. Prof. Dr. Namık Çıblak
Assistants	
Goals	This class is a continuation of ME 343 (Machine Elements I). The main objective of this course is to teach modern and classical approaches to design of standard and common mechanical components. In this class students learn about applications of knowledge of statics, dynamics, strength of materials, introductory fluid mechanics, heat transfer, and design theories to particular mechanical components. This course makes the student able to perform analyses of standard mechanical components, select satisfactory components to be used in particular design cases, obtain an introductory perspective on the overall design of complex mechanical subsystems. A more important result is to develop skills, understanding, and methods that can be used in the design of any mechanical element, including those not covered in this class.
Content	Shafts and axles. Design of nonpermanent joints, screws and fasteners. Design of permanent joints welding and bonding. Mechanical springs. Bearings, rolling-contact bearings. Lubrication and journal bearings. Gears, nomenclature, Spur and helical gears, bevel and worm gears, clutches, brakes, couplings, and flywheels, flexible mechanical elements.

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Ability to construct a design strategy for common mechanical elements.	1	1,2,3,4	A,C,D,H
2) Ability to perform strain and stress analysis, introductory fluid dynamics analysis in mechanical components and relate design variables with the strength and the cost of the component.	1	1,2,3,4	A,C,D,H
3) A good understanding of roles of mechanical components in functioning machines.	1,2	1,4,11	H,G

4) Ability to perform analysis of shafts, permanent and non-permanent joints, springs, bearings, lubrication, gears, clutches, breaks, couplings and flywheels and flexible mechanical systems.	1,2	1,2,3,4	A,C,D,H
5) Gaining a perspective on the overall design of complex mechanical subsystems.	1,2	1,4,11	A,C,D,H

Teaching Methods:	1: Lecture, 2: Problem session, 3: Homework,4: Project, 11: Demonstration
Assessment Methods:	A: Written exam, C: Homework, H: Attendance record

COURSE CONTENT

Week	Topics	Study Materials
1	Introductıon, stress analysis for shafts and axels	Textbook
2	Design layout of shaft and selection of shaft components	Textbook
3	Design of power screws, fasteners and nonpermanent joints.	Textbook
4	Welding, bonding and the design of permanent joints	Textbook
5	Welding, bonding and the design of permanent joints; Midterm exam 1.	Textbook
6	Mechanical Springs	Textbook
7	Bearing nomenclature, rolling contact bearings.	Textbook
8	Bearing selection, lubrication, journal bearings	Textbook
9	Lubrication, journal bearings; midterm exam 2.	Textbook
10	Gears nomenclature, spur and helical gears	Textbook
11	Bevel and worm gears	Textbook
12	Clutches and breaks.	Textbook
13	Couplings and flywheels.	Textbook
14	Flexible mechanical elements	Textbook

RECOMMENDED SOURCES

Textbook	Shigley's Mechanical Engineering Design, Budynas & Nisbett, 8.ed, SI Edition, McGraw-Hill.
Additional Resources	

MATERIAL SHARING

Documents	
Assignments	

Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
In-term exams	2	30
Project	1	25
Attendance	56 class hrs	5
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**					
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						**X**
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gathers data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.						**X**
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.						**X**

13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.					**X**	
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Hrs per Quantity	Total Workload (Hour)
Course Duration (12.5 weeks excluding 1.5 weeks for exams)	12.5	4	50
Off-the-classroom study (pre-study, practice for 14 weeks)	14	6	84
In-term exams	2	2	4
Homework	5	2	10
Final examination	1	3	3
Total Work Load			151
Total Work Load / 25 (h)			6.01
ECTS Credit of the Course			6

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
SYSTEM DYNAMICS AND CONTROL	ME 352	Spring	4 + 1	4	7

Prerequisites	MATH 241 DIFFERENTIAL EQUATIONS, ME 244 DYNAMICS

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Koray K. Şafak, Nezih Topaloğlu
Assistants	Asil Aksekili
Goals	This course aims at providing the junior mechanical engineering students with the following knowledge and abilities: – Feedback control concept. – Mathematical modeling of linear time-invariant systems, with examples from typical engineering systems. – Analysis and design of basic feedback control methods, use of mathematical tools for design of control systems. – Hands-on experience by means of physical and computational laboratory experiments.
Content	Introduction to automatic control. Modeling of dynamic systems. Response analysis using Laplace Transform Method. Transfer functions and block diagrams. Feedback control systems. Control laws. Tuning methods of PID control. Typical actuators and transducers. Root-Locus analysis. Frequency response analysis. Project. Laboratory demonstrations in parallel with theory.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
6. Elementary tools of modeling of mechanical, electrical, fluid, and thermo-fluid systems.	1, 2	1, 3	A, C
7. A basic understanding of behavior of first- and second-order linear time invariant differential equations.	1, 2	1, 3	A, C
8. Basic concepts of Laplace transforms, transfer functions, and frequency response analysis.	2, 3	1, 3	A, C
9. Concept of stability and the use of feedback control to actively control system behavior.	2, 3	1, 3	A, C
10. Use of computational (MATLAB) and experimental tools in modeling, analysis, and design of control systems.	5, 6	3, 5	C, D

Teaching Methods:	1: Lecture, 3: Homework, 5: Laboratory experiments

Assessment Methods:	A: Exam, C: Homework, D: Laboratory reports

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction and Overview of Control Systems	Textbook Ch.1
2	Dynamics of Mechanical System	Textbook Ch. 2
3	Models of Electric Circuits / Models of Electromechanical Sys.	Textbook Ch. 2
4	Heat and Fluid Flow Models	Textbook Ch. 2
5	System Description in State Space / Nonlinear Sys. and Linearization	Textbook Ch. 7,9
6	Review of Laplace Transform	Textbook Ch. 3
7	Blockdiagram Representations	Textbook Ch. 3
8	Effect of Pole Locations / Time-Domain Specifications	Textbook Ch. 3
9	Stability	Textbook Ch. 3
10	Control of Dynamic Error: PID Control	Textbook Ch. 4
11	The Root-Locus Design Method	Textbook Ch. 5
12	The Root-Locus Design Method	Textbook Ch. 5
13	Frequency Response Design Method	Textbook Ch. 6
14	Frequency Response Design Method	Textbook Ch. 6

RECOMMENDED SOURCES	
Textbook	G.F. Franklin, J.D. Powell, A. Emami-Naeini, Feedback Control of Dynamic Systems, 6th ed., Prentice Hall, 2010.
Additional Resources	K. Ogata, Modern Control Engineering, 5th ed., Prentice Hall, 2009.

MATERIAL SHARING	
Documents	Syllabus, Weekly course schedule, Laboratory manuals
Assignments	Homework assignments
Exams	None

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterms	2	20

Homeworks	8	15
Lab work	4	20
	Total	**75**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		25
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		75
	Total	**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						**X**
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.						**X**
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.						**X**
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	4	64
Hours for off-the-classroom study (Pre-study, practice)	16	5	80
Mid-terms	2	4	8
Lab work	6	1	6
Final examination	1	16	16
Total Work Load			182
Total Work Load / 25 (h)			7.28
ECTS Credit of the Course			7

COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Modern Engineering Materials	**ME361**	**1**	**3**	**3**	**5**

Prerequisites	

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Selective
Course Coordinator	
Instructors	Assoc.Prof. Mustafa Bakkal
Assistants	
Goals	3. To give students the background required to pursue further studies in materials processing, design and related engineering fields 4. To develop an understanding of the differences between engineering materials through the application of laboratory experiments to determine their physical and mechanical behavior 5. To introduce students the failure modes and the use of non-destructive testing techniques of engineering materials
Content	Classification of engineering materials. Iron and steel production. Types and use of steel and cast iron. Heat treatment of metals and alloys. Non-ferrous metals and alloys and their use in engineering applications. Types, properties, principal uses and manufacturing techniques of ceramics, polymers and composite materials. Failure of materials. Non-destructive testing of materials. Materials selection in engineering design.

Course Learning Outcomes At the end of this course, students should be able to:	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Recognize, use and state the Iron-Cementite phase diagram and TTT diagrams sufficiently to visualize it in discussions of heat treatment of steels and cast irons	1,3	1,2	A,C
2) Describe the iron and steel making practice in industry. Be familiar with the designations of metals and alloys used in USA, Germany and Turkey	1	1,2	A,C

3) Describe structures of polymers, ceramics, composites and their effects on mechanical properties and production methods	1,3	1,2	A,C
4) Understand the principles of the non-destructive testing and be familiar with NDT techniques.	1,3	1,2	A,C

Teaching Methods:	1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study
Assessment Methods:	A: Testing, B: Experiment, C: Homework, D: Project

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction, engineering materials, metals and alloys. Fe-Fe_3C phase diagram	Textbook
2	Iron and steel production. Effect of alloying elements on properties of steel	Textbook
3	Heat treatment of ferrous and non-ferrous metals and alloys. Annealing, spheroidizing, normalizing, quenching and tempering treatments	Textbook
4	TTT Diagrams, hardenability of steels. Isothermal heat treatments, homogenizing	Textbook
5	Stress relief annealing. Surface hardening of steels	Textbook
6	Types and use of steels. Designations of steels.	Textbook
7	Types and use of cast irons. Designations of cast irons.	Textbook
8	Non-ferrous metals and alloys. Aluminum and its alloys, age-hardenable Aluminum alloys	Textbook
9	Copper, magnesium, nickel and titanium alloys	Textbook
10	Ceramic materials. Processing and applications of ceramics	Textbook
11	Polymers. Types of polymers. Processing and applications of polymers	Textbook

12	Composite materials and their manufacturing methods	Textbook
13	Failure of materials. Sources and prevention of failures in materials. Non-destructive testing	Textbook
14	Case studies in materials selection	Textbook

RECOMMENDED SOURCES	
Textbook	The Science and Engineering of Materials, D.R. Askeland, PWS Pub. Co.,
Additional Resources	Materials Science and Engineering-An Introduction, W. D. Callister Jr., John Wiley & Sons Introduction to Materials Science for Engineers, J.F. Shackelford, McMillan Pub. Co.,

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	50
Assignment	5	8
Quizes	5	42
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Expertise/Field Courses

COURSE'S CONTRIBUTION TO PROGRAM		
No	Program Learning Outcomes	Contribution

		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 devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.					
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.					
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.					
7	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.					
8	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.					
9	Awareness of professional and ethical responsibility.					
10	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.					
11	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 12x Total course hours)	12	3	36
Hours for off-the-classroom study (Pre-study, practice)	12	5	60
Midterm examination	2	3	6
Homework	5	4	20
Final examination	1	3	3
Total Work Load			125
Total Work Load / 25 (h)			5.0
ECTS Credit of the Course			5

COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Manufacturing Techniques	**ME363**	**2**	**3 + 0**	**3**	**5**

Prerequisites	ME 264 - Material Science for ME

Language of Instruction	English
Course Level	Bachelor's Degree
Course Type	Compulsory
Course Coordinator	
Instructors	Dr. Ali Goksenli
Assistants	
Goals	1. To give students the information in materials processing such as casting, forming, machining, welding, 2. To introduce the principles of basic materials processes; tools and machines used; application fields of different processes in manufacturing 3. To develop an understanding of environmental and design issues related to the processes in manufacturing
Content	Principles and classifications of processes in manufacturing. Advantages, limitations and comparisons of material processing. Design and manufacturing; selection of process. Casting, forming, sheet metal working, machining, welding.

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Adequate knowledge of materials processes used in industry and related material behavior	1,2,4,12,13	1,2,4	A
2) Ability to compare, contrast and choose the right material processes	1,2,4,5	1,2,4	A
3) Ability to identify design issues related to material processing	4,13	1,2,4	A
4) Ability to work as a team and research state of the art in materials processing	7,9,10	1,2	D

Teaching Methods:	1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study
Assessment Methods:	A: Testing, B: Experiment, C: Homework, D: Project

COURSE CONTENT

Week	Topics	Study Materials
1	INTRODUCTION, MATERIALS and PROCESSES	Text Book, Lec Notes
2	METAL ALLOYS, IRON-CARBON	Text Book, Lec Notes
3	FUNDAMENTALS of CASTING	Text Book, Lec Notes
4	SHAPE CASTING PROCESSES	Text Book, Lec Notes
5	INJECTION MOLDING	Text Book, Lec Notes
6	MIDTERM EXAM I	Text Book, Lec Notes
7	ROLLING, FORGING, EXTRUSION, DRAWING	Text Book, Lec Notes
8	SHEET METAL FORMING	Text Book, Lec Notes
9	FUNDAMENTALS of MACHINING, CUTTING TOOLS	Text Book, Lec Notes
10	MACHINING PROCESSES	Text Book, Lec Notes
11	MODERN PROCESSES	Text Book, Lec Notes
12	MIDTERM EXAM II	Text Book, Lec Notes
13	PRESENTATION of TERM PROJECTS	Text Book, Lec Notes
14	WELDING	Text Book, Lec Notes

RECOMMENDED SOURCES	
Textbook	"Introduction to Manufacturing Processes", By; Mikell P. Groover, Wiley "Principles of Modern Manufacturing", Mikell P. Groover, Wiley, 5th Ed., "Manufacturing Engineering and Technology", By; S.Kalpakjian – S.R. Schmid Pearson, 6th Ed., 2010
Additional Resources	Lecture Notes: http://me.yeditepe.edu.tr/courses/me363

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	40
Term Project	1	20

Attendance	1	5
Final	1	35
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**	
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.					**X**	
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.			**X**			
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.				**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.					**X**	
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.			**X**			
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 12x Total course hours)	12	3	36
Hours for off-the-classroom study (Pre-study, practice)	14	2,5	35
Midterm examination	2	2	4
Homework	0	0	0
Project	1	40	40
Final examination	1	3	3
Total Work Load			118
Total Work Load / 25 (h)			4,7
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Numerical Methods in Mechanical Engineering	ME 371	(1) Fall	2 + 2	3	6

Prerequisites	ES 112, MATH 221

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Assist. Prof. Dr. Onur Cem Namli
Assistants	
Goals	This course serves as an introduction to numerical procedures that are common to engineering discipline, and their implementation using Matlab or an equivalent software.

Content	Computer arithmetic, sources of error, error propagation. Approximating functions, interpolation. Solution of linear system of algebraic equations. Roots of nonlinear algebraic equations. Numerical integration and differentiation.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) define the consequences of digital arithmetic, estimate numerical accuracy of floating-point computations, function approximation and error propagation.	1,2	1,3	A,C
2) Formulate an approximate solution procedure to an engineering problem, apply basic numerical techniques in this procedure and assess the accuracy and stability of the resulting solution.	3	1,3	A,C
3) Select and customize appropriate algorithms from numerical libraries, implement them as computer code files, and integrate files to construct a complete set of procedures.	5,10	3,5	C,G

Teaching Methods:	1: Lecture, 3: Homework, 5: Laboratory
Assessment Methods:	A: Midterm and final exams, C: Homework, G: In-class practice

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction to numerical analysis	textbook
2	Approximate calculation of functions	textbook
3	Polynomial Evaluation, Binary Number System.	textbook
4	Computing Anomalies, Machine Numbers	textbook
5	Error and its propagation through computations	textbook
6	Rootfinding Problems, Newton's Method.	textbook
7	Secant Method, Fixed-Point Iteration.	textbook
8	Function Interpolation on Lagrange basis	textbook
9	Function Interpolation using divided differences	textbook

10	Tchebyshev, polynomials and a near minimax approach.	textbook
11	Numerical Integration.	textbook
12	Quadrature methods.	textbook
13	Numerical differentiation.	textbook
14	Ordinary Differential Equations.	textbook

RECOMMENDED SOURCES	
Textbook	"Applied Numerical Methods with MATLAB for Engineers and Scientists", Steven C. Chapra, McGrawHill, 3rd Ed.
Additional Resources	Atkinson, K., Elementary Numerical Analysis, 3nd Ed, Wiley, 1993. MATLAB reference manual

MATERIAL SHARING	
Documents	Lecture notes, related links
Assignments	Homeworks
Exams	Exams and solutions

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	1	38
Assignment	6	38
Laboratory work	12	24
	Total	**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
	Total	**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.			**X**			
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.			**X**			
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						**X**
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.					**X**	
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam	16	4	64

week: 16x Total course hours)			
Hours for off-the-classroom study (Pre-study, practice)	16	2	32
Mid-terms	1	6	6
Homework	8	5	40
Final examination	1	7	7
Total Work Load			149
Total Work Load / 25 (h)			5.96
ECTS Credit of the Course			6

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Computer Aided Mechanical Engineering	ME 372	(2) Spring	2 + 2	3	6

Prerequisites	ME 371

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Assist. Prof. Dr. Onur Cem Namlı
Assistants	
Goals	The main objective of this course is to introduce students with more advanced concepts from numerical analysis applied to mechanics problems. Another objective is to impart a student the ability to design the solution strategy of a problem from mechanics for which no analytical solution is available.
Content	Review of solution of systems of first order ordinary differential equations, initial value problems. Euler method, implicit methods, Runge-Kutta methods. Analysis of simple linearized and nonlinear dynamic systems,

	stability of numerical methods. Numerical solution of boundary value problems in ODE's. Shooting method, Finite difference method. Solution of partial differential equations using numerical methods using finite differences.

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Ability to model mechanics problems using differential equations along with appropriate initial and/or boundary conditions.	2	1,5	A
2) Ability to design an approximate solution procedure to a mechanics problem using basic numerical techniques. Evaluate the stability, accuracy and efficiency of the numerical techniques.	3,4	3,5	C,G
3) Ability to develop an interactive software which can solve wide range of problems with little modifications. The students will become familiar with simple mathematical packages and learn how to use them in solving relatively complex problems.	5,7	3,5	C,G

Teaching Methods:	1: Lecture, 3: Homework, 5: Laboratory
Assessment Methods:	A: Midterm and final exams, C: Homework, G: In-class practice

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction	Lecture notes
2	Initial Value Problems, Forward Euler Method	Lecture notes
3	Concept of Stability, Backward Euler Method	Lecture notes
4	Accuracy, Trapezoidal Method	Lecture notes
5	Heun’,s and Midpoint Methods	Lecture notes
6	Runge- Kutta Methods	Lecture notes
7	Midterm Exam	
8	Boundary Value Problems, Shooting method	Lecture notes

9	Finite difference method for linear BVPs	Lecture notes
10	Finite difference method for nonlinear BVPs	Lecture notes
11	Parabolic partial differential equations, method of lines	Lecture notes
12	Elliptic partial differential equations	Lecture notes
13	Hyperbolic partial differential equations	Lecture notes
14	Review	Lecture notes

RECOMMENDED SOURCES	
Textbook	Ascher, U. M., Petzold, L. R., Computer Methods for Ordinary Differential Equations and Differential Algebraic Equations, SIAM, 1998.
Additional Resources	Atkinson, K.A, Han, W: Elementary Numerical Analysis, 3rd Ed, Wiley, 2004 Hoffmann, K.A., Chiang, S.T., Computational Fluid Dynamics Volume I, 2004. MATLAB reference manual

MATERIAL SHARING	
Documents	Lecture notes, related links
Assignments	Homeworks
Exams	Exams and solutions

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	1	29
Assignment	8	57
Laboratory work	12	14
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline;	X					
2	ability to use theoretical and applied information in these areas to model and solve engineering problems.				X		
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						X
4	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		
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.						X
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	X					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.					X	
8	Ability to work individually.	X					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	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	Awareness of professional and ethical responsibility.	X					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	X					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	X					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	X					

15	Ability to verify and validate numerical solutions to engineering problems.	**X**

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	4	64
Hours for off-the-classroom study (Pre-study, practice)	16	2	32
Mid-terms	1	6	6
Homework	8	5	40
Final examination	1	7	7
Total Work Load			149
Total Work Load / 25 (h)			5.96
ECTS Credit of the Course			6

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
SUMMER PRACTICE	**ME 400**	**1**	**0 + 2**	**0**	**1**

Prerequisites	AFE 132 – ENGLISH II FOR ENGINEERING AND ARCHITECTURE

Language of Instruction	Turkish. report to be written in English.
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory summer practice
Course Coordinator	
Instructors	---
Assistants	

Goals	The aim of summer practice is to let students observe and experience the engineering world outside the university, get a glimpse of the practical aspects of engineering, observe how the knowledge at school and the engineering practice outside are related and decide what they would like to do after they graduate and, perhaps, decide about their elective courses according to that. Students register to this course after they have completed their practice and write their report within this course.
Content	Compulsory summer internship for a minimum of 20 business days. Internships cannot coincide with academic semesters. Students are required to undertake an internship prior to or in the middle of their fourth year of education, if time permits, and to register to this course in the semester following the completion of their internship. Their written report is evaluated and graded within this course.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Ability to convey in writing what they observed, did and experienced during their summer practice.	8, 9	From previous courses	D
2) A practical experience with a chance to observe what mechanical engineering involves in a practical environment.	7, 11, 12	8	D

Teaching Methods:	8: Summer practice.
Assessment Methods:	D: Report.

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Report writing	
2	Report writing	
3	Report writing	
4	.	
	.	
	.	
14	Report writing	

RECOMMENDED SOURCES	
Textbook	
Additional Resources	

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Report	1	100
Total		**100**
CONTRIBUTION OF FINAL EXAM TO OVERALL GRADE		---
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		100
Total		**100**

COURSE CATEGORY	Summer Practice

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.	**X**					
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**					
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.			**X**			
8	Ability to work individually.				**X**		
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.			**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	Awareness of professional and ethical responsibility.			**X**			

12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.			**X**			
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (14 weeks)	14	2	28
Total Work Load			28
Total Work Load / 25 (h)			1.1
ECTS Credit of the Course			1

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
INSTRUMENTATION AND EXPERIMENT DESIGN	ME403	1 (Fall)	2 + 2	3	6

Prerequisites	Senior standing or consent of advisor and instructor.

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Assist. Prof. Ali Fethi Okyar, Assist. Prof. Koray Kadir Safak, Assist. Prof. Nezih Topaloğlu
Assistants	
Goals	By the end of the course, the students will gain experience in designing and assembling a laboratory setup, performing an experiment to solve an engineering problem, apply statistical analysis of experimental data and evaluate the results.

Content	Concepts of measurement methods and instrumentation. Characteristics of signals. Measurement system behavior. Probability, statistics and uncertainty analysis as applied to measurement systems. Analog measurements. Signal conditioning. Sampling, digital devices, and data acquisition. Experiments on measurements and instrumentation. Design of an experiment related to ME.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) The ability to select, implement and integrate sensors, amplifiers, signal conditioning and data acquisition systems.	6, 10	1, 5	A, D
2) The ability to calibrate and modulate signals and perform statistical and uncertainty analyzes.	3, 6	1	A
3) The ability to design and assemble an experimental setup for measuring relevant parameters/variables of an engineering problem	4, 6, 7, 9, 14	7, 4	D, E

Teaching Methods:	1: Lecture, 5: Lab, 7: Teamwork
Assessment Methods:	A: Exam, D: Report, E: Presentation

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	INTRODUCTION	TEXTBOOK
2	BASIC CONCEPTS OF MEASUREMENT SYSTEMS	TEXTBOOK
3	STATIC AND DYNAMIC CHARACT. OF SIGNALS	TEXTBOOK
4	MEASUREMENT SYSTEM BEHAVIOR	TEXTBOOK
5	ANALOG ELECTRICAL DEVICES AND MEASUREMENTS	TEXTBOOK
6	ANALOG ELECTRICAL DEVICES AND MEASUREMENTS	TEXTBOOK
7	DATA ACQUISITION SYSTEMS, LAB: ELECTRICAL MEASUREMENTS	TEXTBOOK
8	DATA ACQUISITION SYSTEMS	TEXTBOOK
9	MIDTERM	TEXTBOOK
10	STATISTICAL ANALYSIS OF EXPERIMENTAL DATA	TEXTBOOK
11	STATISTICAL ANALYSIS OF EXPERIMENTAL DATA	TEXTBOOK

12	UNCERTAINTY ANALYSIS, LAB: DATA ACQUISITION	TEXTBOOK
13	UNCERTAINTY ANALYSIS	TEXTBOOK
14	PROJECT PRESENTATIONS, REPORT SUBMISSION	TEXTBOOK

RECOMMENDED SOURCES	
Textbook	Figliola, R.S. and Beasley D.E., *Theory and Design for Mechanical Measurements*, 4th ed., Wiley, 2006
Additional Resources	

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-term	1	15
Lab performance	2	10
Demonstration of setup	1	10
Interim reports	2	10
Project presentation	1	15
Project final report	1	15
Total		**75**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		25
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		75
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5

1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.	**X**					
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**					
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.				**X**		
4	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**	
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.						**X**
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.						**X**
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.					**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 14x Total course hours)	14	4	56
Hours for off-the-classroom study (Pre-study, practice)	14	6	84
Mid-terms	1	5	5
Final examination	1	10	10
Total Work Load			155
Total Work Load / 25 (h)			6.2
ECTS Credit of the Course			6

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Heat Exchanger	**ME 426**	**1 (Fall)**	**3 + 0**	**3**	**5**

Prerequisites	ME 324 Heat Transfer

Language of Instruction	English
Course Level	Senior students for Bachelor's Degree
Course Type	Elective
Course Coordinator	
Instructors	Prof. Erdem An
Assistants	
Goals	The goal of this course is to design a heat exchanger or to predict the performance of a heat exchanger operating under prescribed conditions.
Content	To recognize numerous types of heat exchangers and classify them. To introduce performance parameters for heat exchangers. To develop methodologies for designing a heat exchanger or for predicting the performance of a heat exchanger operating under prescribed conditions. To present practical applications to heat exchangers.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Understanding performance parameters for heat exchangers	1	1,2,3	A, C, H
2) Ability to employ methodologies for designing a heat exchanger or for predicting the performance of a heat exchanger	1,2,8	1,2,3,4	A, C, H
3) Ability to select a heat exchanger for complex systems and analyze its performance	3,4,5,8,9	1,4	D, H
4)			

Teaching Methods:	1: Lecture, 2: Solving problems, 3: Homework, 4: Project
Assessment Methods:	A: Exam, C: Homework, D: Report, H: Attendance

COURSE CONTENT

Week	Topics	Study Materials
1	Classification of heat exchangers	Ch. 1
2	Basic design methods of heat exchangers	Ch. 2
3	Basic design methods of heat exchangers	Ch. 2
4	Basic design methods of heat exchangers	Ch. 2
5	Forced convection correlations for single-phase side of heat exchangers	Ch. 3
6	Heat exchanger pressure drop and pumping power	Ch. 4
7	Midterm exam	
8	Discussion on Project #1	
9	Fouling of heat exchangers	Ch. 5
10	Fouling of heat exchangers	Ch. 5
11	Discussion on Project #2	
12	Compact heat exchangers	Ch. 9
13	Compact heat exchangers	Ch. 9
14	Condensation and boiling	Lecture note

RECOMMENDED SOURCES	
Textbook	Sadık Kakaç and Hongtan Lin, Heat Exchangers: Selection, Rating, and Thermal Design, 2nd ed., CRC Press, 2002
Additional Resources	Frank P. Incropera and David P. DeWitt, Fundamentals of Heat and Mass Transfer, 5th or 6th ed., Wiley

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	1	43
Projects	2	29
Assignment	3	14
Class participation	1	14

Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.					**X**	
4	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**	
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.					**X**	
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.				**X**		
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.				**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	1	14
Projects	2	14	28
Mid-term	1	10	10
Homework	3	6	18
Final examination	1	12	12
Total Work Load			124
Total Work Load / 25 (h)			4.96
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Introduction to Turbomachinery	ME431	2 (Spring)	3 + 0	3	5

Prerequisites	ME331 – Fluid Mechanics

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Elective
Course Coordinator	Prof. Erdem An
Instructors	Prof. Erdem An
Assistants	
Goals	Goal is that the students gain ability to apply the basic principles of thermodynamics and fluid mechanics to analyze fluid machinery such as pumps, fans and compressors.
Content	Basic theory of turbomachinery. Dimensionless parameters and similarity laws. Pumps, fans, compressors and turbines. Application to engineering problems.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**

1) Adequate knowledge on turbomachinery (pump, fan, compressor, turbine)	1	1,3	A,B,C
2) Ability to formulate, and solve complex engineering problems involving turbomachinery; ability to select and apply proper analysis and modeling methods for this purpose.	2,3	1,3,10	A,B,C
3) Ability to analyze a turbomachinery	9,14	1,4,7	D,E
4) Ability to work in teams	7	7	E

Teaching Methods:	1: Lecture, 3: Homework, 4: Project, 7: Teamwork, 10: Guest lecturer
Assessment Methods:	A: Midterm and final exams, B: Quiz, C: Homework, D: Report, E: Presentation

COURSE CONTENT

Week	Topics	Study Materials
1	Basic concepts on turbomachinery	Textbook
2	Laws of thermodynamics, 2nd law of Newton, Dimensionless numbers related to turbomachinery and laws of similarity	Textbook
3	Introduction to hydraulic pumps	Textbook
4	Centrifugal hydraulic pumps	Textbook
5	Axial hydraulic pumps	Textbook
6	Pumping systems	Textbook
7	Hydraulic turbines	Textbook
8	Cont'd	Textbook
9	Centrifugal compressor and fans	Textbook
10	Cont'd	Textbook
11	Axial compressors and fans	Textbook
12	Cont'd	Textbook
13	Steam turbines	Textbook
14	Cont'd	Textbook

RECOMMENDED SOURCES

Textbook	Turbomachinery, Design and Theory; Gorla and Khan
Additional Resources	Introduction to Turbomachinery; Japikse

	Fluid Mechanics with Applications; A. Esposito Fluid dynamics and heat transfer of turbomachinery; B. Lakshminarayana Handbook of turbomachinery; Logan Fan handbook; Bleier Rotodynamic pump design;Turton Centrifugal pump design; Tuzson Pump handbook; Karassik

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterms	1	30
Homeworks	2	10
Quizzes	3	30
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution						
		NA	1	2	3	4	5	
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.					**X**		
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.					**X**		
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.					**X**		
4	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**						

5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.					**X**	
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.					**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.						**X**
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding exam weeks: 13x Total course hours)	13	3	36
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Midterms	1	3	3
Homework	2	4	8
Quiz	3	5	15
Final examination	1	10	10
Total Work Load			128
Total Work Load / 25 (h)			5.1
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Applied Fluid Mechanics	ME436	2 (Spring)	3 + 0	3	5

Prerequisites	ME331- Fluid Mechanics

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	Prof. Erdem An
Instructors	Prof. Erdem An
Assistants	
Goals	Goal is that the students gain ability to apply the basic principles of thermodynamics and fluid mechanics to analyze and design fluid machinery such as pumps, fans and compressors.
Content	Basic theory of turbomachinery. Dimensionless parameters and similarity laws. Impulse and reaction turbines, centrifugal pump, performance characteristics. Fundamentals of aerodynamics: airfoil geometry, generation of circulation, conformal transformation, lift and drag characteristics of airfoils. Application to engineering problems.

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Adequate knowledge on turbomachinery (pump, fan, compressor, turbine)	1	1,3	A,B,C
2) Ability to formulate, and solve complex engineering problems involving turbomachinery; ability to select and apply proper analysis and modeling methods for this purpose.	2,3	1,3,10	A,B,C
3) Ability to design a turbomachinery	9,14	1,4,7	D,E
4) Ability to analyse the turbomachinery designed by the student himself via computational fluid dynamics methods	9,14	1,4,7	D,E
5) Ability to work in teams	7	7	E

Teaching Methods:	1: Lecture, 3: Homework, 4: Project, 7: Teamwork, 10: Guest lecturer
Assessment Methods:	A: Midterm and final exams, B: Quiz, C: Homework, D: Report, E: Presentation

COURSE CONTENT

Week	Topics	Study Materials
1	Basic concepts on turbomachinery	Textbook
2	Laws of thermodynamics, 2nd law of Newton, Dimensionless numbers related to turbomachinery and laws of similarity	Textbook
3	Introduction to hydraulic pumps	Textbook
4	Centrifugal hydraulic pumps	Textbook
5	Axial hydraulic pumps	Textbook
6	Pumping systems	Textbook
7	Turbomachinery design methods	Lecture notes
8	Cont'd	Lecture notes
9	Hydraulic turbines	Textbook
10	Centrifugal compressor and fans	Textbook
11	Cont'd	Textbook
12	Axial compressors and fans	Textbook
13	Cont'd	Textbook
14	Discussion on the rsults of the turbomachinery design projects	

RECOMMENDED SOURCES	
Textbook	Turbomachinery, Design and Theory; Gorla and Khan
Additional Resources	Introduction to Turbomachinery; Japikse Fluid Mechanics with Applications; A. Esposito Fluid dynamics and heat transfer of turbomachinery; B. Lakshminarayana Handbook of turbomachinery; Logan Fan handbook; Bleier Rotodynamic pump design;Turton Centrifugal pump design; Tuzson Pump handbook; Karassik

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT

IN-TERM STUDIES	NUMBER	PERCENTAGE
Midterms	1	30
Homeworks	2	10
Quizzes	3	30
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.					**X**	
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.					**X**	
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.					**X**	
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.					**X**	
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.					**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.						**X**

15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding exam weeks: 13x Total course hours)	13	3	36
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Midterms	1	3	3
Homework	2	4	8
Quiz	3	5	15
Final examination	1	10	10
Total Work Load			128
Total Work Load / 25 (h)			5.1
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Fatigue and Fracture Mechanics	ME 444	(2)Spring	3 + 0	3	5

Prerequisites	ME 246 – Strength of Materials

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Elective
Course Coordinator	Assist. Prof. Fethi Okyar
Instructors	Assist. Prof. Fethi Okyar, Prof. Mehmet Akgün,
Assistants	
Goals	This relates knowledge obtained in strength of materials, materials science, and complex analysis in calculus with fatigue and fracture of structures from the perspective of mechanical engineering.

Content	Mechanisms of fracture, cleavage fracture, ductile fracture. Linear elastic fracture mechanics, crack tip plastic zone. Fatigue crack initiation; stress-life and strain-life approaches to fatigue analysis. Fatigue crack growth and fracture mechanics approach to fatigue analysis. Considerations in design.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) recognize the need for modeling cracks in solids and structures, and classify loading types.	1	1	A
2) select and combine appropriate stress functions to characterize the state of crack-tip singularity .	3	1,3	A,C
3) select and apply relevant fracture criteria in structural design and safety assessments.	3	1,3	A,C
4) employ fracture mechanics in dealing with fatigue of solids and structures.	3	1,3	A,C

Teaching Methods:	1: Lecture, 3: Homework
Assessment Methods:	A: Midterm and final exams, C: Homework

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	fast fracture and toughness	textbook
2	micromechanisms of fast fracture	textbook
3	case studies in fast fracture	textbook
4	cracks as stress raisers	textbook
5	energy of fracture	textbook
6	stress intensity factors in design	textbook
7	fracture toughness values and trends	textbook
8	plastic zone size	textbook
9	designing against fracture	textbook
10	fatigue failure	textbook

11	case studies in fatigue	textbook
12	fatigue: stress-based approach	textbook
13	physical nature of fatigue	textbook
14	designing against fatigue	

RECOMMENDED SOURCES	
Textbook	Mechanical Behavior of Materials: Engineering Methods for Deformation, Fracture and Fatigue, 3ed. Dowling NE, Pearson 2007.
Additional Resources	Deformation and Fracture Mechanics of Engineering Materials, 3ed. Hertzberg RW, Wiley, 1989.

MATERIAL SHARING	
Documents	Lecture notes
Assignments	Homeworks
Exams	Midterm exams and their solutions are posted in the website

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	67
Homeworks	6	33
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5

1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.		x
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	x	
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		x
4	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**	
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**	
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**	
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**	
8	Ability to work individually.	**X**	
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**	
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**	
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**	
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**	
15	Ability to verify and validate numerical solutions to engineering problems.	**X**	

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	3	48
Hours for off-the-classroom study (Pre-study, practice)	16	2	32
Mid-terms	2	6	12
Homework	6	4	24
Final examination	1	8	8
Total Work Load			124
Total Work Load / 25 (h)			4.96
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
MECHANICAL VIBRATIONS	ME445	1 (Fall)	3 + 0	3	5

Prerequisites	ME 244 – DYNAMICS, MATH241 – DIFFERENTIAL EQUATIONS

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Assist. Prof. Nezih Topaloğlu Prof. Mehmet A. Akgün
Assistants	
Goals	The goal of this course is to teach preliminary concepts and problem solving methodologies related to mechanical vibrations.
Content	Free and forced vibrations of one-degree-of-freedom systems: undamped and damped vibrations, natural and resonance frequencies, harmonic and impulse responses, transient and steady-state responses. Multi-degree-of-freedom systems. Modal analysis.

	Vibration suppression, absorption and control. Critical speeds. Vibration measurement.

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Ability to derive the equations of motion for vibratory systems and linearize nonlinear equations of motion.	1, 2	1, 3	A, C
2) Ability to solve for the overall response based on the initial conditions and the forcing, for one or multi degree-of-freedom mechanical systems.	1, 2	1, 3	A, C
3) Ability to design a passive vibration absorbing/suppressing device for a mechanical system experiencing harmonic excitation.	2, 3	1, 3	A, C
4) Ability to demonstrate knowledge in mechanical vibrations in an intra-disciplinary team project.	7	4	E

Teaching Methods:	1: Lecture, 3: Homework, 4: Project
Assessment Methods:	A: Written exam, C: Homework, E: Presentation

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	INTRODUCTION TO VIBRATION AND THE FREE RESPONSE	TEXTBOOK
2	INTRODUCTION TO VIBRATION AND THE FREE RESPONSE	TEXTBOOK
3	INTRODUCTION TO VIBRATION AND THE FREE RESPONSE	TEXTBOOK
4	INTRODUCTION TO VIBRATION AND THE FREE RESPONSE	TEXTBOOK
5	RESPONSE TO HARMONIC EXCITATION	TEXTBOOK
6	REVIEW AND EXAM 1	TEXTBOOK
7	RESPONSE TO HARMONIC EXCITATION	TEXTBOOK
8	RESPONSE TO HARMONIC EXCITATION	TEXTBOOK
9	GENERAL FORCED RESPONSE	TEXTBOOK
10	GENERAL FORCED RESPONSE	TEXTBOOK
11	REVIEW AND EXAM 2	TEXTBOOK
12	MULTIPLE DEGREE OF FREEDOM SYSTEMS	TEXTBOOK
13	DESIGN FOR VIBRATION SUPPRESSION	TEXTBOOK

14	DISTRIBUTED-PARAMETER SYSTEMS	TEXTBOOK

RECOMMENDED SOURCES	
Textbook	*Engineering Vibrations*, Daniel J. INMAN Pearson (Prentice Hall), 3rd ed., 2009, ISBN: 978-0-13-136311-3
Additional Resources	*Theory of Vibration with Applications,* W.T. Thomson, M. D. Dahleh Pearson, 5th ed., 1998, ISBN: 013 651 068X *Vibration Problems in Engineering,* W. Weaver Jr., S. P. Timoshenko, D. H. Young, Wiley, 3rd ed., 1990, ISBN: 0471 632 287

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	1	40
Homeworks	3	10
Project study	1	10
Attendance	14	5
Total		**65**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution						
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.			**X**			
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.					**X**	

3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						**X**
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.		**X**				
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Mid-terms	2	5	10
Homework	3	4	12
Final examination	1	10	10
Total Work Load			130
Total Work Load / 25 (h)			5.20
ECTS Credit of the Course			5

COURSE INFORMATION

Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
MECHANICS OF COMPOSITE MATERIALS	ME 446	2 (Spring)	3 + 0	3	5

Prerequisites	ME 246 – STRENGTH OF MATERIALS

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programme)
Course Type	Compulsory
Course Coordinator	
Instructors	Prof. Dr. Mehmet A. Akgün, Assist. Prof. Onur Cem Namlı
Assistants	
Goals	The aim of this course is to equip students with awareness, appreciation and a good understanding of composite materials; to teach them the methods of analysis of composite laminates and simple composite structures under in-plane and pure bending loads.
Content	Fiber-reinforced composites. Micro and macromechanical lamina analyses. Stress strain relations for a lamina. Laminate constitutive equations. Lamina and laminate strength analysis, failure criteria. Buckling of laminated plates. Manufacturing methods.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) A good understanding of orthotropic/composite materials and of the advantages of fibrous composite materials.	1	1,2,3	A,C,H
2) Ability to perform micromechanical analysis of continuous fiber reinforced composites.	1,2	1,2,3	A,C,H
3) Ability to perform macromechanical analysis of continuous fiber reinforced composites including thermal loads.	1,2	1,2,3	A,C,H
4) Ability to analyze buckling of composite laminates.	1,2,3	1,2,3	A,C,H
5) Ability to read a journal paper on composites, understand it and present it to people	8	4	E

Teaching Methods:	1: Lecture, 2: Problem session, 3: Homework, 4) Project.
Assessment Methods:	A: Written exam, C: Homework, E: Presentation, H: Attendance record

COURSE CONTENT

Week	Topics	Study Materials
1	Introduction to composite materials; definition, terminology, advantages, applications.	Textbook, lecture notes
2	Constitutive equations for materials in general from anisotropic to transversely isotropic materials.	Textbook
3	Macromechanical stiffness analysis of laminae; engineering constants, constitutive equations in arbitrary coordinate systems.	Textbook
4	Macromechanical strength analysis of laminae; failure criteria.	Textbook
5	Micromechanical stiffness analysis of laminae; mechanics of materials approach.	Textbook
6	Midterm 1	Textbook
7	Micromechanical strength analysis of laminae; mechanics of materials approach.	Textbook
8	Macromechanical stiffness analysis of laminates, classical lamination theory.	Textbook
9	Thermal and hygroscopic stress analysis. Strength analysis of laminates.	Textbook
10	Strength analysis, interlaminar stresses. Buckling of laminated plates.	Textbook
11	Buckling analysis and bending of laminated plates.	Textbook
12	Midterm 2	Textbook
13	Bending of laminated plates.	Textbook
14	Paper presentations by students.	Textbook

RECOMMENDED SOURCES	
Textbook	- Mechanics of Composite Materials, R. M. Jones, Taylor & Francis, 1999
Additional Resources	- Analysis and Performance of Fiber Composites, Agarwal, B.D. and Broutman, L. J., JohnWiley & Sons

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
In-term exams	2	40

Assignment	3	10
Attendance	42 class hrs	5
Project	1	10
Final exam	1	35
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.						**X**
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		**X**				
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.					**X**	
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					

15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Hrs per Quantity	Total Workload (Hour)
Course Duration (12.5 weeks excluding 1.5 week for exams)	12.5	3	38
Off-the-classroom study (pre-study, practice for 14 weeks)	14	4	56
In-term exams	2	2	4
Homework	3	3	9
Project (scientific paper reading and presenting)	1	10	10
Final examination	1	3	3
Total Work Load			120
Total Work Load / 25 (h)			4.8
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Mechanisms and Applications	ME 452	All	3 + 0	3	5

Prerequisites	ME 244 Dynamics

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Technical Elective
Course Coordinator	Assist. Prof. Namik Ciblak
Instructors	Assist. Prof. Namik Ciblak
Assistants	
Goals	To apply dynamical principles to rigid body and multi body systems that comprise a mechanism. To design mechanisms to achieve certain tasks. Understand, learn, and appreciate the role of mechanisms in mechanical system design.
Content	Introduction to kinematics and dynamics of rigid bodies. Classification of mechanisms. Basic concepts such as kinematic chain, degree of freedom, joints, and links. Graphical and analytical analysis of the

	kinematics of planar mechanisms. Kinematics of gear trains. Kinematics of Cam-Follower systems. Introduction to force analysis of planar mechanisms.

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Kinematic and dynamic analysis of rigid body and multi body systems.	1, 2, 3	1, 2	A, C
2) Special mechanisms and applications.	2, 3	1, 2	A, C
3) Synthesis of mechanisms.	2, 3, 15	1, 2, 4	A, C, D

Teaching Methods:	1: Lecture, 2: Homework, 3: Quiz; 4: Project
Assessment Methods:	A: Midterm and final exams, B: Quiz, C: Homework, D: Report

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction to Mechanisms and Kinematics	Textbook
2	Vectors	Textbook
3	Position Analysis	Textbook
4	Position Analysis	Textbook
5	Mechanism Design	Textbook
6	Velocity Analysis	Textbook
7	Velocity Analysis	Textbook
8	Velocity Analysis	Textbook
9	Acceleration Analysis	Textbook
10	Acceleration Analysis	Textbook
11	Computer-Aided Mechanism Analysis	Textbook
12	Cams: Design and Kinematic Analysis	Textbook
13	Static Analysis	Textbook
14	Dynamic Force Analysis	Textbook

RECOMMENDED SOURCES	
Textbook	David H. Myszka, Machines and Mechanisms: Applied Kinematic Analysis, 3rd ed., Prentice-Hall. ISBN: 9780131837768
Additional Resources	Erdman, A.G., Sandor, G.N, Kota, S., Mechanism Design: Analysis and Synthesis, 4th ed., Prentice-Hall. ISBN: 0-13-040872-7

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	40
Homework	1+	10
Project	1	20
Final exam	1	30
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.				**X**		
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						**X**
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	**X**					
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**					
8	Ability to work individually.						**X**

9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.				**X**		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	3	48
Hours for off-the-classroom study (Pre-study, practice)	16	3	48
Mid-terms	1	10	10
Homework	1+	10	10
Project	1	10	10
Final examination	1	10	10
Total Work Load			136
Total Work Load / 25 (h)			5.44
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
MECHATRONICS	ME 456	Fall/Spring	3 + 0	3	5

Prerequisites	NONE

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)

Course Type	Elective
Course Coordinator	
Instructors	Assoc. Prof. Koray K. Şafak
Assistants	
Goals	The objectives of this course is to introduce mechatronics as an engineering design approach and to provide students with: – A broad overview of mechatronic systems and components. – An ability to analyze, model and design simple mechatronic systems incorporating sensors, actuators, I/O units, and controllers. – Laboratory experiments on basic mechatronic systems. – Hands-on experience through teamwork in designing and testing of a simple mechatronic system.
Content	Introduction to mechatronics. Basic electronics for control. Computer based control systems, sensors, actuators and interfaces. Signal conditioning: amplification, attenuation, analog filtering. Discrete mathematics for digital control. Design of discrete controllers.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
11. Acquire knowledge on mechatronic systems and their components.	3, 5	Lec, Lab	Ex, Lab
12. Ability to analyze, model and design simple mechatronic systems incorporating sensors, actuators, I/O units and controllers.	3, 4, 5	Lec, Prj	Ex, Prj
13. Hands-on experience through teamwork in design and implementation of a simple mechatronic device incorporating a microcontroller.	4, 7	Prj	Prj

Teaching Methods:	1: Lecture (Lec), 2: Project (Prj), 3: Laboratory experiments (Lab)
Assessment Methods:	1: Exam (Ex), 2: Project report (Prj), 3: Laboratory reports (Lab)

COURSE CONTENT

Week	**Topics**	**Study Materials**
1	Introduction to Mechatronics	Textbook
2	Sensors and Transducers	Textbook
3	Sensors and Transducers	Textbook
4	Signal Conditioning	Textbook
5	Signal Conditioning	Textbook
6	Pneumatic and Hydraulic Actuation Systems	Textbook
7	Mechanical Actuation Systems	Textbook
8	Electrical Actuation Systems	Textbook
9	Electrical Actuation Systems	Textbook

10	Basic System Models	Textbook
11	Closed-loop Controllers	Textbook
12	Digital Logic	Textbook
13	Microprocessors	Textbook
14	Programmable Logic Controllers (PLC)	Textbook

RECOMMENDED SOURCES	
Textbook	W. Bolton, Mechatronics: Electronic Control Systems in Mech. and Electrical Eng., 3rd ed, Prentice Hall, 2003.
Additional Resources	

MATERIAL SHARING	
Documents	Syllabus, Weekly course schedule, Laboratory manuals
Assignments	Homework assignments
Exams	None

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterms	1	20
Project	1	30
Lab work	3	20
Total		**70**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.	**X**					
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**					

3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		X
4	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
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.		X
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	X	
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.		X
8	Ability to work individually.	X	
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	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	Awareness of professional and ethical responsibility.	X	
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	X	
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	X	
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	X	
15	Ability to verify and validate numerical solutions to engineering problems.	X	

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	3	48
Hours for off-the-classroom study (Pre-study, practice)	16	2	32
Mid-terms	1	4	4
Project	1	30	30
Lab work	3	2	6
Final examination	1	4	4
Total Work Load			124
Total Work Load / 25 (h)			4.96
ECTS Credit of the Course			5

COURSE INFORMATON

Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
INTRODUCTION TO MEMS FABRICATION	ME462	2 (Spring)	3 + 0	3	5

Prerequisites	-

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Technical elective
Course Coordinator	
Instructors	Assist. Prof. Nezih Topaloğlu
Assistants	
Goals	On successful completion of this course, students will be able to: • Understand the basics of MEMS • Develop familiarity with common microfabrication methods • Develop familiarity with the steps required for design and analysis of a MEMS device • Read and understand emerging technical literature about the subject
Content	• An overview of microfabrication methods: Thin-film deposition, oxidation, lithography, bulk and surface micromachining. • MEMS Foundry processes. • Basic MEMS governing equations in mechanical, electrical and thermal domain. • Design, analysis and characterization of basic MEMS devices

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Ability to explain and compare basic MEMS microfabrication methods.	1	1, 3	A, C
2) Ability to design fabrication masks for a MEMS foundry process.	2, 5	1, 3	A, C
3) Ability to apply principles of mechanics, electrical circuits and heat transfer to MEMS structures.	1, 2	1, 3	A, C
4) Ability to interpret emerging technical literature related to MEMS and demonstrate knowledge in a team.	5, 7, 8, 9, 10	3, 4	C, D, E

Teaching Methods:	1: Lecture, 3: Homework, 4: Project
Assessment Methods:	A: Written exam, C: Homework, D: Report, E: Presentation

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	INTRODUCTION AND OVERVIEW OF MEMS	SLIDES, TEXTBOOK
2	INTRODUCTION TO MICROMACHINING	SLIDES, TEXTBOOK
3	INTRODUCTION TO MICROMACHINING	SLIDES, TEXTBOOK
4	MEMS FOUNDRY PROCESSES	SLIDES, TEXTBOOK
5	REVIEW OF ESSENTIAL EE & ME CONCEPTS	SLIDES, TEXTBOOK
6	REVIEW OF ESSENTIAL EE & ME CONCEPTS	SLIDES, TEXTBOOK
7	ELECTROSTATIC SENSING AND ACTUATION	SLIDES, TEXTBOOK
8	ELECTROSTATIC SENSING AND ACTUATION	SLIDES, TEXTBOOK
9	THERMAL SENSING AND ACTUATION	SLIDES, TEXTBOOK
10	REVIEW AND MIDTERM	SLIDES, TEXTBOOK
11	PIEZOELECTRIC AND PIEZORESISTIVE EFFECT	SLIDES, TEXTBOOK
12	MICROFLUIDICS AND MEMS	SLIDES, TEXTBOOK
13	MAGNETIC ACTUATION	SLIDES, TEXTBOOK
14	CASE STUDIES	SLIDES, TEXTBOOK

RECOMMENDED SOURCES	
Textbook	*"Foundations of MEMS: International Edition", Chang Liu, 2011, Prentice Hall*
Additional Resources	• *Lecture slides on the course web page* • *"Microsystem Design", Stephen D. Senturia, Kluwer Academic Publishers, 2003* • *"Fundamentals of Microfabrication", M. Madou, CRC Press, 1997.*

MATERIAL SHARING	
Documents	Lecture slides
Assignments	Homeworks, technical paper readings
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-term	1	20

Homeworks	3	15
Technical paper reading assignments	7	15
Project	1	20
Total		**70**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.			**X**			
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.				**X**		
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.			**X**			
8	Ability to work individually.				**X**		
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.				**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	Awareness of professional and ethical responsibility.	**X**					
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**					
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**					
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**					
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Mid-terms	1	5	5
Homework	3	5	15
Final examination	1	10	10
Total Work Load			128
Total Work Load / 25 (h)			5.12
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
The Finite Element Method	ME 477	Fall	3 + 0	3	5

Prerequisites	ME 246, ME 371

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Elective
Course Coordinator	Assist. Prof. Fethi Okyar
Instructors	Assist. Prof. Fethi Okyar, Prof. Mehmet Akgun
Assistants	
Goals	This course serves as an introduction to the theory of finite elements by providing coverage of topics from the linear theory.
Content	Basic concepts such as the displacement-based finite element method, generalization of element coordinates, implementation in computer programs, formulation and calculation of isoparametric and structural elements are covered as well as numerical integrations,

	modeling considerations, and solution of equilibrium equations in static analysis.

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) formulate a discrete system by linear equations based on finite elements analysis and the principle of virtual work	1	1,3,10	A,C
2) select, customize and implement displacement interpolation functions	2	1,3,10	A,C
3) derive isoparametric fomulations based on the relationship between local and global coordinates.	2	1,3,10	A,C
4) construct the finite element model of a physical problem, solve it using available commercial software, and present the results.	3,5,10	4,5	D

Teaching Methods:	1: Lecture, 3: Homework, 4: Project work; 5: Laboratory; 10: Video lecture
Assessment Methods:	A: Midterm and final exams, C: Homework, D: Report

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	some basic concepts of engineering analysis	Video lecture
2	analysis of continuous systems	Textbook
3	the displacement-based finite element method	Video lecture
4	the displacement-based finite element method	Textbook
5	generalized coordinate finite element models	Video lecture
6	generalized coordinate finite element models	Textbook
7	implementation of methods in computer programs	Video lecture
8	formulation and calculation of isoparametric models	Video lecture
9	formulation and calculation of isoparametric models	Textbook
10	isoparametric models of structural elements	Video lecture
11	isoparametric models of structural elements	Textbook

12	numerical integrations, modeling considerations	Textbook
13	solution of equilibrium equations in static analysis	Video lecture
14	solution of equilibrium equations in static analysis	Textbook

RECOMMENDED SOURCES	
Textbook	Bathe, K.J.,"Finite Element Procedures", Prentice Hall, 2 ed., 1996.
Additional Resources	Video lectures: http://ocw.mit.edu/resources/res-2-002

MATERIAL SHARING	
Documents	Lecture notes, related links
Assignments	Homeworks, project
Exams	Exams and solutions

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	45
Project	1	15
Assignment	6	40
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5

1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.		**X**	
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.			**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		**X**	
4	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**		
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.			**X**
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**		
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	**X**		
8	Ability to work individually.	**X**		
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	**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	Awareness of professional and ethical responsibility.	**X**		
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	**X**		
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	**X**		
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	**X**		

15	Ability to verify and validate numerical solutions to engineering problems.	**X**	

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 16x Total course hours)	16	3	48
Hours for off-the-classroom study (Pre-study, practice)	16	2	32
Mid-terms	2	4	8
Homework	6	3	18
Project	1	12	12
Final examination	1	8	8
Total Work Load			132
Total Work Load / 25 (h)			5.28
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Design of Mechanical Systems	ME482	2 (Spring)	2 + 2	3	5

Prerequisites	Senior standing or consent of advisor and instructor.

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	
Instructors	Assist. Prof. Ali Fethi Okyar, Assist. Prof. Koray Kadir Safak, Assist. Prof. Nezih Topaloğlu

Assistants	
Goals	This class aims at simulating modern engineering design paradigms, techniques, and environment that are observed in real life engineering design processes.
Content	Design philosophy and methodologies. Professional ethics in engineering. Use of computers and CAD in design engineering. Project engineering, planning and management. Design optimization. Cost evaluation and economic decisions. Quality aspects. Failure and reliability. Decision making and evaluation. Engineering economics. Human and ecological factors in design. Term project: Forming student project teams simulating the real engineering design teams, preparation and presentation of a project report, and prototype construction in some projects.

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Identifying a market need to develop the customer requirements; translate these into engineering characteristics, yielding a product design specification document.	10	1, 4, 7	A, D, G
2) Generate, evaluate and select alternative concepts for a design problem; breakdown the selected concept into modules; embody components by engineering analyses.	4, 5, 14	1, 4, 7	A, D, G
3) Operate in a team with an awareness of professional and ethical responsibility; communicate the progress and results verbally and in written form.	11, 7, 9	4, 9	D, E
4) Knowledge about contemporary issues and he global and societal effects of engineering practices on health, environment and safety; awareness of entrepreneurship, innovation, sustainable development, project management, risk management and change management.	12, 13	1, 4, 9	A, D

Teaching Methods:	1: Lecture, 4: Project, 7: Teamwork, 9: Seminar
Assessment Methods:	A: Exam, D: Report, E: Presentation, G: In-class practice

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	The Nature of Design	TEXTBOOK
2	The Design Process	TEXTBOOK
3	Product Development	TEXTBOOK
4	Clarifying the Need	TEXTBOOK

5	Phase 0 – Team Behavior and Research	TEXTBOOK
6	Concept Generation	TEXTBOOK
7	Selection	TEXTBOOK
8	Embodiment Design	TEXTBOOK
9	Seminar: *Awareness for Engineers*	LECTURE NOTES
10	Embodiment Design and Detail Design	TEXTBOOK
11	Material Selection	TEXTBOOK
12	Design for Manufacturing	TEXTBOOK
13	Cost Evaluation	TEXTBOOK
14	Legal & Ethical Issues	TEXTBOOK

RECOMMENDED SOURCES	
Textbook	Dieter, G.E., *Engineering Design*, 4th ed., McGraw-Hill. ISBN: 0-07-116204-6
Additional Resources	Cross, N., *Engineering Design Methods* 2nd ed., John Wiley & Sons. ISBN: 0 471 94228 6

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-term	1	20
Interim evaluation	14	30
Progress report	1	10
Design review	1	5
Total		**65**

CONTRIBUTION OF FINAL PRESENTATION & REPORT TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		**100**

COURSE CATEGORY	Capstone design course

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.	**X**					
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.	**X**					
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	**X**					
4	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**
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.				**X**		
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.						**X**
8	Ability to work individually.	**X**					
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.					**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	Awareness of professional and ethical responsibility.				**X**		
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.			**X**			
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.					**X**	
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.					**X**	
15	Ability to verify and validate numerical solutions to engineering problems.	**X**					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 14x Total course hours)	14	4	56
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Mid-term	1	5	5
Final presentation	1	10	10
Total Work Load			127
Total Work Load / 25 (h)			5.08
ECTS Credit of the Course			5

COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Engineering Projects	ME492	2	1 + 4	3	8

Prerequisites	Senior standing or consent of advisor and instructor

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programmes)
Course Type	Compulsory
Course Coordinator	Prof. Mehmet Akgün
Instructors	Asst. Prof. Fethi Okyar; Asst. Prof. Koray Şafak; Asst. Prof. Nezih Topaloğlu; Prof. Erdem An, Asst. Prof. Ali Bahadır Olcay, Asst. Prof. Onur Cem Namlı, Asst. Prof. Namık Cıblak
Assistants	
Goals	Goal is that the students gain ability to analyze or design a mechanical engineering system
Content	Team project towards analysis and design of a mechanical engineering system.

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Ability to use theoretical and applied information in these areas to model and solve engineering problems.	2	4,7	D,E
2) Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	3	4,7	D,E

3) Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively	5	4,7	D,E
4) Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.	7	4,7	D,E
5) Ability to work individually.	8	4,7	D,E
6) Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.	9	4,7	D,E
Ability to work professionally in both thermal and mechanical systems areas, including design and realization.	14	4,7	D,E

Teaching Methods:	4: Project, 7: Teamwork
Assessment Methods:	D: Report, E: Presentation

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Announcement of the short descriptions and requirements for the offered projects; Students fill in the application forms for the projects they are interested in; Each student is assigned to a project at a faculty meeting	
2	First meeting of the students with their project advisors; Preperation of the detailed work and time plan	
3	Project work and weekly meetings with the advisor	
4	Project work and weekly meetings with the advisor	
5	Project work and weekly meetings with the advisor	
6	Project work and weekly meetings with the advisor	
7	Project work and weekly meetings with the advisor	
8	Project work and weekly meetings with the advisor	
9	Project work and weekly meetings with the advisor	
10	Project work and weekly meetings with the advisor	
11	Students hand out the draft of their project report to their advisors	
12	Improvements and final corrections	
13	Deadline for the project reports	
14	Presentations	

RECOMMENDED SOURCES
Textbook

Additional Resources

MATERIAL SHARING
Documents
Assignments
Exams

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Weekly meetings with the advisor	13	30
Total		**100**
CONTRIBUTION OF GDS EXAMINATION TO OVERALL GRADE		10
CONTRIBUTION OF PROJECT PRESENTATION TO OVERALL GRADE		60
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		30
Total		**100**

COURSE CATEGORY	Departmental courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		NA	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline.	**X**					
2	Ability to use theoretical and applied information in these areas to model and solve engineering problems.						**X**
3	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						**X**
4	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**					
5	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.						**X**
6	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	**X**					
7	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.						**X**
8	Ability to work individually.						**X**
9	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.						**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	Awareness of professional and ethical responsibility.	X		
12	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	X		
13	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	X		
14	Ability to work professionally in both thermal and mechanical systems areas, including design and realization.			X
15	Ability to verify and validate numerical solutions to engineering problems.	X		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding exam weeks: 13x Total course hours)	13	1	13
Hours for off-the-classroom study (Pre-study, practice)	13	4	56
Project	1	90	90
Report	1	30	30
Presentation	1	10	10
Total Work Load			199
Total Work Load / 25 (h)			8.0
ECTS Credit of the Course			8

Courses & Program Learning Outcomes

Course	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	LO13	LO14	LO15
Calculus I	●														
Calculus II	●														
Linear Algebra	●														
Differential Equations	●														
Fundamentals of Probability & Statistics	●														
General Chemistry	●					●									
Physics I	●					●									
Physics II	●					●									
Fundamentals of EEE	●														
Humanities I															
Humanities II															
Engineering & Architectural Literature									●						
Tech. Rep. Writing & Presentation Skills									●						
Economics												●			
Engineering Management															
Turkish I															
Turkish II															
History of Turkish Revolution I															
History of Turkish Revolution II															
Free Elective															
Law For Engineers													●		
Introduction to Mechanical Engineering	●						●		●		●	●	●		
Thermodynamics I	●	●			●	●	●	●	●		●				
Thermodynamics II	●	●												●	
Fluid Mechanics	●	●													
Heat Transfer	●	●			●	●	●	●	●		●			●	●
Heat Exchangers	●	●	●	●	●			●	●						
Applied Fluid Mechanics	●	●	●				●		●					●	
Statics	●	●													
Strength of Materials	●	●													
Machine Elements I	●	●	●												
Machine Elements II	●		●												
Fatigue and Fracture Mechanics	●		●												
Mechanics of Composite Materials	●	●	●					●							
Dynamics	●	●													
System Dynamics and Control	●	●	●		●	●									
Mechanical Vibrations	●	●	●				●								

Mechatronics			●	●	●		●								
Mechanisms and Applications	●	●	●					●							●
Eng. Graphics and Solid Modeling	●			●	●		●								
Material Science for Mechanical Eng.	●														
Manufacturing Techniques	●	●		●	●		●		●	●		●	●		
Introduction to MEMS Fabrication	●	●			●		●	●	●	●					
Mechanical Engineering Design				●	●		●		●	●	●	●	●	●	
Algorithms & Comp. Programming					●										
Numerical Methods in Mech. Engng.	●	●	●		●					●					
Computer Aided Mechanical Eng.		●	●	●	●		●								
Finite Element Method	●	●	●		●					●					
Solid Mechanics Laboratory		●			●	●	●		●						●
Fluid Mechanics Laboratory		●	●		●	●	●		●						●
Instrumentation and Exp. Design			●	●		●	●		●	●				●	
Summer Practice							●	●	●		●	●			
Engineering Project		●	●		●		●	●	●					●	

Level of Qualification:

This program is a first cycle (undergraduate) programme of 240 ECTS credits in the area of Mechanical Engineering.

Students who complete the program successfully and acquire the program competencies receive an undergraduate degree in the area of Mechanical Engineering.

Admission Requirements:

In line with the academic and legal procedures of the university, the students who apply for admission into the program should follow the process governed by ÖSYM and succeed in the university entrance examination. Students who have started an equivalent programme in Turkey or abroad may apply for transfer to the program. Application of the student is evaluated before the semester starts considering the credentials of the student and the degree for which s/he is applying. Detailed information regarding admission to the university is available in the university catalogue.

Students, who come to the university from abroad through exchange programmes whose conditions have been drawn by an aggreement and approved by the university may take the courses offered in the programme. To take a course, the student should demonstrate that s/he has completed its prerequisite courses or their equivalents. All courses in the programme curriculum are conducted in English.

Occupational Profiles:
Our graduates are employed in a variety of sectors including Research and Development, production and management. Meanwhile, many of our graduates continue their education at the graduate level and receive Masters and Doctorate degrees in the area of Mechanical Engineering and related fields.

Graduation Requirements:

In order to graduate from the programme, a student is required complete a total of 48 courses including 42 compulsory, 1 free elective and 5 technical elective courses to receive a total of 149 credits and 240 ECTS and obtain a CGPA of at least 2.00/4.00. The list of courses in the curriculum are provided in the table below. Among these courses, ME492 Graduation Project allows the student to apply the knowledge they have acquired during the program to a real-life engineering project. Moreover, each student is required to work as an intern for an institution that has been approved by the department for a total of 20 working days. This compulsory internship is listed with a course code of ME400 in the table below.

Course Categories	ECTS
MATHEMATICS AND BASIC SCIENCES	
GENERAL CHEMISTRY	6
CALCULUS FOR ENGINEERS I	6
PHYSICS I	6
CALCULUS FOR ENGINEERS II	6
PHYSICS II	6
INTRODUCTION TO SCIENTIFIC COMPUTING	5
ECONOMICS FOR ENGINEERS	4
LINEAR ALGEBRA	6
DIFFERENTIAL EQUATIONS	6
Total	**51**
BASIC ENGINEERING COURSES	
ENGINEERING GRAPHICS & SOLID MODELING	7
THERMODYNAMICS I	6
THERMODYNAMICS II	5
STATICS	6
DYNAMICS	6
MATERIALS SCIENCE FOR MECHANICAL ENGINEERING	4
FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENG.	4
FUNDAMENTALS OF PROBABILITY & STATISTICS	5
Total	**43**
DEPARMENTAL COURSES	
INTRODUCTION TO MECHANICAL ENGINEERING	4
STRENGTH OF MATERIALS	6
SOLID MECHANICS LABORATORY	3
FLUID MECHANICS	6
FLUID MECHANICS LABORATORY	3
MACHINE ELEMENTS I	5
NUMERICAL METHODS IN MECHANICAL ENGINEERING	5
HEAT TRANSFER	7
MACHINE ELEMENTS II	5
SYSTEM DYNAMICS AND CONTROL	6
COMPUTER AIDED MECHANICAL ENGINEERING	6
INSTRUMENTATION AND EXPERIMENT DESIGN	6
MECHANICAL VIBRATIONS	6
MANUFACTURING TECHNIQUES	5
ENGINEERING PROJECTS	8
MODERN ENGINEERING MATERIALS	5
INTERNAL COMBUSTION ENGINES	5
HVAC FUNDAMENTALS	5
HEAT EXCHANGERS	5
APPLIED FLUID MECHANICS	5
FATIGUE AND FRACTURE MECHANICS	5
MECHANICS OF COMPOSITE MATERIALS	5
MECHANISMS AND APPLICATIONS	5
MECHATRONICS	5
MEMS FABRICATION	5
FINITE ELEMENT METHOD	5

THEORY AND ENGINEERING OF MUSIC	5
Total	**141**
CAPSTONE DESIGN COURSE	
MECHANICAL ENGINEERING DESIGN	6
Total	**6**
SUMMER PRACTICE	
SUMMER PRACTICE	1
Total	**1**
SOCIAL SCIENCES AND HUMANITIES	
TURKISH I	2
TURKISH II	2
HISTORY OF TURKISH REVOLUTION I	2
HISTORY OF TURKISH REVOLUTION II	2
HUMANITIES I	3
HUMANITIES II	3
LAW FOR ENGINEERS	4
ENGINEERING MANAGEMENT	4
ENGLISH I FOR ENGINEERING AND ARCHITECTURE	4
ENGLISH II FOR ENGINEERING AND ARCHITECTURE	4
Total	**30**
Total ECTS Credit	**272**

ASSESSMENT AND GRADING

Course Grade	Grade Points
AA	4.00
BA	3.50
BB	3.00
CB	2.50
CC	2.00
DC	1.50
DD	1.00
F	0.00

Other Grades:

I: Incomplete is given to a student who provides supporting evidence through genuine and valid documentation of illness or other reason which has prevented her/him form completing the necessary course work. In such a case, within 15 days form the day of submitting the grades to the Registrar's Office, the student required complete the missing work and obtain a grade. Otherwise, the I grade will automatically become an F

P: Pass is given to students who are successful in taking non-credit courses.

X: In Progress is used when the work of a student is a course extends past the time for reporting grades.

T: Transfer is given to courses accepted as equivalents in transfers form other universities.

W: Withdrawal is given if a student withdraws from a course after the add/drop period within the first 10 weeks after the semester starts, with the recommendation of her/his advisor and the permission of the instructor concerned.

NC: Non-Credit is given to the students who are successful in non-credit courses.
ND: Non-Degree is given to an applicant who wishes to take graduate courses but does not wish to be in a degree programme may request admission on a non-degree basis.

4.5. Overall Classification of the Qualification

Satisfactory	2.00-2.49	10
	2.50-2.99	6
Honors	3.00-3.49	1
High Honors	3.50-4.00	1

---

* Grade Point Averages: The student's standing is calculated in the form of a GPA and CGPA, and announced at the end of each semester by the Registrar's Office. The total credit points for a course are obtained by multiplying the grade point of the final grade by the credit hours. In order to obtain the GPA for any given semester, the total credit points earned in that semester are divided by the total credit hours. The CGPA is calculated by taking into account all the courses taken by a student from the beginning of entrance to the University which are recognized as valid by Department in which she/he is registered.

Job Opportunities and Promotions of Graduates:

Graduates are working in both private and public sectors. In private sectors, they find places in machine manufacturing, automotive sectors, construction, information and electronics, metal industries, aviation, service and energy. In public sectors, they generally find job opportunities in the areas of defense industries, aviation and finance sectors. They also work in other sectors related to food, ship and chemistry. Their job responsibilities include sales & marketing, education, management, research & development, production, design, planning and quality control. They also continue their education in graduate schools for master and Ph.D. degrees.

Job Profiles of Graduates:

Graduates from mechanical engineering department find their jobs both in private and public sectors. Most of them work in private sectors such as machine manufacturing, automotive, construction, information and electronics, and metal industries. Their job duties are usually sales & marketing, R&D, production, and design. Some examples of institutional companies in the manufacturing sector are Dalgakiran Compressor, Bosch, Arcelik, Alarko and Vestel where our graduates work in R&D and production departments. They also work at Ford Otosan, Mercedes, Tofas and Renault Trucks in the automotive section as R&D and product development departments. Some graduates are working at Turkish Airlines and TAI-TUSAS in the aviation sector. Those who work in public sector are involved in defense industries in general. There are also a significant number of graduates who prefer working at family companies.

Programme Director & ECTS Coordinator:

Programme Director: Prof. Mehmet Alaeddin Akgün
Phone: (216) 578 0402
E-mail: makgun@yeditepe.edu.tr

ECTS Coordinator: Asst. Prof. Nezih Topaloğlu
Phone: (216) 578 0753
E-mail: nezih.topaloglu@yeditepe.edu.tr

Student Surveys:

Three different surveys are conducted regularly to our students. These are: 1. Instructor evaluation, 2. Learning outcome assessment, and 3. Exit survey. Other assessments are also utilized for continued improvement practices conducted in our department.

Instructor evaluation and learning outcome assessment surveys are conducted in each course by the end of every semester. Instructor evaluation is used to determine the perceived performance of the instructor by the students. Learning outcome assessment aims at measuring the degree of success in achieving learning outcomes that are expected from that course.

Exit survey is given to graduating students. It consists of sections, which asks for contact information, CGPA and an overall evaluation of the program by focusing on the educational objectives of the program. Meetings with former graduates (advisory board, annual Doğa Club activity) and conversations held during their occasional visits to the department also provide invaluable feedback for continuous improvement of the program.

YEDİTEPE UNIVERSITY - FACULTY OF ENGINEERING AND ARCHITECTURE
INSTRUCTOR EVALUATION FORM
YEDİTEPE ÜNİVERSİTESİ - MÜHENDİSLİK VE MİMARLIK FAKÜLTESİ
ÖĞRETİM ÜYESİ DEĞERLENDİRME FORMU

The purpose of this form is to enable you to evaluate the course instructor's performance. Feedback from students is very important for improving the level of education in our Faculty. Hence, please answer the questions objectively.
Bu formun amacı dersi veren öğretim üyesinin performansını değerlendirmenizi sağlamaktır. Fakültemizdeki eğitimin kalitesini arttırmak için öğrencilerden gelen geri dönüşümler çok önemlidir. Bu nedenle, lütfen bütün soruları tarafsızca cevaplayınız.

1	2	1	3	0	1	0	7
0	0	0	0	●	0	●	0
●	1	●	1	1	●	1	1
2	●	2	2	2	2	2	2
3	3	3	●	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	●
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

COURSE

0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

ABOUT THE STUDENT
ÖĞRENCİ HAKKINDA

1. Letter grade I expect from this course Bu dersten beklediğim harf notu	○ F	○ DD/DC	○ CC/CB	○ BB/BA	○ AA
2. The proficiency of my English to follow the course Dersi takip edebilmek için İngilizcemin yeterliliği	○ Very Poor	○ Poor	○ Fair	○ Good	○ Very Good
3. My course attendance Derse devamım	○ <49%	○ 50-69%	○ 70-79%	○ 80-89%	○ 90-100%
4. Amount of homework assignments and projects I've turned in Yapıp teslim ettiğim ödev ve proje miktarı	○ <49%	○ 50-69%	○ 70-79%	○ 80-89%	○ 90-100%
5. Benefits I've gained by doing the homework assignments and projects Ödev ve proje yapmış olmaktan kazanımlarım	○ Very Poor	○ Poor	○ Fair	○ Good	○ Very Good
6. Total number of hours I spent on this course per week (including lectures and labs) Bu derse harcadığım haftalık toplam saat (ders ve laboratuvar saatleri dahil)	○ 1-4 hrs	○ 5-6 hrs	○ 7-8 hrs	○ 9-10 hrs	○ >10 hrs

ABOUT THE INSTRUCTOR ÖĞRETİM ÜYESİ HAKKINDA	**Very Poor**	**Poor**	**Fair**	**Good**	**Very Good**
7. Fairness of the grading policy Not vermedeki adaleti	○	○	○	○	○
8. Quality of the assigned homework Verilen ödevlerin öğreticiliği	○	○	○	○	○
9. Availability of the supplementary course materials (class-notes, handouts, solutions, etc.) Derse destek materyallerinin varlığı (ders notu, derste verilenler, çözümler, vs.)	○	○	○	○	○
10. Ability to generate interest and interaction in class Derse ilgi çekme ve katılım sağlama yeteneği	○	○	○	○	○
11. Ability to use the English language İngilizce diline hakimiyeti	○	○	○	○	○
12. Efficient use of teaching aids (PC, projector, whiteboard, etc.) Eğitime yardımcı araçları verimli kullanımı (PC, projeksiyon cihazı, tahta, vs.)	○	○	○	○	○
13. Informative quality of the "syllabus" handed out at the beginning of the semester Dönemin başında dağıtılan "ders planı"nın bilgilendirme niteliği	○	○	○	○	○
14. Clarity of the lectures Dersin anlaşılabilirliği	○	○	○	○	○
15. Preparedness for the lectures and organization Derse hazırlıklı gelişi ve organizasyonu	○	○	○	○	○
16. Mastery of the course material Dersin konularına hakimiyeti	○	○	○	○	○
17. Clarity of handwriting El yazısının okunabilirliği	○	○	○	○	○
18. Clarity of descriptions, examples and illustrations presented in the lectures Derste verilen tanımlar, örnekler ve şekillerin anlaşılabilirliği	○	○	○	○	○
19. Availability during office hours Ofis saatlerinde ulaşılabilirliği	○	○	○	○	○
20. Efficient and effective use of the lecture time Ders saatini verimli ve etkili kullanımı	○	○	○	○	○
21. Prompt grading and posting solutions Notları ve çözümleri kısa sürede ilan etmesi	○	○	○	○	○
22. Would you choose another course from this instructor? Bu öğretim üyesinden başka ders seçer miydiniz?	○	○	○	○	○

If you have additional comments, please use this section
Ekleyeceğiniz yorumlarınız varsa, lütfen bu kısmı kullanınız

FORM KODU Y

T.C. YEDİTEPE ÜNİVERSİTESİ
Mühendislik ve Mimarlık Fakültesi

Ders Çıktı Değerlendirme Anketi

Please use the following scale to rate how the outcomes are served by this course:
(Note to the instructor: If an outcome is not served by this course, please ask your students to rate it as "**NA**" before filling out the rest of the evaluation).
NA: Not Applicable (does not serve) 1: Very little 2: Little 3: Moderately 4: Well 5: Very well

Lütfen aşağıdaki puantaj sistemini kullanarak bu dersin çıktılara nasıl hizmet verdiğini değerlendiriniz:
(Öğretim üyesine not: Öğrencilerinizin anketin geri kalanını değerlendirmeden önce dersinizin hizmet vermediği çıktıları "**ID**" şeklinde işaretlemelerini sağlayınız).
ID: İlgili değil (hizmet vermiyor) 1: Çok az 2: Az 3: Orta 4: İyi 5: Çok iyi

KOD	NO	ŞUBE	DÖNEM	YIL
CSE 0	000	00	GÜZ 0	00
BME 1	111	11	BAHAR 1	11
EE 2	222	22		22
GBE 3	333	33		33
FDE 4	444	44		44
CE 5	555	55		55
CHBE 6	666	66		66
ME 7	777	77		77
SYE 8	888	88		88
	999	99		99

		NA / ID	ÇOK AZ	AZ	ORTA	İYİ	ÇOK İYİ
i	**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.** (Matematik, fen bilimleri ve kendi dalları ile ilgili mühendislik konularında yeterli bilgi birikimi; bu alanlardaki kuramsal ve uygulamalı bilgileri mühendislik problemlerini modelleme ve çözme için uygulayabilme becerisi.)	○	1	2	3	4	5
ii	**Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.** (Karmaşık mühendislik problemlerini saptama, tanımlama, formüle etme ve çözme becerisi; bu amaçla uygun analiz ve modelleme yöntemlerini seçme ve uygulama becerisi.)	○	1	2	3	4	5
iii	**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. (Realistic constraints and conditions may include factors such as economic and environmental issues, sustainability, manufacturability, ethics, health, safety issues, and social and political issues, according to the nature of the design.)** (Karmaşık bir sistemi, süreci, cihazı veya ürünü gerçekçi kısıtlar ve koşullar altında,belirli gereksinimleri karşılayacak şekilde tasarlama becerisi; bu amaçta modern tasarım yöntemlerini uygulama becerisi. (Gerçekçi kısıtlar ve koşullar tasarımın niteliğine göre; ekonomi, çevre sorunları, sürdürülebilirlik, üretilebilirlik, etik, sağlık, güvenlik, sosyal ve politik sorunlar gibi öğeleri içerirler).	○	1	2	3	4	5
iv	**Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.** (Mühendislik uygulamaları için gerekli olan modern teknik ve araçları geliştirme, seçme ve kullanma becerisi; bilişim teknolojilerini etkin bir şekilde kullanma becerisi.)	○	1	2	3	4	5
v	**Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.** (Mühendislik problemlerinin incelenmesi için deney tasarlama, deney yapma, veri toplama, sonuçları analiz etme ve yorumlama becerisi.)	○	1	2	3	4	5
vi	**Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.** (Disiplin içi ve çok disiplinli takımlarda etkin biçimde çalışabilme becerisi; bireysel çalışma becerisi.)	○	1	2	3	4	5
vii	**Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.** (Sözlü ve yazılı etkin iletişim kurma becerisi; en az bir yabancı dil bilgisi.)	○	1	2	3	4	5
viii	**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.** (Yaşam boyu öğrenmenin gerekliliği bilinci; bilgiye erişebilme, bilim ve teknolojideki gelişmeleri izleme ve kendini sürekli yenileme becerisi.)	○	1	2	3	4	5
ix	**Awareness of professional and ethical responsibility.** (Mesleki ve etik sorumluluk bilinci.)	○	1	2	3	4	5
x	**Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.** (Proje yönetimi ile risk yönetimi ve değişiklik yönetimi gibi iş hayatındaki uygulamalar hakkında bilgi; girişimcilik, yenilikçilik ve sürdürebilir kalkınma hakkında farkındalık.)	○	1	2	3	4	5
xi	**Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.** (Mühendislik uygulamalarının evrensel ve toplumsal boyutlarda sağlık, çevre ve güvenlik üzerindeki etkileri ile çağın sorunları hakkında bilgi; mühendislik çözümlerinin hukuksal sonuçları konusunda farkındalık.)	○	1	2	3	4	5

T.C. YEDİTEPE ÜNİVERSİTESİ
Mühendislik ve Mimarlık Fakültesi

Yeni Mezun Anketi

Sevgili Öğrencimiz,

Çok yakında Yeditepe Üniversitesi Mühendislik ve Mimarlık Fakültesinden mezun olacaksınız. Sizleri şimdiden gönülden kutluyoruz. Aşağıdaki anketi doldurarak, hedeflerimize ulaşabilmemizde bize büyük katkı sağlamış olacaksınız. Anket 1 sayfadan oluşmaktadır. Optik okuyucu ile değerlendirilecektir. Ankete yanıtlarınız adınız ile ilişkilendirilmeyecektir. Katkınız ve zamanınız için çok teşekkür ederiz.

Yeni Mezun Bilgisi

Lütfen aşağıdaki bilgileri okunaklı bir şekilde doldurun.

Adınız Soyadınız	
Öğrenci Numaranız	
Ev Telefonlarınız	
Cep Telefonlarınız	
E-posta Adresleriniz	
Mezun Olduğunuz Bölüm	
Mezun olduğunuz Yıl	
Anketi Doldurma Tarihi	

ÖNEMLİ NOT:
Mezuniyet sonrasında Üniversiteniz, Bölümünüz ve Mezunlar Derneği ile ilişkinizi sürdürün.
LÜTFEN gelecekte olabilecek adres ve telefon değişikliklerini Bölüm sekreterinize bildirin.

Mezun olduğunuz bölüm	○ CSE	○ BME	○ EE	○ GBE	○ FDE	○ CE	○ CHBE	○ ME	○ SYE	○ ARCH		
Mezuniyet dereceniz (CGPA)	○ 2.00-2.50			○ 2.50-3.00			○ 3.00-3.50			○ 3.50-4.00		
Cinsiyetiniz	○ Kadın	○ Erkek										

Lütfen aşağıdaki belirtilen puanlama sistemini kullanınız.
ID. İlgili değil, gözlemleme olanağı yok/olmadı
1.Kesinlikle katılmıyorum 2.Katılmıyorum 3.Kısmen katılıyorum 4.Katılıyorum 5.Kesinlikle katılıyorum

1-a	Yeterli matematik, fen bilimleri ve mühendislik bilgi birikimim var.	ID 1 2 3 4 5
1-b	Bu bilgi birikimini mühendislik problemlerini modelleme ve çözme için uygulama becerisi kazandım.	ID 1 2 3 4 5
2-a	Karmaşık mühendislik problemlerini saptama, tanımlama, formüle etme ve çözme becerisi kazandım.	ID 1 2 3 4 5
2-b	Karmaşık mühendislik problemlerini çözmek için uygun analiz ve modelleme yöntemlerini seçme ve kullanma becerisi kazandım.	ID 1 2 3 4 5
3-a	Karmaşık bir sistemi, süreci, cihazı veya ürünü tasarlama becerisi kazandım.	ID 1 2 3 4 5
3-b	Modern tasarım yöntemlerini uygulama becerisi kazandım.	ID 1 2 3 4 5
4-a	Modern teknik ve araçları seçme, geliştirme ve kullanma becerisi kazandım.	ID 1 2 3 4 5
4-b	Bilişim teknolojilerini etkin bir şekilde kullanma becerisi kazandım.	ID 1 2 3 4 5
5-a	Deney yapma, veri toplama, sonuçları analiz etme ve yorumlama becerisi kazandım.	ID 1 2 3 4 5
5-b	Deney tasarlama becerisi kazandım.	ID 1 2 3 4 5
6-a	Disiplin içi ve çok disiplinli takımlarda etkin biçimde çalışabilme becerisi kazandım.	ID 1 2 3 4 5
6-b	Bireysel çalışma becerisi kazandım.	ID 1 2 3 4 5
7-a	Etkin iletişim kurma becerimi geliştirdim.	ID 1 2 3 4 5
7-b	Sunum yapma ve rapor yazma becerisi kazandım.	ID 1 2 3 4 5
8-a	Yaşam boyu öğrenmenin gerekliliği bilinci kazandım.	ID 1 2 3 4 5
8-b	Bilim ve teknolojideki gelişmeleri izleme ve kendimi sürekli yenileme becerisi kazandım.	ID 1 2 3 4 5
9	Mesleki ve etik sorumluluk bilinci kazandım.	ID 1 2 3 4 5
10-a	Proje yönetimi, risk yönetimi ve değişiklik yönetimi hakkında bilgi sahibi oldum.	ID 1 2 3 4 5
10-b	Girişimcilik, yenilikçilik ve sürdürebilir kalkınma hakkında farkındalık kazandım.	ID 1 2 3 4 5
11-a	Mühendislik uygulamalarının sağlık, çevre ve güvenlik üzerindeki etkileri ile çağın sorunları hakkında bilgi sahibi oldum.	ID 1 2 3 4 5
11-b	Mühendislik çözümlerinin hukuksal sonuçları konusunda farkındalık kazandım.	ID 1 2 3 4 5
12	Aldığım eğitimin kalitesinden memnunum.	ID 1 2 3 4 5
13	Bana sunulan laboratuvar olanaklarından memnunum.	ID 1 2 3 4 5
14	Verilen eğitimin İngilizce olmasından memnunum.	ID 1 2 3 4 5
15	Yapmış olduğum Çift Anadal/Yandal Programından memnunum.	ID 1 2 3 4 5
16	Üniversitedeki bilgisayar olanaklarından memnunum.	ID 1 2 3 4 5
17	Üniversitedeki kütüphane ve veritabanı olanaklarından memnunum.	ID 1 2 3 4 5
18	Üniversitedeki sosyal, sportif ve kültürel olanaklardan memnunum.	ID 1 2 3 4 5
19	Üniversitedeki yemek olanaklarından memnunum.	ID 1 2 3 4 5
20	Üniversitedeki servis (ulaşım) olanaklarından memnunum.	ID 1 2 3 4 5
21	Üniversitedeki yurt olanaklarından memnunum.	ID 1 2 3 4 5
22	Genel olarak Bölümümden memnunum.	ID 1 2 3 4 5
23	Genel olarak Mühendislik ve Mimarlık Fakültesi Dekanlığının verdiği hizmetten memnunum.	ID 1 2 3 4 5
24	Genel olarak Yeditepe Üniversitesi Rektörlüğü Öğrenci İşlerinin verdiği hizmetten memnunum.	ID 1 2 3 4 5