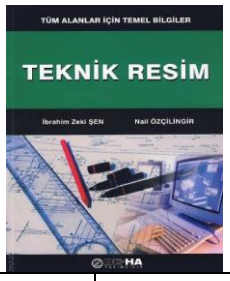
NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Computer Aided Technical Drawing	MKM-121	1/II	2+0+0	2	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	None
Instructor	:	Mechanical Engineering Instructor
Aims	:	To gain three-dimensional thinking ability, to provide the ability of reading technical drawings, to give the ability of drawing standard machine elements and machine assembly pictures and to teach using CAD software.
Course Learning Outcomes	:	The students to pass the course successfully will be able to; 1- Perform freehand sketching, technical writing and also refers to the level to be able to write dimensioning these pictures. 2- Draw standard and cross-sectional views of machine parts. 3- Have an idea about surface treatment symbols and apply them. 4- Draw the technical drawings and assembly pictures of the machine elements. 5- Use dimensional and geometric tolerances in a dominant way. 6- The student, who has all the theoretical and freehand sketching capabilities, can apply them in a CAD program at the next stage.
Course Content	:	Types of technical drawing, line work, perspective, projection, opening, threads and fasteners, locking and holding devices, riveted type bonding, welded connections, dimensioning, limitations and transitions, geometric tolerance, cams, bearings, felts, technical drawing applications, surface roughness, sectioning, intersections, expansions and finding of actual sizes, threaded profile and construction drawings, assembly pictures, using a computer aided drawing program.

Course Book



Teknik Resim	İbrahim Zeki Şen- Nail Özçilingir	Deha Publishing	2013

Other Resources

Autocad 2014 Tutorial First Level 2D Fundamentals	Robert H.Shih	SDC Publications
Autocad 2014 Tutorial Second Level 3D Modelling	Robert H.Shih	SDC Publications

Works/Project

Each week, homework and end-of-term projects will be held.

Using Computer

Students can do their homework by using computer (not obligatory).

Other Applications

Success Assessment System

	Activities	Base Grade	Piece	Contribution to Assessment,%	
	Midterm	50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Project	50	1	%	
	Term Paper	50	1	%	
	Laboratory Applications	50	1	%	
	Other Applications	50	1	%	
	Final Exam	50	1	60%	
	Make-up Exam/ GUE	50	-	100%	
	Single Course Exam / GUE	50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Medium	High	Very High

MECHANICAL ENGINEERING														
	PQ-1	PQ-2	PQ-3	PQ-4	PQ-5	PQ-6	PQ-7	PQ-8	PQ-9	PQ-10	PQ-11	PQ-12	PQ-13	PQ-14	PQ-15
CA-1	3		3				4	3	3						
CA-2	3		3				4	3	3						
CA-3	2		4				4	3	3						
CA-4	3		4				4	3	3						
CA-5	4		4				4	3	3						
CA-6	3		4				4	3	3						

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.			x		
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)		x			
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)	x				
5	The student should be able to show the ability to work in independent or interdisciplinary teams.			x		
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.		x			
8	Students should be able to access, evaluate, use and produce solutions the information they need.		x			
9	Students should have the skill of lifelong learning.			x		
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.					
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.	x				
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				x	

SYLLABUS	
Week	**Subject**
1	Description of the course, introduction, aim, processing, presentation of technical drawing tools and materials, standard writing, line types, geometric drawings, scale
2	Projection methods, center, parallel vertical projection, opening
3	Technical drawing of parts, auxiliary views, relations between appearances
4	Isometric projection methods, drawing order, dimensioning, tolerances, surface roughness, surface treatment marks
5	Section views, sectioning, Cross sectional scanning method, measurement
6	Introduction to 3D modeling, perspective drawing (isometric-cabinet)
7	Assembly drawing (perspective)
8	**MIDTERM**
9	Screw and screw elements, wedge and key connections, pins and pin connections, bolts
10	Adjusting rings, retaining rings, spindle locating plates, springs, gear wheels, bearings, welds, rivets and rivet connections
11	Introduction to CAD software, toolbox, commands, CAD drawing logic, transition from 2 to 3 dimensions
12	Visa drawings operates intensively commands
13	Solid modeling, part creation, editing and redefinition
14	Modeling Assembly modeling and assembly of parts
15	Obtaining 2D technical drawings from a 3D model

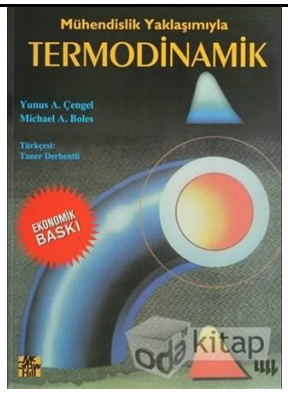
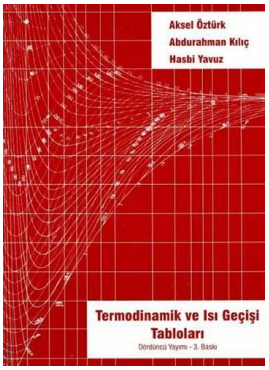
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	2	28
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	14	0.5	7
	Group or Self Study	--	--	--
Completion of Assignments and Submission as Reports		5	1	5
Term Project		-	--	--
Project Presentation		-	--	--
Other Works		-	--	--
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	8	8
Final Exam	Exam	1	2	2
	Self Study for exam	1	8	8
TOTAL WORKLOAD (Hour)		**60**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3

Last Updated Date	12.04.2019
Updater	Ens. Murat URYAN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Thermodynamics-1	MKM-211	2/I	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Physics-I & Mathematics-II
Instructor	:	Mechanical Engineering Instructor
Aims	:	This course aims to introduce fundamentals of Thermodynamics for designing of thermal systems includes power cycles. It's expected that students gain capability to carry out and analyse of various Thermodynamic processes (water vapor, refrigerant liquids and ideal gasses) and cycles. It's aim to gain the ability of calculating the related data during the state changes. Gas turbines, nozzles, heat exchangers, compressors are examined in terms of Thermodynamics to enhance the ability of analysis, application and communication in this field.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can express the basic concepts of Thermodynamics 2. First law of Thermodynamics: can conservation of mass and energy, work, heat transfer and be able to apply energy analysis in closed systems. 3. First law of Thermodynamics: can identify and be able to apply energy analysis of open system steady-flow systems 4. Can define second law of Thermodynamics and be able to analyze related systems. 5. Can identify entropy and can apply entropy analysis to related systems.
Course Content	:	Basic concepts and principles of Thermodynamics, properties of pure substance, first law of Thermodynamics in closed systems, specific heat, first law of Thermodynamics in open systems, un-steady open systems, work and heat, second law of Thermodynamics, entropy and heat energy, entropy relations, entropy change of pure substances, adiabatic efficiency, analysis of engineering systems with second law

Textbook	 Mühendislik Yaklaşımıyla Termodinamik — Yunus A.Çengel — Literatür — 1996
Other References	 Termodinamik ve Isı Geçişi Tabloları — Aksel Öztürk — Çağlayan — 2014
Homewor & Projects	Homework is required by the instructor in the required weeks.
Use of Computer	Students can do their homework by using computer (not obligatory).
Other Applications	

Success Assessment System

Activities		**Base Grade**	**Piece**	**Contribution to Assessment,%**	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	4														
CA-2	5	3	4	4				3							4
CA-3	5	3	4	4			4	3							4
CA-4	5	3	4	4				3							4
CA-5	5	3	4	4				3							4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.			X		
3	Students should be able to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).				X	
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).					X
5	The student should be able to show the ability to work independently or in interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.		X			
7	Students should be able to detect and identify problem areas and select the areas and methods for solving the subject.					X
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.				X	
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					X
15	Students should be able to show the competence of understanding the universal and social effects of Mechanical Engineering solutions.				X	

SYLLABUS	
WEEK	**Subjects**
1	Definitions and main concepts of Thermodynamics, properties of pure substance
2	Characteristic tables
3	First law of Thermodynamics
4	First law of Thermodynamics: energy equations in cycles and change of state
5	Specific heat
6	First law of Thermodynamics: control volumes
7	Energy analysis of open system steady-flow systems
8	**MIDTERM**
9	Analysis of un-steady open systems
10	Conservation of energy and mass
11	Second law of Thermodynamics
12	Entropy and heat energy
13	Entropy relations, entropy change of pure substances
14	Adiabatic efficiency
15	Analysis of engineering systems with second law

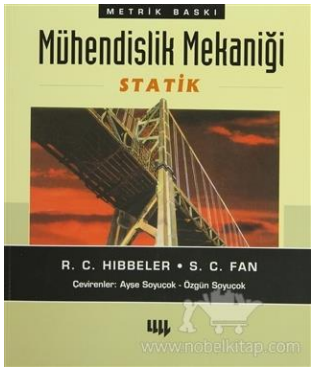
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	3	42
Laboratory Practice				
Guided Problem Solving	Course Work			
Group or Self Study		7	2	14
Completion of Assignments and Submission as Reports		4	1	4
Term Project				
Project Presentation				
Other Works		2	5	10
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	8	8
Final Exam	Exam	1	2	2
	Self Study for exam	1	8	8
TOTAL WORKLOAD(Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3 Credits

Last Updated Date	29.03.2019
Updater	Ens. Ayhan IŞIK

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
ENGINEERING COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Statics	MKM-212	2/I	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree, Required
Prerequisite Course	:	Physics-1
Instructor	:	
Aims	:	Examination of mechanically rigid body mechanics and statics of particles. Application of the basic principles of mechanics correctly for the analysis and solution of static problems.
Course Learning Outcomes	:	Students who successfully complete this course: 1. Will be able to define the basic principles of mechanics by using vector analysis, algebra and trigonometry tools. 2. Will be able to explain the components of two and three dimensional force systems. 3. Will be able to calculate the equilibrium problems of two and three dimensional force systems 4. Can make calculations such as resultant and equilibrium analysis in force systems by unit vector method.
Course Content	:	Statics of particles, space forces system, rigid bodies, equivalent force systems, equilibrium of rigid bodies, diffusive forces, bearing systems, friction, beams, rods, cables, load, connection between force and moment, virtual work method

<table>
<tr><td>Textbook</td><td> 

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<tr><td>Mühendislik Mekaniği Statik</td><td>R.C. Hibbeler</td><td>Literatür</td><td>2010</td></tr>
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<tr><td>Other Resources</td><td></td></tr>
<tr><td>Homework and Projects</td><td></td></tr>
<tr><td>Use of computer</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Applications</td><td></td></tr>
<tr><td>Success Assessment System</td><td>
<table>
<tr><th colspan="2">Activities</th><th>Base Grade</th><th>Piece</th><th colspan="2">Contribution to Assessment,%</th></tr>
<tr><td colspan="2">Midterm</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Projects</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Project / Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Applications</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
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RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Level of Contribution	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

	MECHANICAL ENGEENRING														
	PQ-1	PQ-2	PQ-3	PQ-4	PQ-5	PQ-6	PQ-7	PQ-8	PQ-9	PQ-10	PQ-11	PQ-12	PQ-13	PQ-14	PQ-15
CA-1	4	1	3	3			3	1		1			2		4
CA-2	4	1	4	4			3	1		2			3		5
CA-3	5	1	4	4			3	1		2			3		5
CA-4	5	2	4	4			3	1		2			3		5

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.	x				
3	Students should be able to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).				x	
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).				x	
5	The student should be able to show the ability to work independently or in interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to detect and identify problem areas and select the areas and methods for solving the subject.			x		
8	Students should be able to access, evaluate, use and produce solutions the information they need.	x				
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.		x			
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			x		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					
15	Students should be able to show the competence of understanding the universal and social effects of Mechanical Engineering solutions.					x

ECTS CREDITS/WORK LOAD TABLE

SYLLABUS	
WEEK	**Subjects**
1	Statics of particles
2	Space Forces System
3	Rigid Bodies: Equivalent System of Forces
4	Forces in beams and cables
5	Balance of space forces system
6	Distributed forces: centers of gravity
7	Distributed forces, moment of inertia
8	**MIDTERM**
9	Carrier Systems
10	Repeat and problem solutions
11	Friction: dry friction
12	Friction: screw, axle, discs
13	Forces in beams and cables
14	Links between load, force and moment
15	Method of Virtual Work

ACTIVITIES		NUMBER	HOUR	TOTAL WORKLOAD (Hour)
Theoretical Course		14	3	42
Application				
Guided Problem Solving	Course Work			
	Group or Self Study	7	2	14
Completion of Assignments and Submission as Reports		4	1	4
Term Project		--	--	--
Project Presentation		--	--	--
Quizzes		--	--	--
Midterm		1	2	2
Other Practices		2	5	10
Self-study for Midterm		1	8	8
Final Exam		1	2	2
Self-study for Final Exam		1	8	8
TOTAL WORKLOAD (Hour)		90		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3 Credits

Last Updated	04.04.2019
Updater	Ens. Ali GÜN

	NAVAL ACADEMY DEPARTMENT OF MECHANICAL ENGINEERING COURSE DESCRIPTION	

Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Materials Science	MKM-213	2/I	3+0+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Chemistry
Instructor	:	Mechanical Engineering Instructor
Aims	:	Definition of engineering materials, properties of materials, the study of production processes, making the student to be able to make selection by using material knowledge in design process
Course Learning Outcomes	:	The students who pass this course successfully; 1. Can recognize the internal structure of materials 2. Can learn basic professional terminology. 3. Can determine the place of use according to the properties of the material. 4. Can learn the strengthening mechanism, phase concepts and changing. 5. Can learn crystal defect and structures on material properties and test techniques used to determine mechanical properties. 6. Can be aware of the importance of corrosion in the material.
Course Content	:	Cast iron and steel metallurgy, properties and tests of materials, alloying elements in steels and iron, non-ferrous metals, non-metallic materials, welding, stress and strain, basic metallurgy, metals and processes, vibration, atomic structure, bond types and properties, crystal structure and properties, allotropy, crystal structure defects, metallic material deformation, solidification of metals, types of alloys, diffusion of metals, phase laws and phase diagrams, phase transformations, Fe-C system, heat treatment applied to metals, material inspections, destructive and non-destructive inspection methods, electrical, thermal, magnetic and optical properties, corrosion and protection of metals.

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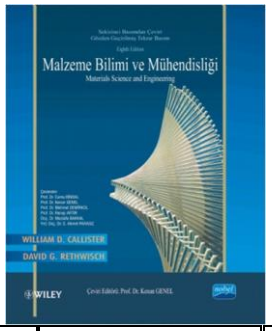
<tr><td>Course Book</td><td> 

<table>
<tr><td>Malzeme Bilimi ve Mühendisliği</td><td>William D.Callister</td><td>Nobel Publishing</td><td>2013</td></tr>
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<tr><td>Other Resources</td><td> 

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<tr><td>Malzeme Bilimi ve Mühendisliği</td><td>William E.Smith</td><td>Literatür</td><td>2001</td></tr>
</table></td></tr>
<tr><td>Works/Project</td><td>Studies on Fe-C System, Diagram drawing and phase determination of materials at different temperatures will be done.</td></tr>
<tr><td>Using Computer</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Applications</td><td>Friction on the surface of materials by tribometer or examination of the abrasion caused by different factors and detailed examination of the materials by optical microscope.</td></tr>
<tr><td>Success Assessment System</td><td>
<table>
<tr><th colspan="2">Assessment</th><th>Minimum Score</th><th>Number</th><th colspan="2">Grade Percentage%</th></tr>
<tr><td colspan="2">Mid Term Exam</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Projects</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Project /Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up Exam/ GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
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RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ -10**	**PQ -11**	**PQ -12**	**PQ -13**	**PQ -14**	**PQ-15**
CA-1	3	5	4		4		3	4	4						
CA-2	3		4		4		3	5	5				5	5	3
CA-3	3	4	4		4		4	5	4						
CA-4	3	5	4		4	3	4	4	4						
CA-5	3	5	4		4	3	4	4	4						
CA-6	3	4	4		4		4	4	4						

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.			x		
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					x
3	Students should have the ability to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).					
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)		x			
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				x	
8	Students should be able to access, evaluate, use and produce solutions the information they need.			x		
9	Students should have the skill of lifelong learning.				x	
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.					
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.					
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			x		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.					

SYLLABUS	
Week	**Subject**
1	Introduction to materials science and material properties
2	Atomic structure and inter-atomic bonds
3	Examination of crystal structures, allotropy, Miller indices
4	Crystal structure defects, causes and types of formation
5	Phase laws and diagrams, alloys
6	Mechanical properties of metals, dislocations
7	Fe-C equilibrium diagrams, iron based materials
8	**MIDTERM**
9	Heat treatment of materials, phase transformations, change in microstructure and mechanical properties
10	Water hardening, surface hardening
12	Plastic shaping process of materials
13	Corrosion
14	Non-metallic engineering materials (Ceramic, Polymer, Composite)
15	Non-destructive testing methods of materials

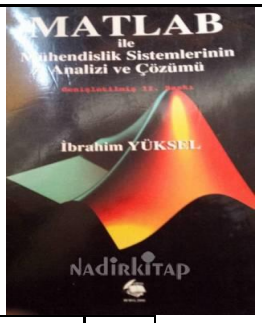
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	3	42
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	--	--	--
	Group or Self Study	7	2	14
Completion of Assignments and Submission as Reports		4	1	4
Term Project		1	--	--
Project Presentation		-	--	--
Other Works (Midterm)		2	5	10
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	8	8
Final Exam	Exam	1	2	2
	Self Study for exam	1	8	8
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		Total Work Load / 30 = 60 / 30		2

Last Updated	10.04.2019
Updater	Ens. Murat URYAN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
ENGINEERING COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Computer Use and Programming	MKM-214	2/I	2+0+0	2	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree, compulsory
Prerequisite Course	:	-
Instructor	:	
Aims	:	To introduce students to the basics of computer. To teach important software applications such as spreadsheets and databases. To introduce the basic architecture and technologies of the Internet. To introduce the basic skills needed to develop algorithms and computer programming skills to gain the support of mathematical topics.
Course Learning Outcomes	:	Students who successfully complete this course: 1. Recognize the basic principles of computer programs. 2. Define computerized systems used in maritime. 3. Have knowledge about programming languages. 4. Can use an algorithm program.
Course Content	:	Computers, the use of computers in daily life, computer hardware and software, operating systems, input/output and storage, network and internet, wired and wireless communication, text editors, spreadsheets, visualization, software like databases, error calculation with computers, Introduction to scientific problem solving using algorithms. Use of computer aided algorithm program.

Textbook	 MATLAB ile Mühendislik Sistemlerinin Analizi ve Çözümü — İbrahim Yüksel — Vipaş — 2000
Other Resources	Instructor lecture notes.
Homeworks and Projects	
Use of computer	Computer use is obligatory.
Other Applications	MATLAB

Success Assessment System		**Activities**	**Base Grade**	**Piece**	**Contribution to Assessment,%**	
		Midterm	50	1	24%	
	Semester Assessment	Quizzes	50	1	%	16%
		Homework	50	1	%	
		Projects	50	1	%	
		Term Project / Project	50	1	%	
		Laboratory Application	50	1	%	
		Other Applications	50	1	%	
		Final Exam	50	1	60%	
		Make-up exam / GUE	50	-	100%	
		Single Course Exam / GUE	50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very low	Low	Medium	High	Very high

	MECHANICAL ENGINEERING														
	PQ-1	PQ-2	PQ-3	PQ-4	PQ-5	PQ-6	PQ-7	PQ-8	PQ-9	PQ-10	PQ-11	PQ-12	PQ-13	PQ-14	PQ-15
CA-1	5	2	3	2			3	1		4			3		5
CA-2	5	2	3	2			3	1		4			3		5
CA-3	5	2	3	2			3	1		4			3		5
CA-4	5	2	3	2			3	1		4			3		5

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.		x			
3	Students should be able to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).			x		
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).		x			
5	The student should be able to show the ability to work independently or in interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to detect and identify problem areas and select the areas and methods for solving the subject.			x		
8	Students should be able to access, evaluate, use and produce solutions the information they need.	x				
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				x	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			x		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					
15	Students should be able to show the competence of understanding the universal and social effects of Mechanical Engineering solutions.					x

SYLLABUS	
WEEK	**Subjects**
1	Basic principles of programming: mathematical and logical basics
2	Development of computers and their usage, basic hardware and software information, introduction to operating systems, network and computer network, internet, wired/wireless communication.
3	Introduction to the algorithm program. Variables and commands
4	Matrix operations
5	Matrix operations
6	Loops (for, while)
7	Loops (for, while)
8	**MIDTERM**
9	Functions
10	Functions
11	Functions
12	Cell structures
13	Reading and writing from input and output (fread, fprint, save, load)
14	Plotting
15	Plotting

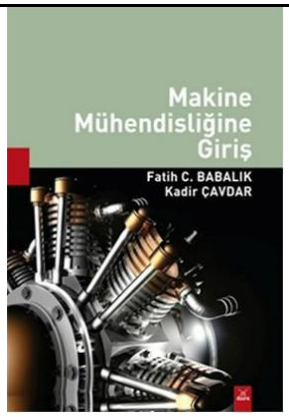
ECTS CREDITS/WORK LOAD TABLE			
ACTIVITIES	**NUMBER**	**HOUR**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	14	2	28
Application			
Study Hours Out of Class	5	1	5
Completion of Assignments and Submission as Reports	8	1	8
Term Project	--	--	--
Project Presentation	--	--	--
Quizzes	--	--	--
Midterm	1	2	2
Self-study for Midterm	1	5	5
Final Exam	1	2	2
Self-study for Final Exam	1	10	10
TOTAL WORKLOAD (Hour)	60		
ECTS CREDITS	Total Work Load / 30 = 60 / 30		2 Credits

Last Updated	04.04.2019
Updater	Ens. Ali GÜN

	**NAVAL ACADEMY** **DEPARTMENT OF MECHANICAL ENGINEERING** **COURSE DESCRIPTION**	

Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Introduction to Mechanical Engineering	MKM-215	2/I	2+0+0	2	1

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	None
Instructor	:	Mechanical Engineering Instructor
Aims	:	To give the students of Naval Academy Department of Mechanical Engineering a broad knowledge about machine science, to present new technological developments, to promote the profession and to provide engineering ethics.
Course Learning Outcomes	:	The students who pass the course successfully; 1. Will learn the purpose of the courses to be taken in engineering education. 2. Will have information about the present, future, job opportunities and the role of the profession. 3. Will gain basic skills for time management and project planning. 4. Will gain the consciousness of professional ethics and responsibility. 5. Students who successfully complete this course will be closer to the profession and motivated by listening to experiences of alumni and their colleagues. 6. Will be able to understand and apply the importance of lifelong education
Course Content	:	Naval Academy training program introduction, development of mechanical engineering over time, ethics, application areas

<table>
<tr><td>Course Book</td><td> 

<table>
<tr><td>Makine Mühendisliğine Giriş</td><td>Fatih C.Babalık</td><td>Dora</td><td>2012</td></tr>
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<tr><td>Other Resources</td><td></td></tr>
<tr><td>Works/Project</td><td></td></tr>
<tr><td>Using Computer</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Applications</td><td></td></tr>
<tr><td>Success Assessment System</td><td>
<table>
<tr><th colspan="2">Assessment</th><th>Base Grade</th><th>Piece</th><th colspan="2">Grade Percentage, %</th></tr>
<tr><td colspan="2">Midterm</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Paper</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Applications</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Applications</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
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</table>

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Level of Contribution	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	3						3	3	3						5
CA-2									5	4	4	3	5	3	5
CA-3					4	4	3		4	4	4	4			
CA-4									4				5	5	5
CA-5								3	3			4	4		5
CA-6									5						

Seq. No	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.			x		
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.	x				
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)	x				
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).	x				
5	The student should be able to show the ability to work in independent or interdisciplinary teams.		x			
6	Students should be able to work as managers, planners or coordinators in team and project works.				x	
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.		x			
8	Students should be able to access, evaluate, use and produce solutions the information they need.					x
9	Students should have the skill of lifelong learning.					x
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.					x
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.	x				
12	Students should have the ability to communicate effectively.	x				
13	Students should have professional and ethical responsibility.	x				
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.		x			
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.		x			

SYLLABUS	
Week	**Subject**
1	Engineering concept
2	Measurement systems
3	Machinery-equipment-supplies
4	Manufacturing methods
5	Engineering design - construction
6	Thermodynamics - Fluid Mechanics
7	Heat transfer
8	**MİDTERM**
10	Strength calculations
11	Materials
12	Machine elements
13	Automation - Automatic Control
14	CNC Technique - Quality and measurement techniques
15	Explaining professional experiences - question and answer

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	2	28
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	--	--	--
	Group or Self Study	--	--	--
Completion of Assignments and Submission as Reports		-	--	--
Term Project		--	--	--
Project Presentation		-	--	--
Other Works		--	--	--
Midterm Exam	Exam	1	1	1
	Self Study for exam	1	1	1
Final Exam	Exam	1	1	1
	Self Study for exam	1	27	27
TOTAL WORKLOAD (Hour)		**60**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3

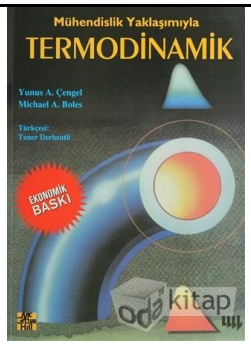
Last Updated	11.04.2019
Updater	Ens. Murat URYAN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Thermodynamics-2	MKM-222	2/II	(3+0+0)	3	3

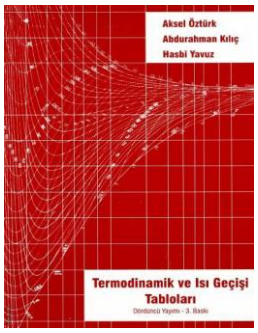
Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Thermodynamics-I
Instructor	:	Mechanical Engineering Instructor
Aims	:	This course aims to gain engineering perspective and to transfer application areas of thermodynamic cycles. To analyze steam power cycles, refrigeration cycles, gasoline, diesel and gas turbine cycles. To enhancing the ability of analysis, practice and communication in this field.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can perform thermodynamic analysis of gasoline, diesel and gas turbine cycles 2. Can perform thermodynamic analysis of basic and regenerative steam cycles. 3. Can evaluate the effects of cogeneration cycles on energy efficiency. 4. Can analyze refrigeration cycles of vapor compression and gas flow 5. Will be able to understand the thermodynamic cycles which are the basis of the systems used in ships. 6. Can identify thermodynamic properties of gas and vapor mixtures
Course Content	:	Gases and their thermodynamics properties, gas-vapor mixtures, ideal gas cycles, Otto cycle, diesel cycle, Brayton cycle, regenerative gas turbine cycle. Ideal gas turbine cycle, vapor cycles, Rankine cycles, ideal regenerative Rankine cycle, cogeneration and combined gas-vapor cycles, gas refrigeration cycles, Thermodynamics of moist air, psychometrics diagrams, air conditioning and ventilation systems, Carnot principle and cycle, heat engines and cycles, compressor cycles

Textbook



Mühendislik Yaklaşımıyla Termodinamik	Yunus A.Çengel	Literatür	1996

Other References



Termodinamik Tablolar	D.H.O	D.H.O	1996
Termodinamik ve Isı Geçişi Tabloları	Aksel Öztürk	Çağlayan	2014

Homework & Projects

Homework is required by the instructor in the required weeks.

Use of Computer

Students can do their homework by using computer (not obligatory).

Other Applications

Success Assessment System

Activities		Base Grade	Piece	Contribution to Assessment,%	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	5	4	4	4	4			4							4
CA-2	5	4	4	4	5			3	4						4
CA-3	5			3	4										3
CA-4	5	3	3	3	5			3							4
CA-5	4				4		4	4			4	4			4
CA-1	4				4										

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.			X		
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)				X	
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)					X
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.		X			
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.					X
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.				X	
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					X
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

SYLLABUS	
WEEK	**Subjects**
1	Properties of gases, gas cycles (ideal air cycle)
2	Otto and diesel cycle
3	Brayton cycle
4	Regenerative gas turbine cycles
5	Ideal gas turbines
6	Vapor cycles, Rankine cycle
7	Ideal regenerative Rankine cycle
8	**MIDTERM**
9	Ideal regenerative Rankine cycle
10	Cogenerated and combined gas-vapor cycles
11	Refrigeration cycles
12	Gas refrigeration cycles
13	Thermodynamics of moist air, psychometrics diagrams
14	Air conditioning and ventilation systems
15	Heat engines and cycles, compressor cycles

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical	Theoretical Instruction	14	3	42
Laboratory Practice				
Guided Problem Solving	Course Work			
Group or Self Study		14	1	14
Completion of Assignments and Submission as Reports		2	3	6
Term Project				
Project Presentation				
Other Works		2	4	8
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	8	8
Final Exam	Exam	1	2	2
	Self Study for exam	1	8	8
TOTAL WORKLOAD (Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3 Credits

Last Updated Date	29.03.2019
Updater	Ens. Ayhan IŞIK

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
ENGINEERING COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Dynamics	MKM-223	2/II	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Physics-1, Mathematics-2
Instructor	:	
Aims	:	Thorough understanding of the basic principles of mechanics and their implementation to solve engineering problems. Explanation of the basic concepts of Dynamics including Force, Mass and Acceleration, Work and Energy, Impulse and Momentum.
Course Learning Outcomes	:	Students who successfully complete this course: 1. Will be able to define the basic concepts of Dynamics. 2. Analyze motion parameters. 3. Can identify the types of particle motion. 4. Explain the relationship between particle motion versus force, mass, acceleration. 5. Can define work and energy concepts and perform their analysis. 6. Can define impulse and momentum concepts and perform their analysis.
Course Content	:	Kinematics of particles, kinetics of force points, mass and acceleration, principle of work and energy, linear motion, curvilinear motion, kinematics of rigid bodies, absolute and relative velocity in plane motion, planar motion of rigid bodies, impulse and momentum principle, collision

<table>
<tr><td>Textbook</td><td> 

<table>
<tr><td>Mühendislik Mekaniği Dinamik</td><td>R.C. Hibbeler</td><td>Literatür</td><td>2009</td></tr>
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<tr><td>Other Resources</td><td></td></tr>
<tr><td>Homework and Projects</td><td></td></tr>
<tr><td>Use of computer</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Applications</td><td></td></tr>
<tr><td>Success Assessment System</td><td>
<table>
<tr><th colspan="2">Activities</th><th>Base Grade</th><th>Piece</th><th colspan="2">Contribution to Assessment,%</th></tr>
<tr><td colspan="2">Midterm</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Projects</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Project / Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Applications</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
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RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

	MECHANICAL ENGINEERING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	4		3	3	1		3			3			2		5
CA-2	5		3	4	1		3			3			2		5
CA-3	5		4	4	1		3			3			2		5
CA-4	5		3	4	1		3			3			2		5
CA-5	4		4	4	1		3			3			2		5
CA-6	4		4	4	1		3			3			2		5

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					
3	Students should be able to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).			x		
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).				x	
5	The student should be able to show the ability to work independently or in interdisciplinary teams.	x				
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to detect and identify problem areas and select the areas and methods for solving the subject.			x		
8	Students should be able to access, evaluate, use and produce solutions the information they need.					
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			x		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.		x			
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					
15	Students should be able to show the competence of understanding the universal and social effects of Mechanical Engineering solutions.					x

SYLLABUS	
WEEK	**Subjects**
1	Kinematics of particles
2	Force, mass and acceleration
3	General curvilinear motion
4	General curvilinear motion
5	Kinematics of rigid bodies
6	Rotation around a fixed axis
7	General motion
8	**MIDTERM**
9	General motion
10	Kinetics of particles (forces and accelerations)
11	Planar kinetics of rigid bodies (forces and accelerations)
12	Kinetics of particles (work and energy)
13	Planar kinetics of rigid bodies (work and energy)
14	Kinetics of particles (impulse and momentum)
15	Kinetics of particles (impulse and momentum)

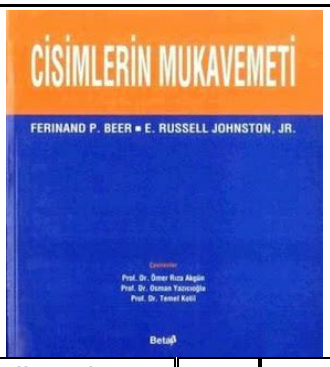
ECTS CREDITS / WORK LOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course		14	3	42
Guided Problem	Course Work			
	Group or Self Study	14	2	28
Completion of Assignments and Submission as Reports		2	3	6
Term Project				
Project Presentation				
Midterm		1	2	2
Self Study for exam		1	5	5
Final Exam		1	2	2
Self Study for exam		1	5	5
TOTAL WORKLOAD(Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3 Credits

Last Updated	20.03.2019
Updater	Ens. Ali GÜN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
ENGINEERING COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Strength of Materials	MKM-311	3/I	(4+0+0)	4	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree, Required
Prerequisite Course	:	Physics-1, Statics
Instructor	:	
Aims	:	Fundamental concepts of strength, mechanical properties of materials, axial normal force, shear stress and force, bending stress, and to teach the elastic curve subject and the problems encountered in the use of solution.
Course Learning Outcomes	:	Students who successfully complete this course: 1. Recognize the general concepts of strength. 2. Understand one-dimensional and two-dimensional stress analysis. 3. Can solve stress and strain problems in axial loading. 4. Students can calculate the status of the elements in the case of torsional stability. 5. Calculate the normal stress in the loading state. 6. Analyze the required shear force, normal force and moment diagrams in the design and perform their drawings.
Course Content	:	The concept of internal forces and stress, stress and strain in axial loading, torsion, simple bending, transverse loading, stress and strain deformations, design of beams and shafts according to strength, calculation of beam's deflection, energy methods, examination of beam problems.

<table>
<tr><td>Textbook</td><td> 

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<tr><td>Cisimlerin Mukavemeti</td><td>Ferdinand P.Beer</td><td>Beta</td><td>2003</td></tr>
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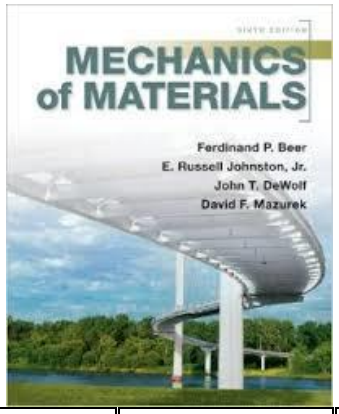
<tr><td>Other Resources</td><td> 

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<tr><td>Engineering Mechanics of Materials</td><td>Ferdinand P.Beer</td><td>McGrawhill</td><td>2012</td></tr>
</table></td></tr>
<tr><td>Homework and Projects</td><td></td></tr>
<tr><td>Use of computer</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Applications</td><td></td></tr>
<tr><td>Success Assessment System</td><td>
<table>
<tr><th colspan="2">Activities</th><th>Base Grade</th><th>Piece</th><th colspan="2">Contribution to Assessment,%</th></tr>
<tr><td colspan="2">Midterm</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Projects</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Project / Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Applications</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
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RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Level of Contribution	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

	MECHANICAL ENGINEERING														
	PQ-1	PQ-2	PQ-3	PQ-4	PQ-5	PQ-6	PQ-7	PQ-8	PQ-9	PQ-10	PQ-11	PQ-12	PQ-13	PQ-14	PQ-15
CA-1	5	2	3	3	1		3	3		3	4		4	1	4
CA-2	5	2	3	3	1		4	3		3	4		4	1	4
CA-3	5	3	4	4	1		4	4		3	4		4	1	4
CA-4	5	3	4	4	1		4	4		3	4		4	1	4
CA-5	5	3	4	4	1		4	4		3	4		4	1	4
CA-6	5	3	4	4	1		4	4		3	4		4	1	4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				x	
3	Students should be able to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).				x	
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).			x		
5	The student should be able to show the ability to work independently or in interdisciplinary teams.	x				
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to detect and identify problem areas and select the areas and methods for solving the subject.				x	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				x	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			x		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.				x	
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.				x	
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.	x				
15	Students should be able to show the competence of understanding the universal and social effects of Mechanical Engineering solutions.				x	

SYLLABUS	
WEEK	**Subjects**
1	The concept of internal forces and stress.
2	Stress and strain in axial loading.
3	Shear force, shear stress.
4	The Mohr circle.
5	Moment of inertia
6	Simple bending.
7	Torsion.
8	**MIDTERM**
9	Stress resultants (normal force and bending)
10	Stress resultants (normal force and torsion)
11	Stress resultants (bending and torsion)
12	Stress and strain deformations.
13	Design of beams and shafts on the basis of strength.
14	The calculation of deflection on the beams.
15	Buckling of columns.

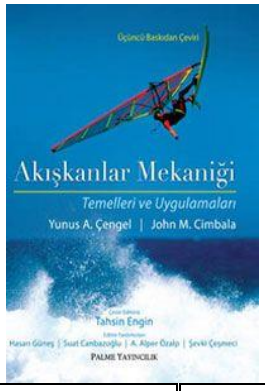
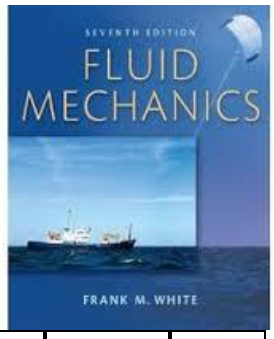
ECTS CREDITS/WORK LOAD TABLE				
ACTIVITIES		**NUMBER**	**HOUR**	**TOTAL WORKLOAD (Hour)**
Theoretical Course		15	4	60
Application				
Study Hours Out of Class				
Guided Problem	Course Work			
	Group or Self Study	2	5	10
Completion of Assignments and Submission as Reports				
Term Project		--	--	--
Project Presentation		--	--	--
Quizzes		--	--	--
Midterm		1	2	2
Other Practices		2	1	2
Self-study for Midterm		1	4	4
Final Exam		1	2	2
Self-study for Final Exam		1	10	10
TOTAL WORKLOAD (Hour)		90		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3 Credits

Last Updated	04.04.2019
Updater	Ens. Ali GÜN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Fluid Mechanics	MKM-312	3/I	(4+0+0)	4	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Physics-I & Differential Equations
Instructor	:	Mechanical Engineering Instructor
Aims	:	Introducing the basic principles of Fluid Mechanics. To define, formulate and simplify the basic equations of Fluid Mechanics and and to use the ability to solve problems.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Will have knowledge of properties of fluids, and will be able to perform basic analysis of flow systems. 2. Can calculate the fluid pressure at the static state and the forces applied by static fluids on surfaces. 3. Can solve Bernoulli and energy equations 4. Can do momentum analysis of flow systems 5. Can perform dimensional analysis and similitude 6. Can define the basic characteristics of laminar and turbulent flows 7. Can define major and minor losses in pipe systems 8. Can develop flow equations in integral and differential forms and can perform basic solutions. 9. Can evaluate drag and buoyancy forces.
Course Content	:	Basic concepts and definitions. Flow properties, pressure, pressure variation in static fluids, hydrostatic force on inclined surfaces, relative equilibrium, linear acceleration, flow characteristics, flow types, open system general equations, continuity equation and Bernoulli equation, energy and momentum equations, dimensional analysis and modeling, Buckingham π theorem, similarity, modeling, laminar and turbulent flow in pipes, major and minor losses in pipes, differential flow analysis, exact solutions of Navier Stokes equations, external flow, drag and buoyancy

Textbook	 Akışkanlar Mekaniği Temelleri ve Uygulamaları — Yunus A.Çengel — Güven yayınları — 2008
Other References	 Akışkanlar Mekaniği — Frank M.White — Literatür — 2004
Homework & Projects	Homework is required by the instructor in the required weeks.
Use of Computer	Students can do their homework by using computer (not obligatory).
Other Applications	

Success Assessment System

Activities		**Base Grade**	**Piece**	**Contribution to Assessment,%**	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	5			4				4			4				4
CA-2	5		4	4			3				4				
CA-3	5			4				4			3				3
CA-4	4			3											
CA-5	4			3											
CA-6	4			4			3	3			3				4
CA-7	5	5	4	4			4	4			4				4
CA-8	5														
CA-9	5		3	4			3	3			4				3

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.			X		
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)			X		
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.				X	
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.				X	
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.				X	
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.			X		

SYLLABUS	
WEEK	**Subjects**
1	Fluid properties
2	Pressure, pressure variation in static fluids
3	Hydrostatic force on submerged surfaces
4	Relative equilibrium, linear acceleration, flow characteristics, flow types, open system equations
5	Fluid kinematics
6	Continuity equation and Bernoulli equation
7	Energy and momentum equations
8	**MIDTERM**
9	Dimensional analysis and modeling, Buckingham π theorem
10	π theorem pressure coefficient, Reynolds, Froud, Weber and Mach numbers, similarity, modeling
11	Laminar and turbulent flow in pipes
12	Major and minor losses in pipes
13	Differential flow analysis
14	Exact solutions of Navier Stokes equations
15	External flow, drag and buoyancy

ECTS CREDITS / WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (HOUR)**	**TOTAL WORKLOAD (HOUR)**
Theoretical Course	Theoretical Instruction	14	4	56
Laboratory Practice				
Guided Problem Solving	Course Work			
Group or Self Study		10	1	10
Completion of Assignments and Submission as Reports		2	2	4
Term Project				
Project Presentation				
Other Works				
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	8	8
Final Exam	Exam	1	2	2
	Self Study for exam	1	8	8
TOTAL WORKLOAD (Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		**3**

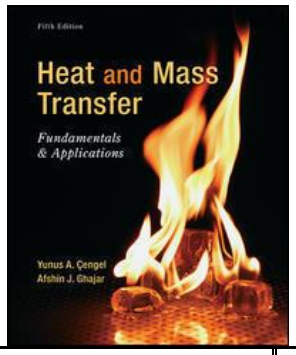
Last Updated Date	10.04.2019

Updater	Ens.Ayhan IŞIK

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Fundamentals of Heat Transfer	MKM-321	3/II	(2+0+0)	2	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Physics-I, Differential Equations, Thermodynamics-II, Fluid Mechanics
Instructor	:	Mechanical Engineering Instructor
Aims	:	Introducing the basic principles of heat transfer. To introduce the methods of heat transfer (including conduction, convection and radiation) and to gain the ability to calculate the heat transfer for each. To develop the ability to solve engineering problems by defining and formulating thermal systems.
Course Learning Outcomes	:	Students who successfully complete this course can; 1. Define heat transfer methods 2. Analyze heat conduction and convection problems 3. Evaluate heat transfer in laminar and turbulent flow systems 4. Identify and analyze heat exchangers 5. Have ability to gain analysis, application and interpretation of heat transfer problems in theoretical and applied fields.
Course Content	:	Basic concepts and principles, Fourier law of conduction, heat transfer via conduction and convection, thermal conductivity, one dimensional heat conduction and multilayer wall systems, steady-state heat conduction, turbulent flow on horizontal plane, laminar and turbulent flow in pipes and channels, hydraulics and thermal boundary layers, boiling and condensation, heat exchangers.

Textbook					
	Isı ve Kütle Geçişinin Temelleri	Frank P.Incropera	Literatür	2001	
Other References					
	Heat and Mass Transfer Fundamentals and Applications	Yunus A.Çengel	Mc Grawhill	2011	
Homework & Projects	Homework is assigned by the instructor in the required weeks.				
Use of Computer	Students can do their homework by using computer (not obligatory).				
Other Applications					

Success Assessment System		**Activities**	**Base Grade**	**Piece**	**Contribution to Assessment, %**	
		Midterm	50	1	24%	
	Semester Assessment	Quizzes	50	1	%	16%
		Homework	50	1	%	
		Projects	50	1	%	
		Term Project /Project	50	1	%	
		Laboratory Application	50	1	%	
		Other Application	50	1	%	
		Final Exam	50	1	60%	
		Make-up Exam/ GUE	50	-	100%	
		Single Course Exam / GUE	50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	4			4				4							
CA-2	5			4			4	4			4				3
CA-3	5	3	3	4				3							3
CA-4	4	3	3	3			3	3			3				3
CA-5	4	3	3	3			4	4			4				4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				X	
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)			X		
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.				X	
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			X		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.			X		

SYLLABUS	
WEEK	**Subjects**
1	Introduction to heat transfer, conservation of energy principle
2	General heat diffusion equations, boundary and initial conditions
3	Heat conduction
4	One dimensional steady-state heat conduction and multilayer wall systems
5	One dimensional steady-state heat conduction and multilayer wall systems
6	Conduction with thermal energy generation
7	Heat convection
8	**MIDTERM**
9	Heat convection
10	Turbulent flow on horizontal plane
11	Laminar and turbulent flow in pipes and channels
12	Hydraulics and thermal boundary layers
13	Natural convection
14	Boiling and condensation
15	Heat exchangers

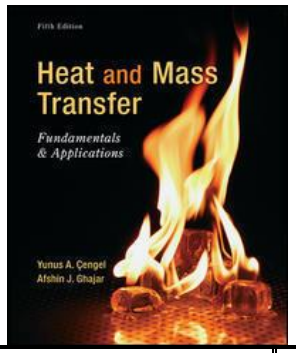
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	2	28
Laboratory Practice				
Guided Problem Solving	Course Work			
Group or Self Study		14	1	14
Completion of Assignments and Submission as Reports		1	2	2
Term Project				
Project Presentation				
Other Works				
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	6	6
Final Exam	Exam	1	2	2
	Self Study for exam	1	6	6
TOTAL WORKLOAD (Hour)		**60**		
ECTS CREDITS		Total Work Load / 30 = 60 / 30		2

Last Updated Date	16.04.2019
Updater	Ens. Ayhan IŞIK

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Heat Transfer	MKM-321	3/II	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Physics-I, Differential Equations, Thermodynamics II, Fluid Mechanics
Instructor	:	Mechanical Engineering Instructor
Aims	:	Introducing the basic principles of Heat Transfer. To introduce heat transfer forms (conduction, convection and radiation) and to gain the ability to calculate the heat transfer for each. To develop the ability to solve engineering problems by defining and formulating thermal systems. To achieve to interpret on thermal systems.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can define heat transfer methods. 2. Can analyze the heat conduction, convection and radiation and solve the related problems. 3. Can calculate the heat transfer in the form of laminar and turbulent flow in various systems 4. Can identify and analyze heat exchangers 5. Can gain the ability to analyze, solve and interpret of heat transfer problems in practice and theory.
Course Content	:	Basic concepts and principles, Fourier law of conduction, heat transfer via conduction, convection and radiation, thermal conductivity, one dimensional heat conduction and multilayer wall systems, steady heat conduction, un-steady heat conduction, radial heat conduction, finned surfaces (extended surface), turbulent flow on horizontal plane, laminar and turbulent flow in pipes and channels, hydraulics and thermal boundary layers, boiling and condensation, heat exchangers

Textbook	 Isı ve Kütle Geçişinin Temelleri | Frank P.Incropera | Literatür | 2001
Other References	 Heat and Mass Transfer Fundamentals and Applications | Yunus A.Çengel | Mc Grawhill | 2011
Homework & Projects	Homework is required by the instructor in the required weeks.
Use of Computer	Students can do their homework by using computer (not obligatory).
Other Applications	

Success Assessment System

Activities		**Base Grade**	**Piece**	**Contribution to Assessment,%**	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	4			4				4							
CA-2	5			4			4	4			4				3
CA-3	5	3	3	4				3							3
CA-4	4	3	3	3			3	3			3				3
CA-5	4	3	3	3			4	4			4				4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				X	
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)			X		
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.				X	
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			X		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.			X		

SYLLABUS	
WEEK	**Subjects**
1	Introduction to heat transfer, conservation of energy
2	Heat conduction
3	One dimensional steady heat conduction and multilayer wall systems
4	Transient heat conduction
5	Finned surfaces (extended surface)
6	Heat convection
7	Turbulent flow on horizontal plane
8	**MIDTERM**
9	Laminar and turbulent flow in pipes and channels
10	Hydraulics and thermal boundary layers
11	Natural convection
12	Boiling and condensation
13	Radiation
14	Radiation, heat exchangers
15	Heat exchangers

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (HOUR)**	**TOTAL WORKLOAD (HOUR)**
Theoretical Course	Theoretical Instruction	14	3	42
Laboratory Practice				
Guided Problem Solving	Course Work			
Group or Self Study		14	1	14
Completion of Assignments and Submission as Reports		2	2	4
Term Project				
Project Presentation				
Other Works		2	3	6
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	10	10
Final Exam	Exam	1	2	2
	Self Study for exam	1	10	10
TOTAL WORKLOAD (Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3 Credits

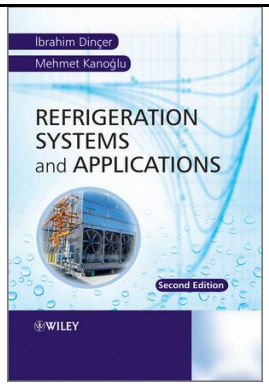
Last Updated Date	10.04.2019
Updater	Ens.Ayhan IŞIK

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
HVAC and Refrigeration	MKM-322	3/II	(2+0+0)	2	2

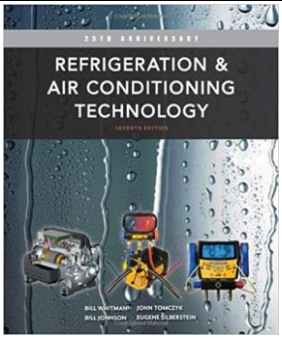
Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Thermodynamics II, Fluid Mechanics
Instructor	:	Mechanical Engineering Instructor
Aims	:	This course aims to introduce fundamentals of Refrigeration and HVAC Systems used in ships and land facility. Obtaining the design, operation and maintenance ability of these facilities. To be able to design and selection of Refrigeration and HVAC Systems. To teach the calculation of heating and cooling loads.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can define Refrigeration and HVAC Systems used in ships and land facilities 2. Can apply thermodynamics analysis of Refrigeration and HVAC Systems 3. Can calculate cooling load 4. Can design cooling towers and surfaces 5. Can design air duct
Course Content	:	Refrigerants, refrigeration principles, refrigeration cycles, multi-stage evaporator systems, compressor types and working principles, evaporators, valves and capillary pipe systems, condenser, thermodynamics of mixtures, absorption refrigeration cycle, cooling engines with reception, ship refrigeration systems, cold/freezing rooms, refrigeration systems with air refrigerant, liquefaction of gases, psychrometrics, cooling towers, air-conditioning cycle, cooling and dehumidification systems, specific humidity, relative humidity, condensation point, water spray air-conditioning, ventilation, air duct design, heating systems

Textbook



Refrigeration Systems and Applications	Dinçer Kanoğlu	Wiley	2010

Other References



Refrigeration and Air Conditioning Techonology	Bill Whitman	Cengage Learning	2013

Homework & Projects

Homework is required by the instructor in the required weeks.

Use of Computer

Students can do their homework by using computer (not obligatory).

Other Applications

Success Assessment System

Activities		Base Grade	Piece	Contribution to Assessment,%	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	4			4				4			4				5
CA-2	5	4		4				4			4				4
CA-3	5			4				3			4				4
CA-4	4		4	3			3	4			3				3
CA-5	4		4	3			3	3			3				3

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.			X		
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)			X		
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.					X
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					X
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			X		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

SYLLABUS	
WEEK	**Subjects**
1	Refrigerants, refrigeration principles, refrigeration cycles
2	Multi-stage evaporator systems
3	Compressor types and working principles
4	Evaporators, valves and capillary pipe systems
5	Condenser, thermodynamics of mixtures
6	Absorption refrigeration cycle, cooling engines with reception
7	Refrigeration systems with air refrigerant, obtaining liquid air and cryogenics
8	**MIDTERM**
9	Specific humidity, relative humidity, condensation point
10	Psychrometrics, cooling tower
11	Air-conditioning cycle, cooling and dehumidification systems
12	Water spray air-conditioning, ventilation
13	Ventilation, air duct design, heating systems
14	Cooling systems in ships, food and ship’s load safety
15	Cooling systems in ships, food and ship’s load safety

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (HOUR)**	**TOTAL WORKLOAD (HOUR)**
Theoretical Course	Theoretical Instruction	14	2	28
Laboratory Practice				
Guided Problem Solving	Course Work			
Group or Self Study		10	1	10
Completion of Assignments and Submission as Reports				
Term Project				
Project Presentation				
Other Works (Midterm)		2	3	6
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	6	6
Final Exam	Exam	1	2	2
	Self Study for exam	1	6	6
TOTAL WORKLOAD (Hour)		**60**		
ECTS CREDITS		Total Work Load / 30 = 60 / 30		2

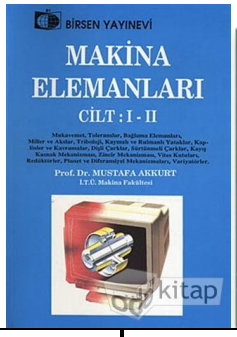
Last Updated Date	10.04.2019
Updater	Ens.Ayhan IŞIK

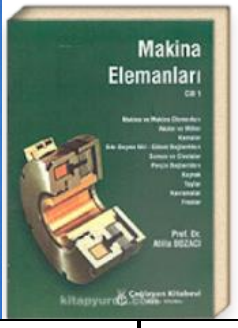
NAVAL ACADEMY
DEPARTMENT OF MECHANİCAL ENGINEERING
ENGINEERING COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Machine Elements	MKM-323	3/II	(4+0+0)	4	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Statics, Dynamics, Strength of Materials, Materials Science
Instructor	:	Mechanical Engineering Instructor
Aims	:	To teach the basic information and calculation methods to make the most appropriate design of the elements that make up the machine and which have certain features that make the machine work.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can define and classify machine elements according to their functions 2. Can categorize the behavior of machine elements under static and dynamic constraints. 3. Can make two and three dimensional deformations related to machine elements. 4. Will learn the fundamentals of rivet connections, riveting methods, opening methods of rivet holes, can associate rivet patterns and make the calculations of rivet connections strength. 5. Can relate and calculate the elements used in shaft, pin and other connections. 6. Can calculate the strength of bolt connections and choose their size.
Course Content	:	Basic concepts, strength theories, structure of machine elements, loading types, rivets, welds, bolts, keys, springs, shafts, bearing housings

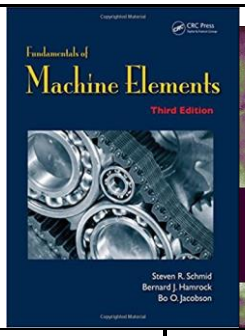
Textbook

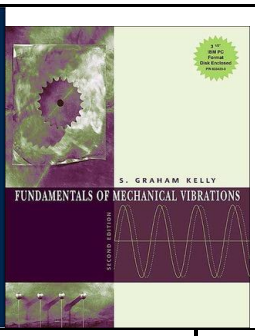




Makine Elemanları (1.Cilt)	Atilla Bozacı	Seç Yayınevi	2000
Makine Elemanları Cilt I	Mustafa Akkurt	Birsen Yayınevi	1997
Makine Elemanları Cilt II	Mustafa Akkurt	Birsen Yayınevi	1997

Other References





Fundamentals of Mechanical Vibrations	S.Graham Kelly	McGraw Hill	2000
Fundemantals of Machine Elements	Steven R.Schmid	CRC Press	2014

Homework & Projects

Computer Use

Students can do their homework by using computer (not obligatory).

Other Activities

Assessment Criteria

	Activities	Base Grade	Quantity	Effects on Grading, %	
	Midterm Exams	50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Paper/Project	50	1	%	
	Laboratory Work	50	1	%	
	Other Activities	50	1	%	
	Final Exam	50	1	60%	
	Makeup Exam	50	-	100%	
	Single-course Exam	50	-	100%	

Seq. No	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				X	
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					X
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.		X			
6	Students should be able to work as managers, planners or coordinators in team and project works.		X			
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.			X		
8	Students should be able to access, evaluate, use and produce solutions the information they need.			X		
9	Students should have the skill of lifelong learning.			X		
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			X		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.			X		
12	Students should have the ability to communicate effectively.		X			
13	Students should have professional and ethical responsibility.		X			
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			X		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Level of Contribution	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	4	4	5	4			4	4	4	3			2		4
CA-2	5	4	5	4			4	4	2	3			2		4
CA-3	5	4	5	4			4	4	2	3			2		4
CA-4	5	4	5	4			4	4	2	3			2		4
CA-5	5	4	5	4			4	4	2	3			2		4
CA-6	5	4	5	4			4	4	2	3			2		4

SYLLABUS	
WEEK	**Subjects**
1	Definitions and concepts
2	Strength theories
3	Fatigue, strength limit, notch precision diagrams
4	Structure of machine elements, loading types
5	Stress boosters and design equations
6	Rivets
7	Objectives, methods, shapes and dimensions in welds
8	**MIDTERM**
9	Stresses and connection quality in welds
10	Bolts (terminology, classification, materials)
11	Bolts (strength, bolt stresses in static and dynamic load)
12	Keys
13	Housing
14	Springs
15	Shafts

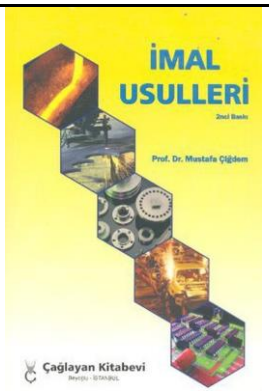
ECTS CREDITS / WORK LOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	4	56
	Laboratory Practice	0	0	0
Guided Problem Solving	Course Work	14	1	14
	Group or Self Study	14	1	14
Completion of Assignments and Submission as Reports				
Term Project		4	1	4
Project Presentation				
Other Works				
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	6	6
Final Exam	Exam	1	2	2
	Self Study for exam	1	6	6
TOTAL WORKLOAD (Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3

Last Updated Date	10.04.2019
Updater	Ens. Musa Cenk ÖZEKİNCİ

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Manufacturing Processes	MKM-324	3/II	2+0+1	2.5	4

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	None
Instructor	:	Mechanical Engineering Instructor
Aims	:	To introduce the principles and application areas of basic manufacturing methods, to give information about casting, plastic forming, machining, and powder metallurgy.
Course Learning Outcomes	:	The students who pass this course successfully: 1. Have basic information about the principles and application areas of manufacturing methods. 2. To have knowledge about the advantages, limitations and application areas of manufacturing methods. 3. To provide the ability to determine the most appropriate method for solving engineering problems with the knowledge of manufacturing. 4. Will be able to use the knowledge of conventional manufacturing methods and to make basic calculations. 5. Can choose the working parameters related to manufacturing methods. 6. Comprehends the necessity of reaching the optimum in all operations.
Course Content	:	Manufacturing technologies and general concepts, casting technique, manufacturing errors and solutions, plastic forming, machining, welding, powder metallurgy, micro and nano-manufacturing, hydride manufacturing, electrical discharge machining, water cutting, laser processing, rapid prototyping, production, CNC Introduction to G codes and machining parts

Course Book	 İmal Usulleri | Mustafa Çiğdem | Çağlayan | 2006
Other Resources	
Works/Project	The use of CNC G codes in processing a part to be covered theoretically
Using Computer	Students can do their homework by using computer (not obligatory).
Other Applications	

Success Assessment System

Assessment		Minimum Score	Number	Grade Percentage, %	
Midterm Exam		50	1	24%	
Semester evaluation	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Medium	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	3		3				3	4						5	
CA-2	3		4				5	4						4	
CA-3	4		4	3			5	4						4	
CA-4	5		4				4	4						4	
CA-5	4		4				4	4						4	
CA-6	5		4	3			4	4						5	

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.		x			
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					x
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)				x	
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)			x		
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				x	
8	Students should be able to access, evaluate, use and produce solutions the information they need.			x		
9	Students should have the skill of lifelong learning.				x	
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field					
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.					
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			x		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.					

SYLLABUS	
Week	**Subjects**
1	Casting technology
2	Model preparation and molding techniques, core preparation, melting and casting techniques
3	Die casting techniques: sand mold casting, ceramic mold, shell mold, plaster mold, precision casting
4	Fixed mold casting techniques; metal, pressure casting, centrifugal and continuous casting and casting cleaning techniques
5	Plastic deformation of metals (tension, strain, tensile test, slip, cold deformation)
6	Crystal geometry concepts - microstructure - hot deformation
7	Rolling - extrusion - forging and wire drawing - plastering - sheet metal working - pipe manufacturing
8	**MIDTERM**
9	Basic principles of welding - melting techniques (gas, arc, termite sources)
10	Combining techniques by applying pressure and melting (pressure, gas technique, resistance, induction)
11	Terminology of machining, introduction to CNC G codes and their meanings
12	Chip removal (cutting zone, chip formation, chip removal - temperature control)
13	Machining methods (turning - milling - drilling - grinding)
14	Cutting tools (cutting tool materials, insert selection, tool geometry, cutting and feed speeds, tool life)
15	Powder metallurgy - CNC G codes for machining

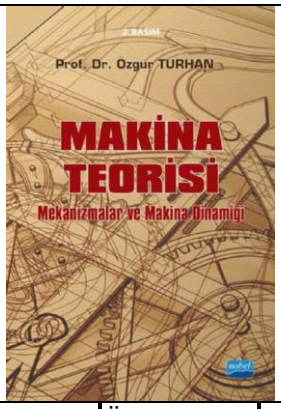
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	4	60
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	10	1	10
	Group or Self Study	--	--	--
Completion of Assignments and Submission as Reports		-	--	--
Term Project		4	1	4
Project Presentation		-	--	--
Other Works		-	--	--
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	6	6
Final Exam	Exam	1	2	2
	Self Study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3 Credits

Last Updated	10.04.2019
Updater	Ens. Murat URYAN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
ENGINEERING COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Mechanisms	MKM-325	3/II	(2+0+0)	2	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree, Required
Prerequisite Course	:	Statics, Dynamics
Instructor	:	
Aims	:	To understand the structure and movements of mechanisms, to determine the degree of freedom of mechanism, to learn the movements that can be realized by mechanisms, to learn speed and acceleration analysis methods
Course Learning Outcomes	:	Students who successfully complete this course: 1. When look at a mechanism, he/she can understand the structure, find the degree of freedom, and make structural changes. 2. Can analyze mechanisms and design them for some purposes. 3. Will be able to do kinematic analysis of ordinary and planetary gear mechanisms. 4. Will be able to analyze the speed and acceleration of mechanisms.
Course Content	:	Main concepts in mechanism technique, kinematic chains, degree of freedom, equations of motion of plane machines, force analysis in machines, gyroscopic effects

Textbook	 Makine Teorisi — Özgür TURHAN — Nobel — 2014
Other Resources	Dizel motorları teorisi — — Birsen — 2008
Homework and Projects	
Use of computer	Students can do their homework by using computer (not obligatory).
Other Applications	

Success Assessment System

Activities		Base Grade	Piece	Contribution to Assessment,%	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project / Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Applications	50	1	%	
Final Exam		50	1	60%	
Make-up exam / GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES RELATIONSHIP

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

	MECHANICAL ENGINEERING														
	PQ-1	PQ-2	PQ-3	PQ-4	PQ-5	PQ-6	PQ-7	PQ-8	PQ-9	PQ-10	PQ-11	PQ- 12	PQ-13	PQ-14	PQ-15
CA-1	5		3	3	4		4	4		3	4				4
CA-2	5		3	3	4		4	4		3	4				4
CA-3	5		3	3	4		4	4		3	4				4
CA-4	5		3	3	4		4	4		3	4				4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					
3	Students should be able to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).			x		
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).			x		
5	The student should be able to show the ability to work independently or in interdisciplinary teams.				x	
6	Students should be able to work as managers, planners or coordinators in team and project works.					
7	Students should be able to detect and identify problem areas and select the areas and methods for solving the subject.				x	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				x	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			x		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.				x	
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.					
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					
15	Students should be able to show the competence of understanding the universal and social effects of Mechanical Engineering solutions.				x	

SYLLABUS	
WEEK	**Subjects**
1	Introduction to mechanisms
2	Mechanism systematic
3	Kinematic of mechanisms
4	Mechanism design
5	Introduction to machine dynamic
6	Equations of motion of planes with one degree of freedom
7	Static balance of machine
8	**MIDTERM**
9	Operating forces impact on the machines
10	Evaluation of motion equations in machine
11	Force analysis in machines
12	Shaking forces, mass balancing on machines
13	Mass balancing in rigid rotors
14	Gyroscopic effects
15	The overview

ECTS CREDITS/WORK LOAD TABLE			
ACTIVITIES	**NUMBER**	**HOUR**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	14	2	28
Application			
Study Hours Out of Class			0
Completion of Assignments and Submission as Reports	10	1	10
Term Project	--	--	--
Project Presentation	--	--	--
Quizzes	--	--	--
Midterm	1	2	2
Self-study for Midterm	1	9	9
Final Exam	1	2	2
Self-study for Final Exam	1	9	9
TOTAL WORKLOAD (Hour)	60		
ECTS CREDITS	Total Work Load / 30 = 60 / 30		2 Credits

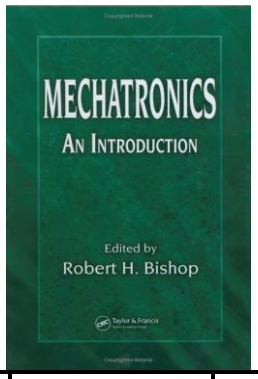
Last Updated	04.04.2019
Updater	Ens. Ali GÜN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Automatic Control	MKM-411	4/I	(3+0+0)	3	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Mathematics-2, Physics-1, Physics-2
Instructor	:	Mechanical Engineering Instructor
Aims	:	To introduce the basic principles of automatic control systems consisting of sensors, mechanical, electrical/electronic and programming. These and similar courses are intended to be successful, knowledgeable, and able to follow new technologies.
Course Learning Outcomes	:	Students who successfully complete this course will be able to; 1. Can define the fundamentals of automatic control systems. 2. Can use sensors in systems. 3. Define data collection systems. 4. Can grasp the Boolean algebra. 5. Can apply pneumatic, hydraulic, mechanical systems in automatic control systems. 6. Can control mechatronic systems with PLC.
Course Content	:	Automatic control input, control systems, open / close systems, Boolean algebra, actuators and sensors, data acquisition systems, measuring systems, pneumatic systems, mechanical systems.
Textbook		

Otomatik Kontrol Sistemleri	Benjamin C.Kuo	Literatür	2009

<table>
<tr><td>Other Resources</td><td>


<table>
<tr><td>Mechatronics an Introduction</td><td>Robert H.Bishop</td><td>CRC Taylor and Francis</td><td>2006</td></tr>
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</td></tr>
<tr><td>Homework and Projects</td><td></td></tr>
<tr><td>Use of computer</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Applications</td><td></td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th colspan="2">Activities</th><th>Base Grade</th><th>Piece</th><th colspan="2">Contribution to Assessment,%</th></tr>
<tr><td colspan="2">Midterm Exam</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Projects</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Project /Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up Exam/ GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
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RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Level of Contribution	1	2	3	4	5
	Very Low	Low	Medium	High	Very High

MECHANICAL ENGINEERING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	5		5				4			5					
CA-2	3		5	5			5								5
CA-3	4		5	5			5								5
CA-4	4		4							5					
CA-5	5		4	5			5			5					5
CA-6	3	4		4			4			3					4

Seq. No.	Program Qualifications	Dersin Katkı Düzeyi				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.		X			
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					X
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)			X		
5	The student should be able to show the ability to work in independent or interdisciplinary teams.			X		
6	Students should be able to work as managers, planners or coordinators in team and project works.		X			
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.			X		
8	Students should be able to access, evaluate, use and produce solutions the information they need.			X		
9	Students should have the skill of lifelong learning.			X		
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			X		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.		X			
12	Students should have the ability to communicate effectively.	X				
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.		X			
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.					X

SYLLABUS	
Week	**Subjects**
1	Automatic control input, control systems, open / closed systems, Boolean algebra
2	Sensors, performance terms, types of sensors, inductive and capacitive sensors, encoders, tachogenerators
3	Pressure / temperature sensors, light sensors and their applications
4	Data acquisition systems, pumps and their applications
5	Control systems and programming with servo and stepper motors
6	Measuring systems, analog/digital measuring devices, recorders
7	Data acquisition system, indicators, test and calibration
8	**MIDTERM**
9	Pneumatic actuators, cylinders, valves and connectors
10	Hydraulic systems, their advantages and disadvantages, system elements
11	Mechanical systems, gearboxes, rack and pinion systems.
12	Gear-wheel mechanisms, guideways, housing.
13	Electric drive systems
14	Relay, diode, transistor, solenoid
15	Electric motors, DC / AC motors, step / linear motors

ECTS CREDIT / WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	3	42
	Laboratory Practice			
Guided Problem Solving	Class Work			
	Group or Self Study			
Completion of Assignments and Submission as Reports		2	1	2
Term project		1	5	5
Project Presentation				
Other Works				
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	3	3
Final exam	Exam	1	2	2
	Self Study for exam	1	4	4
TOTAL WORKOAD (Hour)		**60**		
ECTS CREDITS		Total Work Load / 30 = 60 / 30		**2**

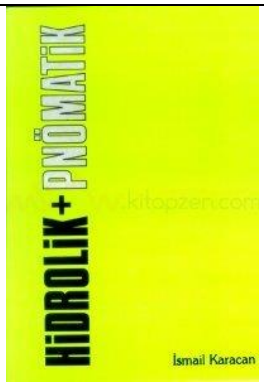
Last Updated	15.04.2019
Updater	Ens. Muhammet Taha AKKOÇ

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class hour (T+P+L))	Credit	ECTS
Hydraulic and Pneumatic Systems	MKM-412	4/I	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Fluid mechanics
Instructor	:	Mechanical Engineering Instructor
Aims	:	In this course, hydraulic and pneumatic circuit design recognition, planning and finding solutions are aimed. It also provides information on operating pressures, operating temperatures, transmission of hydraulics and losses on the operation of existing hydraulic systems in ships.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can define hydraulic and pneumatic systems and circuit elements. 2. Can distinguish pumps, motors, cylinders and seals. 3. Can make calculations of pneumatic and hydraulic system. 4. Can choose the hydraulic-pneumatic control systems used in the Navy 5. Can define hydraulic-pneumatic control systems in submarines, frigates and assault boats.
Course Content	:	Introduction to hydraulics and introduction of hydraulic system, Flow control methods, accumulators and fluids, Maintenance and safety measures in hydraulic circuits, Hydraulic and pneumatic standard hydraulic circuit samples and representation with symbols. Introduction to pneumatics, calculations of pneumatic systems, cylinders, sealing elements, motors, drawing of pneumatic circuits, maintenance fault detection and isolating guides, hydraulic-pneumatic control systems in our fleet, hydraulic-pneumatic control system applications in submarines, frigates and assault boats.

Textbook



Hidrolik ve Pnömatik	İsmail Karacan	Bizim Büro	1997

Other Resources

Hidrolik pnömatik sistemler		Birsen	2012
Hidrolik pnömatik		Birsen	2013
Hidrolik makinalar : çözülmüş problemlerle		Birsen	1984

Homework and Projects

Use of computer

Students can do their homework by using computer (not obligatory).

Success Assessment System

Activities		**Base Grade**	**Piece**	**Contribution to Assessment,%**	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50		%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Medium	High	Very High

MECHANICAL ENGINEERING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	3	5	5	5			4								4
CA-2	3	3	5	4											4
CA-3	5	4	5	5											4
CA-4	3													5	
CA-5	3													5	

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					X
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					X
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.			X		
6	Students should be able to work as managers, planners or coordinators in team and project works.		X			
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.			X		
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.		X			
12	Students should have the ability to communicate effectively.	X				
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					X
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

SYLLABUS	
Week	**Subjects**
1	Introduction to hydraulics and of hydraulic systems
2	Advantages of hydraulic system and introduction of hydraulic circuit elements, oil tanks, pipes and hoses
3	Pumps, motors, cylinders and sealing elements
4	Directional and flow control valves
5	Flow control methods, accumulators and fluids
6	Filters, sealing elements, manometers, maintenance and safety measures in hydraulic circuits
7	Hydraulic and pneumatic standard symbols, hydraulic circuit samples and representation with symbols.
8	**MIDTERM**
9	Introduction to pneumatics, advantages of circuit elements
10	Production and distribution of compressed air , elements used production of compressed air
11	Pneumatic system calculations, cylinders, sealing elements, motors
12	Operating principles of pneumatic directional control valves
13	Pressure control valves, flow control valves, special valves, servo valves, circuit elements, power control
14	Drawing of pneumatic circuits, maintenance-fault detection and isolating guides, hydraulic-pneumatic controlled systems in our fleet
15	Examples of hydraulic-pneumatic control systems in submarines, frigates and assault boats.

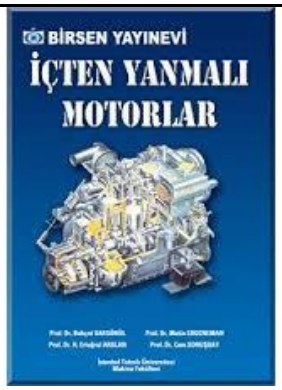
ECTS CREDIT/WORKLOAD TABLE			
ACTIVITIES	**NUMBER**	**TIME (HOUR)**	**TOTAL WORKLOAD (HOUR)**
Theoretical Course	14	3	42
Practices			
Study Hours Out of Class	14	1	14
Completion of Assignments and Submission Reports	4	4	16
Term project			
Project Presentation			
Quiz			
Midterm Exam	1	2	2
Self Study for midterm exam	1	7	7
Final Exam	1	2	2
Self Study for final exam	1	7	7
TOTAL WORKLOAD (Hour)	**90**		
ECTS CREDITS	Total Work Load / 30 = 90 / 30		3

Last Updated Date	15.04.2019
Updater	Ens. Muhammet Taha AKKOÇ

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Internal Combustion Engines	MKM-413	4/I	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Static, Machine Elements, Thermodynamics I-II, Heat Transfer
Instructor	:	Mechanical Engineering Instructor
Aims	:	The aim of this course is to teach the working principles, new technologies of internal combustion engines and design and selection of main engines of warships.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can define the thermodynamic model, air intake and exhaust flow, friction and combustion, emission analysis in internal combustion engines. 2. Can apply the basic principles of thermodynamics, fluid mechanics and heat transfer to the application fields in internal combustion engines with the current modeling and analysis techniques. 3. Can do thermodynamic analysis of internal combustion engines. 4. Can determine the design parameters of internal combustion engines. 5. Can use basic experiments and testing systems for internal combustion engines. 6. Can make the selection and design of the main engine of the warships.
Course Content	:	Introduction to internal combustion engines, operation and power characteristics, engine parameters, ideal power cycles, P-V diagram, timing diagram, standard air cycles, air and fuel intake systems, mixture formation and combustion chemistry, charge systems, exhaust systems, emissions, heat transfer in machines and cooling systems, friction and lubrication, dynamics and kinematics of internal combustion engines, dimensioning of engine elements, main engine selection, principles of safe machine operation

Textbook	 İçten Yanmalı Motorlar | Behçet Saf Gönül | Birsen Yayınevi | 2005
Other References	İçten Yanmalı Motorlar | | Birsen | 2003
Homework & Projects	
Computer Use	Students can do their homework by using computer (not obligatory).
Other Activities	

Success Assessment System

Activities		Base Grade	Piece	Contribution to Assessment,%	
Midterm		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project/Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PP-1	**PP-2**	**PP-3**	**PP-4**	**PP-5**	**PP-6**	**PP-7**	**PP-8**	**PP-9**	**PP-10**	**PP-11**	**PP-12**	**PP-13**	**PP-14**	**PP-15**
CA-1	5	5	4	5			4	4	2	2			3		4
CA-2	5	5	4	5			4	4	2	2			3		4
CA-3	5	5	4	5			4	4	2	2			3		4
CA-4	5	5	4	5			4	4	2	2			3		4
CA-5	5	5	4	5			4	4	2	2			3		4
CA-6	5	5	4	5			5	5	2	2			3		4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				X	
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)				X	
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)					X
5	The student should be able to show the ability to work in independent or interdisciplinary teams.			X		
6	Students should be able to work as managers, planners or coordinators in team and project works.			X		
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.			X		
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			X		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.			X		
12	Students should have the ability to communicate effectively.		X			
13	Students should have professional and ethical responsibility.		X			
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			X		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

SYLLABUS	
WEEK	**Subjects**
1	Introduction to internal combustion engines, classification of engines, definition of engine terms, main engine cycles
2	Operation and power characteristics, engine parameters
3	Ideal power cycles, standard air cycles, Otto cycle, diesel cycle, hybrid cycle, Stirling cycles
4	Air and fuel intake systems, volumetric efficiency of machines, fuel injection, super-charging and turbo-charging, sweeping methods on two-stroke machines
5	Mixture formation and combustion chemistry, hydrocarbon fuels, diesel fuels, alternative fuels
6	Charge systems, exhaust systems, emissions
7	Heat transfer and cooling systems in engines
8	**MIDTERM**
9	Friction and lubrication
10	Dynamics and kinematics of internal combustion engines
11	Dimensioning of engine elements, piston, piston pin, connecting rod, crankshaft
12	Dimensioning of engine elements, valves, piston head, shim
13	Main engine selection, selection, principles,
14	Resistance calculations, engine characteristic
15	Principles of safe machine operation

ECTS CREDITS / WORK LOAD TABLE					
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**	
Theoretical Course	Theoretical Instruction	14	3	42	
	Laboratory Practice	0			
Guided Problem Solving	Course Work				
	Group or Self Study	14	1	14	
Completion of Assignments and Submission as Reports					
Term Project					
Presentation					
Other Presentation					
Midterm Exam	Exam	1	3	3	
	Self Study for exam	1	14	14	
Final Exam	Exam	1	3	3	
	Self Study for exam	1	14	14	
TOTAL WORKLOAD(Hour)		**90**			
ECTS CREDITS		Total Work Load / 30 = 90 / 30			3

Last Updated Date	15.04.2019
Updater	Ens. Musa Cenk ÖZEKİNCİ

	NAVAL ACADEMY DEPARTMENT OF MECHANICAL ENGINEERING COURSE DESCRIPTION	

Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Laboratory	MKM-414	4/I	2+0+0	2	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Thermodynamics, Materials Science, Fluid Mechanics, Heat Transfer, Strength of Materials
Instructor	:	Mechanical Engineering Instructor
Aims	:	In the Machine Laboratory course, experiments related to the basic courses of Mechanical Engineering such as Fluid Mechanics, Thermodynamics, Strength of Materials, Material Sciences, etc. are performed, and the results are compared with the analytical calculations and experimental results. In this way, students can do the applications of these courses in laboratory environment. These experiments include experiments such as the steam cycle, loss of pipes, lubrication of the bearings, strength of the material, cooling and air conditioning cycles that students will encounter in ships in the next years. In this way, the students gain the skills to recognize and run the devices that make up these experimental sets, to record data, to compare the theoretical results with experimental results and to prepare a technical report.
Course Learning Outcomes	:	The students to pass the course successfully; 1. Can establish experimental setup. 2. Can compare theoretical calculations with practical application. 3. Can solve engineering problems. 4. Can make assessment. 5. Can compare the measurement systems. 6. Interpret the results of the experiment.
Course Content	:	The importance of measurement in engineering, analysis of experimental findings, dimension, pressure, flow, temperature measurements. Introduction of experiments and standard test result report format. Refrigeration cycle and implementation of relevant tests. Flow measurement in pipes and application of related experiments. Friction losses in pipes and implementation of related experiments. Heat exchangers and application of related experiments. Resistance and buoyant forces on the object within a flow, air tunnel test. Hydrodynamic theory, introduction to materials science, tensile strength theory of materials, tensile test and hardness measurement.

Course Book	 Ölçme Tekniği | Osman F.Genceli | Birsen | 2012
Other Resources	Ölçme Tekniği | | Birsen | 2000
Works/Project	
Using Computer	Students can do their homework by using computer (not obligatory).
Other Applications	

Success Assessment System	**Assessment**		**Minimum Score**	**Number**	**Grade Percentage, %**	
	Mid Term Exam		50	1	24%	
	Semester evaluation	Quizzes	50	1	%	16%
		Homework	50	1	%	
		Projects	50	1	%	
		Term Paper/Project	50	1	%	
		Laboratory Work	50	1	%	
		Other Activities	50	1	%	
	Final Exam		50	1	60%	
	Make-up Exam/ GUE		50	-	100%	
	Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Medium	High	Very High

MECHANICAL ENGINEERING

	PQ-1	PQ-2	PQ-3	PQ-4	PQ-5	PQ-6	PQ-7	PQ-8	PQ-9	PQ-10	PQ-11	PQ-12	PQ-13	PQ-14	PQ-15
CA-1	3	5	3		5		4	4	3					4	
CA-2	5	5			4		4	4							3
CA-3	5	5		5				3							
CA-4	5	5						5							
CA-5	5	5													3
CA-6		5					4	4							3

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					x
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					x
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				x	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.					x
6	Students should be able to work as managers, planners or coordinators in team and project works.			x		
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				x	
8	Students should be able to access, evaluate, use and produce solutions the information they need.				x	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.		x			
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.			x		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.				x	
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.			x		

SYLLABUS	
Week	**Subject**
1	The importance of measurement in engineering, introduction of experiments and standard test result report format, dimensional standards error analysis
2	Size, pressure, flow, temperature measurements.
3	Cooling theory, flow measurement in pipes, friction loss experiments.
4	Introduction to materials science, tensile strength theory of materials, air tunnel, heat exchangers, introduction of hydrodynamic lubrication tests.
5	Conducting experiments assigned to groups
6	Conducting experiments assigned to groups
7	Conducting experiments assigned to groups
8	Conducting experiments assigned to groups
9	**MIDTERM**
10	Conducting experiments assigned to groups
11	Conducting experiments assigned to groups
12	Conducting experiments assigned to groups
13	Conducting experiments assigned to groups
14	Presentation of the experiments by groups
15	Presentation of the experiments by groups

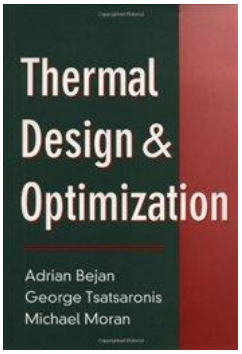
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	1	15
	Laboratory Practice	15	1	15
Guided Problem Solving	Course Work	5	1	5
	Group or Self Study	15	1	15
Completion of Assignments and Submission as Reports		-	--	--
Term Project		--	--	--
Project Presentation		-	--	--
Other Works		-	--	--
Midterm Exam	Exam	1	1	1
	Self Study for exam	1	4	4
Final Exam	Exam	1	1	1
	Self Study for exam	1	4	4
TOTAL WORKLOAD (Hour)		**60**		
ECTS CREDITS		Total Work Load / 30 = 60 / 30		2

Last Updated	15.04.2019
Updater	Ens. Murat URYAN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Design of Thermal Systems	MKM-415	4/I	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Thermodynamics I-II, Heat Transfer, Fluid Mechanics
Instructor	:	Mechanical Engineering Instructor
Aims	:	In the light of previously learned information, it is aimed to teach the design, modeling, and simulation and optimization principles of the thermal system which serve a specific purpose.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can define machine or system and determine their functions. 2. Can make the calculations of the thermal system according to the desired properties. 3. Can identify and combine the system elements appropriately.. 4. Can make drawings of thermal system. 5. Can calculate the cost of the thermal system. 6. Can evaluate the results by making comparisons.
Course Content	:	Fundamentals of machine design, concept development and innovation, design input parameters, review of basic information to be used in design (Thermodynamics I-II, Heat Transfer, Fluid Mechanics), design and preparation of feasibility / solid model, cost analysis, preparation of project report and project presentation.

<table>
<tr><td>Textbook</td><td>


<table>
<tr><td>Thermal Design & Optimization</td><td>Adrian Bejan</td><td>John Wiley</td><td>1995</td></tr>
</table>
</td></tr>
<tr><td>Other References</td><td>1-Design and Optimization of Thermal Systems, Yogesh JALURIA, CRC
2-Design of Thermal Systems, W.F. STOECKER, McGraw Hill</td></tr>
<tr><td>Homework & Projects</td><td></td></tr>
<tr><td>Computer Use</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Activities</td><td></td></tr>
<tr><td>Success Assessment System</td><td>
<table>
<tr><th colspan="2">Activities</th><th>Base Grade</th><th>Piece</th><th colspan="2">Contribution to Assessment,%</th></tr>
<tr><td colspan="2">Midterm Exams</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Projects</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Paper/Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Work</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Activities</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up Exam/ GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
</table>
</td></tr>
</table>

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	4	4	4	4	3	3	4	5	2	3			3		4
CA-2	5	5	4	5	3	3	4	5	2	3			3		4
CA-3	5	5	4	5	3	3	4	5	2	3			3		4
CA-4	5	5	4	5	3	3	4	5	2	3			3		4
CA-5	5	5	4	5	3	3	4	5	2	3			3		4
CA-6	5	5	4	5	3	3	4	5	2	3			3		4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				X	
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					X
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)					X
5	The student should be able to show the ability to work in independent or interdisciplinary teams.				X	
6	Students should be able to work as managers, planners or coordinators in team and project works.				X	
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.			X		
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.			X		
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.		X			
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.		X			
12	Students should have the ability to communicate effectively.		X			
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			x		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

SYLLABUS	
WEEK	**Subjects**
1	Distribution of design subjects
2	Principles of machine design
3	Principles of machine design
4	Development of Concept and innovation
5	Determination of design input parameters
6	Review of basic information to be used in design
7	Review of basic information to be used in design
8	**MIDTERM**
9	Design process
10	Design process
11	Design process
12	Cost analysis
13	Preparation of the project final report
14	Presentation of the project
15	Evaluation

ECTS CREDITS / WORK LOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	3	42
	Laboratory Practice	0	0	0
Guided Problem Solving	Course Work			
	Group or Self Study	14	1	14
Completion of Assignments and Submission as Reports				
Term Project				
Project Presentation				
Other Works				
Midterm Exam	Exam	1	3	3
	Self Study for exam	1	14	14
Final Exam	Exam	1	3	3
	Self Study for exam	1	14	14
TOTAL WORKLOAD(Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3

Last Updated Date	15.04.2019
Updater	Ens. Musa Cenk ÖZEKİNCİ

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
ENGINEERING COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Graduation Project-I	MKM-416	4/I	(0+2+0)	1	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	-
Instructor	:	Mechanical Eng. Teaching staff
Aims	:	To students; 1. To provide the opportunity to have experience in all stages of design within the framework of an engineering problem, 2. Developing innovative ideas and gaining team awareness, 3. To give the ability to search literature, 4. To encourage to use time effectively, 5. To raise awareness about scientific and technological innovations. 6. To gain experience in research and development on a project subject, 7. To create an opportunity to make technical contributions to Turkish Naval Forces with the project to be worked on.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Will have knowledge about design methodology, 2. Will be able to define and explain a design problem, together with their requirements and constraints, by means of their open-end design project. 3. Will be able to gain access to and use information, to create an alternative concept, to select and develop concepts, to reach a solution, to test the data and to present the results. 4. Will be able to prepare a project plan that includes work packages, stages and task sharing among team members, 5. Will be informed in terms of professional ethics.
Course Content	:	This course includes a comprehensive design experience by using the knowledge acquired during the undergraduate study. Within the scope of this course, the design of a system or a process is considered within the scope of open-ended projects. The problem in the project is tried to be solved individually by the students or with the help of teams.

<table>
<tr><td>Textbook</td><td colspan="5">While a textbook is not particularly recommended, utilization of the Mechanical Engineering Handbook is recommended.</td></tr>
<tr><td>Other Resources</td><td colspan="5">• Richard G. Budyas ve J. Keith Nisbett, Shigley’den Makine Mühendisliğinde Tasarım, 2008 McGraw-Hill, 2015 Literatür, 8. Metrik Basımdan Çeviri.
• Jan O. Fischer, Gerd Holbach, Cost Management in Shipbuilding - Planning, Analysing and Controlling Product Cost in the Maritime Industry, GKP Publishing, Cologna, 2011.
• Yılmaz, T. (Ed.), 2008, Gemi Mühendisliği El Kitabı, Gemi Mühendisleri Odası, İstanbul.
• D.G. Ullman, ”The Mechanical Design Process”, McGraw Hill, 1992
• K.T. Ulrich, S.D. Eppinger, “Product Design and Development”, McGraw Hill, 1995
• G.E. Dieter, “Engineering Design”2.ed., McGraw Hill, 1991
• J.E. Shigley, C. Mischke, “Standard Handbook of Machine Design”, McGraw Hill, 1986
• H. Rothbart, “Mechanical Design and Systems Handbook”, 2.ed., McGraw Hill, 1985</td></tr>
<tr><td>Homework and Projects</td><td colspan="5">There will be a design project covering one semester. Project work will be carried out individually or in teams, and a project subject and a consultant instructor / staff will be present.</td></tr>
<tr><td>Use of computer</td><td colspan="5">For the literature review of the project, planning, design, calculation, modeling, analysis, preparation of the study report and presentation, computers will be used.</td></tr>
<tr><td>Other Applications</td><td colspan="5"></td></tr>
<tr><td rowspan="10">Success Assessment System</td><td colspan="2">Activities</td><td>Base Grade</td><td>Piece</td><td>Contribution to Assessment,%</td></tr>
<tr><td colspan="2">Midterm</td><td></td><td></td><td></td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td></td><td></td><td rowspan="6">%40</td></tr>
<tr><td>Homework</td><td></td><td></td></tr>
<tr><td>Projects</td><td></td><td></td></tr>
<tr><td>Term Project / Project</td><td>50</td><td>1</td></tr>
<tr><td>Laboratory Application</td><td></td><td></td></tr>
<tr><td>Other Applications</td><td></td><td></td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td>%60</td></tr>
<tr><td colspan="2">Make-up exam / GUE</td><td>50</td><td>-</td><td>%100</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td>%100</td></tr>
</table>

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

	MECHANICAL ENGEENRING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ -10**	**PQ -11**	**PQ -12**	**PQ -13**	**PQ -14**	**PQ -15**
CA-1	5		5				3	4		3					5
CA-2	5	4	5				3	4		3					5
CA-3	5	4	5				3	4		3					5
CA-4	5			4	3										5
CA-5	5					5							5		5

Seq. No.	Program Qualifications	Course Contribution				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				x	
3	Students should be able to design a system, component or process to meet the desired requirements (Mechanical systems, Thermal systems).					x
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).				x	
5	The student should be able to show the ability to work independently or in interdisciplinary teams.			x		
6	Students should be able to work as managers, planners or coordinators in team and project works.					x
7	Students should be able to detect and identify problem areas and select the areas and methods for solving the subject.			x		
8	Students should be able to access, evaluate, use and produce solutions the information they need.				x	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			x		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.					x
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					
15	Students should be able to show the competence of understanding the universal and social effects of Mechanical Engineering solutions.					x

SYLLABUS	
WEEK	**Subjects**
1	Determination of Graduation Study
2	Determination of Graduation Study
3	Graduation Study Preliminary Preparation
4	Graduation Study Preliminary Preparation
5	Literature Study
6	Intermediate Presentation-1
7	Literature Study
8	Literature Study
9	Literature Study
10	Planning the graduation project
11	Planning the graduation project
12	Intermediate Presentation-2
13	Writing the project report
14	Writing the project report
15	Report check
16	Report evaluation

ECTS CREDITS / WORK LOAD TABLE			
ACTIVITIES	**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course			
Application			
Study Hours Out of Class	15	4	60
Completion of Assignments and Submission as Reports			
Term Project	1	15	15
Project Presentation			
Quizzes			
Midterm			
Self-study for Midterm			
Final Exam	1	1	1
Self-study for Final Exam	1	14	14
TOTAL WORKLOAD (Hour)	90 Saat		
ECTS CREDITS	Total Work Load / 30 = 90 / 30		3 Credits

Last Updated	25.03.2019
Updater	Ens. Ali GÜN

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

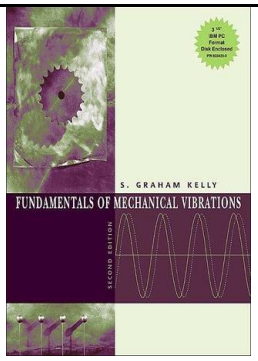
Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Mechanical Vibrations	MKM-421	4/II	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Mathematics I-II, Physics-I, Dynamics
Instructor	:	Mechanical Engineering Instructor
Aims	:	To determine the mechanical vibrations that dynamic machine elements face, to determine the frequencies with the highest vibration and to specify the basic design principles for the safe operation of the machine elements by determining the required structural change and reducing the vibration.
Course Learning Outcomes	:	Students who successfully complete this course will be able to; 1. Define basic vibration terms 2. Have knowledge about working principles of vibration measurement instruments. 3. Examine vibrational motion by energy method 4. Can classify forced vibrations 5. Illustrate vibration isolation 6. Can analyze multi-degree-of-freedom systems
Course Content	:	Basic concepts, simple harmonic motion, sum of two vibration motions, vibrations of single degree of freedom systems, damped free vibrations, equivalent systems, viscous damping, free vibrations with dry friction, forced vibrations, vibration isolation, vibration-measuring devices, vibrations of two degree of freedom systems, vibrations of multi-freedom systems, spindle, examples on vibration of bed gear-wheel systems

Textbook

Mekanik Titreşimler	Fuat Pasin	Birsen	2000

Other Resources



Fundamentals of mechanical vibrations	S.Graham Kelly	McGraw Hill	2000
Machinery vibration:balancing		McGraw Hill	1995

Homework and Projects

Use of computer

Students can do their homework by using computer (not obligatory).

Other Applications

Assessment Criteria

Assessment		Min. Score	Number	Grade Percentage,%	
Mid term Exam		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project /Project	50	1	%	
	Laboratory Application	50	1	%	
	Other Application	50	1	%	
Final Exam		50	1	60%	
Make-up Exam		50	-	100%	
Single Course Exam		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Level of Contribution	1	2	3	4	5
	Very Low	Low	Medium	High	Very High

MECHANICAL ENGINEERING														
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	5	3			3			4							4
CA-2		5		5	4									5	
CA-3	5		5		5										5
CA-4				4											
CA-5	4		5		4										
CA-6	5	3	5		5		4		3		4				4

Seq. No	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.			X		
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					X
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)					X
5	The student should be able to show the ability to work in independent or interdisciplinary teams.			X		
6	Students should be able to work as managers, planners or coordinators in team and project works.		X			
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.			X		
9	Students should have the skill of lifelong learning.				X	
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.				X	
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.		X			
12	Students should have the ability to communicate effectively.	X				
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			X		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.					X

SYLLABUS	
Week	**Subjects**
1	Basic concepts, simple harmonic motion, sum of two vibration
2	Single degree of freedom of vibrational motion, undamped free vibrations
3	Investigation of vibrational motion by energy method
4	Equivalent systems, combined springs, sample problems
5	Damped free vibrations, viscous damping
6	Free vibrations with dry friction
7	Forced and damped vibrations
8	**MIDTERM**
9	Sample problems related to forced vibrational motion
10	Vibration insulation and vibration measuring devices
11	Degenerate vibrations of two degrees of freedom systems, characteristic equation
12	Degenerate vibrations of two degrees of freedom systems, characteristic equation
13	Vibrations of two degrees of freedom systems, problems with two degrees of freedom and multi-degree of freedom systems
14	Multi-degree of freedom systems, dependent and independent vibrations
15	Problems on vibrations of shaft and gear-wheel systems

ECTS CREDIT/WORKLOAD TABLE			
ACTIVITIES	**NUMBER**	**TIME (HOUR)**	**TOTAL WORKLOAD (HOURS)**
Theoretical Course	14	3	42
Laboratory Practice			
Study Hours Out of Class	14	1	14
Completion of Assignments and Submission Reports	2	5	10
Term project			
Project Presentation			
Midterm Exam	1	2	2
Self Study for midterm exam	1	10	10
Final Exam	1	2	2
Self Study for final exam	1	10	10
TOTAL WORKLOAD (HOUR)	**90**		
ECTS CREDITS	Total Work Load / 30 = 90 / 30		3

Last Updated	15.04.2019
Updater	Ens. Muhammet Taha AKKOÇ

NAVAL ACADEMY
DEPARTMENT OF MECHANİCAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class hour (T+P+L)	Credit	ECTS
Mechanical Systems Design	MKM-422	4/II	(1+2+0)	2	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Materials Science, Strength of Materials, Machine Elements
Instructor	:	Mechanical Engineering Instructor
Aims	:	The aim of this course is to design a machine and/or system for a desired purpose based on the information obtained from different courses of students and to report it in a project format.
Course Acquirements	:	Students who successfully complete this course will be able to: 1- Define the machine or system and determine its functions. 2- Make calculations according to the desired properties and size. 3- Identify and assemble the system elements appropriately. 4- Make his drawings. 5- Calculate the cost. 6- Evaluate the results by making a comparison.
Course Content	:	Principles of machine design, concept development and innovation, determination of design input parameters, basic information to be used in design (material science, strength of materials, machine elements, machine drawing, mechatronics) review, design and preparation of solid model, cost analysis, preparation of project report and project presentation.

<table>
<tr><td>Textbook</td><td> 

<table>
<tr><td>Design in Mechanical Engineering from Shigley</td><td>Richard Budynas</td><td>Literatür</td><td>2016</td></tr>
</table></td></tr>
<tr><td>Other Resources</td><td>1-Engineering books
2-Databases
3-Design in Mechanical Engineering from Shigley 2008</td></tr>
<tr><td>Homework and Projects</td><td></td></tr>
<tr><td>Use of computer</td><td>Students can do their homework by using computer (not obligatory).</td></tr>
<tr><td>Other Applications</td><td></td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th colspan="2">Activities</th><th>Base Grade</th><th>Quantity</th><th colspan="2">Effects on Grading, %</th></tr>
<tr><td colspan="2">Mid term Exam</td><td>50</td><td>1</td><td colspan="2">24%</td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td>50</td><td>1</td><td>%</td><td rowspan="6">16%</td></tr>
<tr><td>Homework</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Projects</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Term Project /Project</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Laboratory Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td>Other Application</td><td>50</td><td>1</td><td>%</td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td colspan="2">60%</td></tr>
<tr><td colspan="2">Make-up Exam</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
<tr><td colspan="2">Single Course Exam</td><td>50</td><td>-</td><td colspan="2">100%</td></tr>
</table>
</td></tr>
</table>

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Level of Contribution	1	2	3	4	5
	Very Low	Low	Medium	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	5	4	5	5	3	3	4								5
CA-2	5	5	5		4							3		3	
CA-3			5	5	5	3	4		4				3		5
CA-4	4		5	4											
CA-5	4		5		4				4	3			4	4	5
CA-6		5		4	5		5		3	4	4	3	4		5

Seq. No	Program Qualifications	Course Contribution S				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.					X
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					X
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems).				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.				X	
6	Students should be able to work as managers, planners or coordinators in team and project works.			X		
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.				X	
8	Students should be able to access, evaluate, use and produce solutions the information they need.					X
9	Students should have the skill of lifelong learning.					X
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.		X			
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.		X			
12	Students should have the ability to communicate effectively.		X			
13	Students should have professional and ethical responsibility.			X		
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.				X	
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

SYLLABUS	
Week	**Subjects**
1	Distribution of design issues
2	Principles of machine design
3	Principles of machine design
4	Concept development and innovation
5	Determination of design input parameters
6	Review of basic information to be used in design
7	Review of basic information to be used in design
8	**MIDTERM**
9	Design process
10	Design process
11	Design process
12	Design process
13	Cost analysis
14	Preparation of the final report of the project
15	Presentation of the project

ECTS CREDITS / WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (HOURS)**	**TOTAL WORKLOAD (HOURS)**
Theoretical Course	Theoretical Instruction	14	1	14
	Laboratory Practice	14	2	28
Guided Problem Solving	Class Work			
	Group or Self Study			
Completion of Assignments and Submission as Reports				
Term Project		1	4	4
Project Presentation		1	2	2
Other Studies (Midterm)				
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	4	4
Final exam	Exam	1	2	2
	Self Study for exam	1	4	4
TOTAL WORKLOAD (HOUR)		**60**		
ECTS CREDITS		Total Work Load / 30 = 60 / 30		**2**

Last Updated	10.04.2019
Updater	Ens. Muhammet Taha AKKOÇ

NAVAL ACADEMY
DEPARTMENT OF MECHANICAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Gas Turbines	MKM-413	4/I	(3+0+0)	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Thermodynamics I-II, Heat Transfer, Fluid Mechanics
Instructor	:	Mechanical Engineering Instructor
Aims	:	The aim of the course is to teach basic concepts, system components and theoretical and real cycles of gas turbines.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Can define heat transfer methods and mechanism in gas turbines. 2. Can calculate the heat transfer in various geometric components in gas turbines and explain the heat transfer in case of heat generation. 3. Can define and calculate heat exchangers in gas turbines. 4. Can calculate the heat transfer in laminar and turbulent flow in various systems. 5. Can identify and design parts of gas turbines. 6. Can calculate gas work cycles. 7. Can design additional systems that help the operation of gas turbines.
Course Content	:	Working principles, moving parts, cycles, system elements, fixed parts, combustion systems, lubrication systems, compressors and enterprises of gas turbines.

Textbook	

Gaz Türbinleri	Selim Çetinkaya	Nobel	1999

Other References	

Buhar ve gaz türbinleri		Birsen	2007

Homework & Projects	
Computer Use	Students can do their homework by using computer (not obligatory).
Other Activities	

Success Assessment System

Activities		**Base Grade**	**Piece**	**Contribution to Assessment,%**	
Midterm Exams		50	1	24%	
Semester Assessment	Quizzes	50	1	%	16%
	Homework	50	1	%	
	Projects	50	1	%	
	Term Project/Project	50	1	%	
	Laboratory Work	50	1	%	
	Other Activities	50	1	%	
Final Exam		50	1	60%	
Make-up Exam/ GUE		50	-	100%	
Single Course Exam / GUE		50	-	100%	

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

MECHANICAL ENGINEERING															
	PQ-1	**PQ-2**	**PQ-3**	**PQ-4**	**PQ-5**	**PQ-6**	**PQ-7**	**PQ-8**	**PQ-9**	**PQ-10**	**PQ-11**	**PQ-12**	**PQ-13**	**PQ-14**	**PQ-15**
CA-1	5	3	4	4			4	5	3	2			3		4
CA-2	5	3	4	4			4	5	3	2			3		4
CA-3	5	3	4	4			4	5	3	2			3		4
CA-4	5	3	4	4			4	5	3	2			3		4
CA-5	5	3	4	4			4	5	3	2			3		4
CA-6	5	3	4	4			4	5	3	2			3		4
CA-7	5	3	4	4			4	5	3	2			3		4

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					X
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.			X		
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)				X	
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				X	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.			X		
6	Students should be able to work as managers, planners or coordinators in team and project works.		X			
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.			X		
8	Students should be able to access, evaluate, use and produce solutions the information they need.				X	
9	Students should have the skill of lifelong learning.			X		
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			X		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.		X			
12	Students should have the ability to communicate effectively.		X			
13	Students should have professional and ethical responsibility.		X			
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.			X		
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.				X	

SYLLABUS	
WEEK	**Subjects**
1	Historical development of gas turbines, classification, and classification of flow processes.
2	Compressibility, one dimensional compressible flow of ideal gases, flow in channels.
3	Theoretical cycles, Theoretical Brayton Cycle, regeneration, intercooler.
4	Heated gas turbines, closed system gas turbines.
5	Real cycles, stagnation values, compressor and turbine efficiency, regenerator efficiency.
6	Performance, work and air rates, mechanical losses and combustion efficiency, pressure losses.
7	Aviation gas turbines, non-compressor jet engines, turbojet, turbofan
8	**MIDTERM**
9	Compressors, centrifuges, compressors, axial compressors.
10	Velocity diagrams of compressor stage, stage characteristics.
11	Combustion chambers, fuel supply
12	Combustion chamber types, combustion characteristics
13	Turbines, turbine stages, velocity diagrams
14	Fuel economy, weight and dimensions, transmission requirement, materials, comparison
15	Real cycles, stagnation values, compressor and turbine efficiency

ECTS CREDITS / WORK LOAD TABLE				
ACTIVITIES		**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	14	3	42
	Laboratory Practice	0	0	0
Guided Problem Solving	Course Work			
	Group or Self Study	14	1	14
Completion of Assignments and Submission as Reports				
Term Project				
Project Presentation				
Other Works				
Midterm Exam	Exam	1	3	3
	Self Study for exam	1	14	14
Final Exam	Exam	1	3	3
	Self Study for exam	1	14	14
TOTAL WORKLOAD(Hour)		**90**		
ECTS CREDITS		Total Work Load / 30 = 90 / 30		3

Last Updated Date	15.04.2019
Updater	Ens. Musa Cenk ÖZEKİNCİ

	NAVAL ACADEMY DEPARTMENT OF MECHANICAL ENGINEERING ENGINEERING COURSE DESCRIPTION	

Course	Code	Year / Semester	Class Hour (T+P+L)	Credit	ECTS
Graduation Project-II	MKM-424	4/II	(1+2+0)	2	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	-
Instructor	:	Mechanical Engineering Instructor
Aims	:	Students will be able to use the time effectively, working order, lectern and subject dominance, oral and written presentation to gain experience. To contribute to the professional and ethical development of students.
Course Learning Outcomes	:	Students who successfully complete this course; 1. Will analyze performances by applying designs and based on artificial (simulation and modeling) and actual measurements, 2. Will prepare presentations and reports in an informative template to communicate project progress and results, 3. Will learn to conduct tests to verify compliance with the requirements and constraints of the product, 4. Will work in groups of 2-4 people to gain teamwork experience, 5. Will be conscious of professional ethics.
Course Content	:	This course includes a comprehensive design and application experience by using the knowledge acquired in undergraduate studies. Within the scope of this course, the design of a system or a process is considered within the scope of open-ended projects. It includes an application that includes stages from the selection of an appropriate project to its completion. The problem in the project is tried to be solved individually by the students or with the help of teams.

<table>
<tr><td>Textbook</td><td colspan="5">It is recommended to use Mechanical Engineering Manuals although not particularly recommended.</td></tr>
<tr><td>Other Resources</td><td colspan="5">Richard G. Budyas ve J. Keith Nisbett, Shigley’den Makine Mühendisliğinde Tasarım, 2008 McGraw-Hill, 2015 Literatür, 8. Metrik Basımdan Çeviri.
Jan O. Fischer, Gerd Holbach, Cost Management in Shipbuilding - Planning, Analysing and Controlling Product Cost in the Maritime Industry, GKP Publishing, Cologna, 2011.
Yılmaz, T. (Ed.), 2008, Gemi Mühendisliği El Kitabı, Gemi Mühendisleri Odası, İstanbul.
D.G. Ullman, ”The Mechanical Design Process”, McGraw Hill, 1992
K.T. Ulrich, S.D. Eppinger, “Product Design and Development”, McGraw Hill, 1995
G.E. Dieter, “Engineering Design”2.ed.,McGraw Hill, 1991
J.E. Shigley, C. Mischke, “Standard Handbook of Machine Design”, McGraw Hill, 1986
H. Rothbart, “Mechanical Design and Systems Handbook”, 2.ed., McGraw Hill, 1985</td></tr>
<tr><td>Homework and Projects</td><td colspan="5">There will be a design project covering a semester. Project work will be carried out individually or in teams, and a project subject and a consultant instructor / staff will be present.</td></tr>
<tr><td>Use of computer</td><td colspan="5">The literature review of the project, planning, design, calculation, modeling, analysis, reporting, writing a text appropriate to a template and presentation stages can be used.</td></tr>
<tr><td>Other Applications</td><td colspan="5"></td></tr>
<tr><td rowspan="10">Success Assessment System</td><td colspan="2">Activities</td><td>Base Grade</td><td>Piece</td><td>Contribution to Assessment, %</td></tr>
<tr><td colspan="2">Midterm</td><td></td><td></td><td></td></tr>
<tr><td rowspan="6">Semester Assessment</td><td>Quizzes</td><td></td><td></td><td rowspan="6">40%</td></tr>
<tr><td>Homework</td><td></td><td></td></tr>
<tr><td>Projects</td><td></td><td></td></tr>
<tr><td>Term Project / Project</td><td>50</td><td>1</td></tr>
<tr><td>Laboratory Application</td><td></td><td></td></tr>
<tr><td>Other Applications</td><td></td><td></td></tr>
<tr><td colspan="2">Final Exam</td><td>50</td><td>1</td><td>60%</td></tr>
<tr><td colspan="2">Make-up Exam/ GUE</td><td>50</td><td>-</td><td>100%</td></tr>
<tr><td colspan="2">Single Course Exam / GUE</td><td>50</td><td>-</td><td>100%</td></tr>
</table>

RELATIONSHIP BETWEEN PROGRAM QUALIFICATIONS AND LEARNING OUTCOMES

Contribution Level	1	2	3	4	5
	Very Low	Low	Middle	High	Very High

	MECHANICAL ENGINEERING													
	PQ-1	PQ-2	PQ-3	PQ-4	PQ-5	PQ-6	PQ-7	PQ-8	PQ-9	PQ-10	PQ-11	PQ-12	PQ-13	PQ-14	PQ-15
CA-1	5		5				3	4		3					5
CA-2	5	4	5				3	4		3					5
CA-3	5	4	5				3	4		3					5
CA-4	5			4	3										5
CA-5	5					5							5		5

Seq. No.	Program Qualifications	Course Contribution Scale				
		1	2	3	4	5
1	Students should have knowledge about mathematics, science and engineering in theoretical and applied fields.					x
2	Students should be able to design and conduct experiments, analyze and interpret the results of experiments.				x	
3	Students should have the ability to design a system, component or process to meet the desired requirements. (Mechanical systems, Thermal systems)					x
4	Students should have the ability to define and solve mechanical engineering problems, use the necessary techniques, skills and modern tools (mechanical problems, thermal problems)				x	
5	The student should be able to show the ability to work in independent or interdisciplinary teams.			x		
6	Students should be able to work as managers, planners or coordinators in team and project works.					x
7	Students should be able to identify and identify problem areas and to select the areas and methods for solving the subject.			x		
8	Students should be able to access, evaluate, use and produce solutions the information they need.				x	
9	Students should have the skill of lifelong learning.					
10	Students should be able to use modern communication methods to transfer their knowledge and thoughts about the field.			x		
11	Students should be able to communicate their feelings, thoughts and suggestions effectively in oral and written form.					
12	Students should have the ability to communicate effectively.					
13	Students should have professional and ethical responsibility.					x
14	The student should have sufficient knowledge about occupational health and safety and environmental protection.					
15	Students should be able to show the competence of understanding the universal and social effects of mechanical engineering solutions.					x

SYLLABUS		
WEEK	**Subjects**	
	Theory	**Application**
1	Determination of Graduation Study	--
2	Determination of Graduation Study	--
3	Graduation Study Preliminary Preparation	--
4	Literature Study	--
5	Literature Study	--
6	Intermediate Presentation-1	--
7	Testing and testing	Laboratory work
8	Testing and testing	Laboratory work
9	Testing and testing	Laboratory work
10	Analysis of test and test results	Laboratory work
11	Analysis of test and test results	Laboratory work
12	Intermediate Presentation-2	--
13	Writing the project	--
14	Writing the project	--
15	Project control	--
16	Evaluation of the project	--

ECTS CREDITS / WORKLOAD TABLE			
ACTIVITIES	**NUMBER**	**TIME (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course			
Laboratory Practice			
Study Hours Out of Class			
Completion of Assignments and Submission as Reports			
Term Project	1	30	30
Project Presentation			
Quizzes			
Midterm			
Self Study for Midterm			
Final Exam	1	14	14
Self Study for Final Exam	2	8	16
TOTAL WORKLOAD (Hour)	**60**		
ECTS CREDITS	Total Work Load / 30 = 90 / 30		3

Last Updated	15.04.2019
Updater	Ens. Ali GÜN