NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

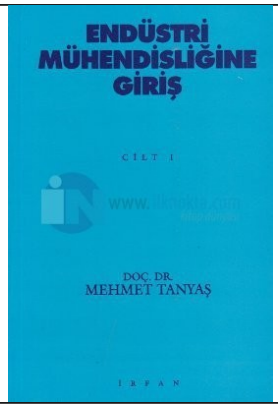
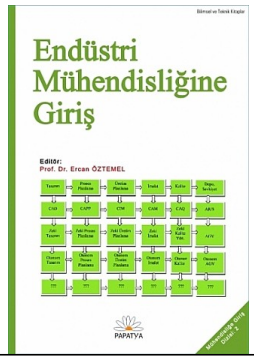
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
INTRODUCTION TO INDUSTRIAL ENGINEERING	ENM-211	2/1	2+0	2	2

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	None
Instructor	:	Industrial engineering Instructor
Aims	:	The aim of the course is introducing industrial engineering to the students studying the Industrial engineering and introducing the other course they need to take
Course Acquirements	:	The students to pass the course successfully; 1. Comprehension of the meaning of the engineering and industrial engineering. 2. Comprehension of the steps of problem defining and solving in Industrial engineering. 3. Producing solution to the typical problems and constructing models regarding the implementation of Industrial engineering 4. Recognition of the techniques of the Industrial engineering 5. Ability to analyzing and interpreting the solutions at the level of a language with which decision maker can understand 6. Ability to test the susceptibility of solutions to various parameters
Course Content	:	Simulation modeling principles, types, purposes, manual simulation of a simple system, time processing , repetition of probability distributions, random numbers and values, a random value production , input analysis, distribution fitting, output analysis, validation techniques.

Evaluation :

Assessment	Number	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class performance	1	50	% 16
Make-up exam	1	50	--
Single Course Exam	1	50	--

Resources	:	1.Endüstri Mühendisliğine Giriş, Mehmet Tanyaş

		
		1.Endüstri Mühendisliğine Giriş, Ercan Öztemel 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply to knowledge acquired in mathematics, science and engineering,					
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,					
3	Ability to design experiments , analyze and interpret data,					
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,					X
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,				X	
8	To develop customized computer software for an algorithm in accordance with proposed solutions,	X				
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,				X	
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,				X	
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and individual work,					X

14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk's principles and reforms					
15	Ability to have a good command of Turkish language			**X**		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			**X**		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Definition and history of industrial engineering
2	The definition of Operations Research , history and the relationship with Industry Engineering
3	Management and decision making , quantitative approach to decision making , elements of decision problems
4	System analysis, definition of system and modeling approaches
5	Overview of operations research techniques
6	Decision analysis, analytic hierarchy process
7	Mathematical modeling
8	Inventory management and control
9	MIDTERM WEEK
10	Stochastic processes , queuing theory
11	Simulation modeling, system dynamics
12	Job design, ergonomics
13	Quality control
14	Project management
15	Modern production systems, lean manufacturing
16	Just in time production

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	--	--	--
	Group or Self Study	--	--	--
Completion of Assignments and Submission as Reports		-	--	--
Term Project		1	--	--
Presentation		-	--	--
Other Works (Midterm)		4	--	--
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self Study for exam	1	6	6
TOTAL WORKLOAD (Hour)		60 Hours		
ECTS CREDITS		2 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

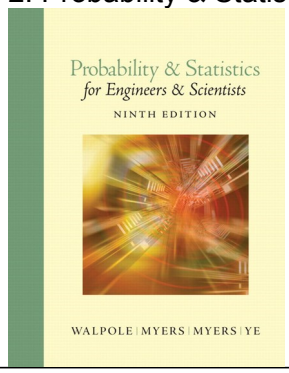
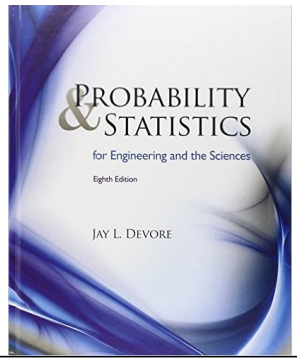
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
PROBABILITY	EN-212	2/I2	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Mathematics
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is to set up a substructure for probabilistic decision-making problems by providing students with the basic concepts of probability associated with the formation and distribution.
Course Acquirements	:	The students to pass the course successfully; 1. Ability to detect the probabilistic decision-making problems. 2. To determine the way to express the problems faced in random situations with which probabilistic distribution. 3. To solve the probabilistic decision-making problems. 4. To analyze the solution. 5. Interpret Solutions in a language understood by the decision makers. 6. Ability to test the sensitivity of the different parameters of the solution.
Course Content	:	

Evaluation :

Assessment	Number	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	--
Single Course Exam	1	50	--

Resources	:	1. Olasılık Ve İstatistik, Semra Oral Erbaş

		
		1. Probability & Statistics, Walpole, Myers, Myers 2. Probability & Statistics, Devore  

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments , analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,					
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,					
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and individual work,				X	
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk's principles and reforms					
15	Ability to have a good command of Turkish language			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Introduction to probability theory
2	- Counting Techniques - Probability Concept - Cluster Concept and Operations
3	- Conditional probability and Bayes' Theorem - Individual events
4	- Random Variables
5	- Expected Value - Variance and standard deviation
6	Moment - Moment generating function
7	Discrete Distributions - Bernoulli and binomial distributions - Geometric and Hipergeometrical
8	Discrete Distributions - Poisson distribution - Negative Binomial Distribution
9	Midterm Week
10	Continuous Probability Distributions - Uniform distribution - Normal distribution
11	Continuous Probability Distributions - Exponential - Hazard rate function
12	Joint Distributions - Discrete distributions compound - Expectations and variance - Marginal distributions
13	Joint Distributions - Continuous compound distributions - Expectations and variance - Marginal distributions
14	Conditional distributions
15	- Chebyshev Inequality - Markov inequality
16	- Central Limit Theorem Law of Large Numbers

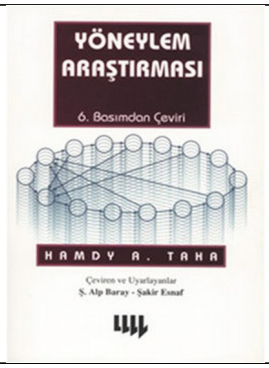
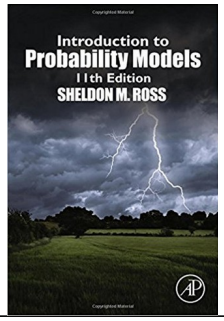
ECTS CREDITS/ WORKLOAD TABLE

ACTIVITIES		NUMBER	DURATION (Hour)	TOTAL WORKLOAD (Hour)
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	-	-	-
	Group or Self Study	15	2	30
Completion of Assignments and Submission as Reports		-	--	--
Term Project		1	--	--
Presentation		-	--	--
Other Works (Midterm)		4	--	--
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self Study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90Hours		
ECTS CREDITS		30 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
STOCHASTIC PROCESSES	ENM-221	2/2	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Probability
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is help the learners understand the basic concepts of stochastic processes in students
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Determine probabilistic decision-making problems. 2. model real- life problems with the help of appropriate of stochastic processes. 3. solve problems of stochastic processes . 4. analyze the solution. 5. Interpret solutions in a language understood by the decision makers. 6. test the sensitivity of the different parameters of the solution.
Course Content	:	
Evaluation	:	ASSESSMENT / NUMBER / MINIMUM SCORE / GRADE PERCENTAGE Mid Term Exam / 1 / 50 / % 24 Final Exam / 1 / 50 / % 60 Class Performance / 1 / 50 / % 16 Make-up exam / 1 / 50 / -- Single Course Exam / 1 / 50 / --
Resources	:	1. Yöneylem Araştırması, Hamdy A. TAHA (6.Baskı)

		
		1. Introduction to Probability Models, Sheldon M. ROSS 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,					
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,					
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk's principles and reforms,					
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	The probability theory again - Conditional probability and Bayes Formula - Discrete and random continuous variables
2	Conditional distributions - Continuous and discrete case - Conditional expectations - Conditional probability and expectation theme Account
3	Bernoulli Transactions - Inter-arrival distributions - Waiting time distributions
4	Poisson Processes - Inter-arrival distributions - Waiting time distributions
5	Poisson Processes - Compound Poisson processes - Inhomogeneous Poisson processes
6	Markov Chains - One-step transition probability matrix - Markov property - Status classification
7	Markov Chains - Limit possibilities - Long-term behavior of Markov chains
8	Markov Chains - Absorbing chains - Time in transient states
9	Midterm Exam Week
10	Steady State Markov Chains Transition probability
11	Steady state Markov Chains - Limit possibilities - Balance equations
12	Steady state Markov Chains - Birth and death process
13	Queuing Theory - Queue definitions - Little Law
14	Queuing Theory - M / M / 1 Queuing models
15	Queuing Theory - M / M / s Queuing models
16	Queuing Theory - M / G / 1 Queuing model - M / G / s Queuing model

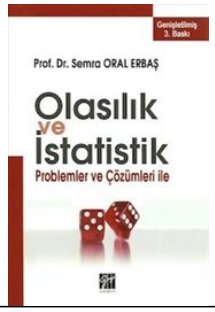
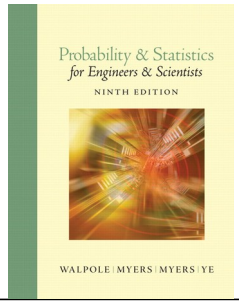
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	-	-	-
	Group or Self study	15	2	30
Completion of Assignments and Submission as Reports		-	--	--
Term Project		1	--	--
Presentation		-	--	--
Other Works (Midterm)		4	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		3 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
STATISTICAL METHODS	ENM-223	2/2	4+0	4	4

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Mathematics 1 , Mathematics 2 , Probability
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is to enable students to understand teach the basic concepts and laws of statistics, the research techniques; to have positive and scientific viewpoints and; to assist them to be able to consider events in depth and in detail.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Determine how to analyze the problems of decision-making with statistical methods. 2. Determine the way to express the problems faced in random situations with which probabilistic distribution. 3. Use statistical methods in decision making problems 4. Do statistical analysis for solutions 5. Interpret solutions in a language understood by the decision makers. 6. Test the sensitivity of the different parameters of the solution.
Course Content	:	Sampling theory, statistical shorthand theory, confidence intervals, decision theory, regression analysis, analysis of variance .
Evaluation	:	
Resources	:	

Assessment	Number	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	--
Single Course Exam	1	50	--

		1. Olasılık ve İstatistik (Prof.Dr.Semra Oral ERBAŞ 
		1. Matematiksel İstatistik (J.E.FEUND-I.MILLER) 2. Probability & Statistics, Walpole, Myers, Myers  

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments , analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,					
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,					
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and individual work,					X
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk’s principles and reforms,					
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Basic concepts of Statistics
2	Summary of Data
3	Gradients
4	Sampling theory
5	Statistical estimation theory
6	Statistical estimation theory
7	Confidence interval
8	Confidence intervals, hypothesis testing
9	Midterm Week
10	Hypothesis Testing
11	Chi-square tests
12	Correlation analysis
13	Regression analysis
14	Regression analysis
15	Variance analysis
16	Chi-square tests

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	15	1	15
Guided Problem Solving	Course Work	-	-	-
	Group or Self Study	15	3	45
Completion of Assignments and Submission as Reports		-	--	--
Term Project		1	--	--
Presentation		-	--	--
Other Works (Midterm)		4	--	--
Midterm Exam	Exam	1	2	2
	Self Study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self Study for exam	1	6	6
TOTAL WORKLOAD (Hour)		120 Hours		
ECTS CREDITS		4 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

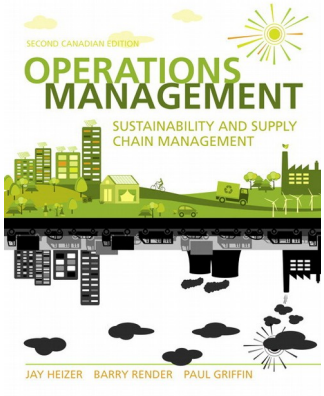
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
OPERATIONS RESEARCH - 1	ENM-311	3/1	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Introduction to Industrial Engineering
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is enable the learners face with the decision making problems in mathematical modeling and solve them through analytical methods, then interpret and analyze the results.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Define decision-making problems. 2. Model decision-making problems mathematically. 3. Solve decision-making problems. 4. Analyze solutions. 5. Interpret and explain a solution to decision makers. 6. Test sensitivity of different parameters in a solution.
Course Content	:	The history and background of operations analysis, modeling techniques, solving problems with graphical method, simplex and revised simplex method, duality, dual simplex method, sensitivity analysis, transportation problems.

Evaluation :

ASSESSMENT	NUMBER	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	%100
Single Course Exam	1	50	%100

Resources	:	1. Yöneylem Araştırması, Hamdy A. TAHA (6.Baskı)

		
		1. Operations Management, Jay Heizer 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,					
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,					
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk’s principles and reforms,					
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		
17	Information on business practices such as project management, risk management and change management; awareness of entrepreneurship, innovation and sustainable development.				X	

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	History of Operations Analysis
2	Linear Programming Techniques - Mathematical models of parts and acceptances - Modeling Examples
3	graphical Method - Alternative solutions - Unlimited solutions
4	Simplex Method - Standard and canonical forms - In the form of table solution
5	Big M and Two- Phase Method
6	Duality - The creation of binary problems - Binary variables and shadow prices
7	duality - Primal - Dual Relationships - Strong and weak dual theorems
8	Dual Simplex Method
9	**Midterm Exam Week**
10	Sensitivity Analysis - Changes in the objective function coefficients - Changes in the right-hand side vector
11	Sensitivity Analysis - Adding a new constraint / lift - Adding a new variable / lift
12	Revised Simplex Method
13	Revised Simplex Method
14	Revised Dual Simplex Method
15	Transportation Problem - Modeling - To be balanced - Creating a Startup Solution methods - Transportation Simplex Method
16	Assignment Problem -Modeling -Solution with the Hungarian method

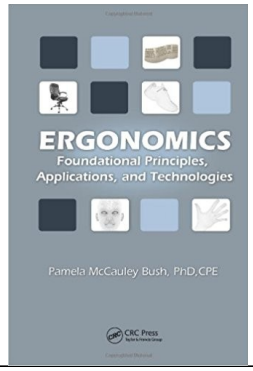
ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	--	--	--
	Group or Self study	15	2	30
Completion of Assignments and Submission as Reports		--	--	--
Term Project		--	--	--
Presentation		--	--	--
Other Works (Midterm)		--	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		3 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
Ergonomics	ENM-312	3/1	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	-
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is to enable learners to have the ability to design and evaluate a business system, taking into account human factors and ergonomics principles.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Understand the meaning and importance of ergonomics. 2. Recognize of the anthropometric characteristics and uses of human design 3. Have the knowledge about man's capacity and competence 4. Perform applications on design affecting productivity and leading to health problems that require ergonomic solutions 5. Gain the necessary knowledge and skills in human - machine interaction 6. Comprehend of the impact and importance of ergonomics to product design parameters
Course Content	:	Work Study & Introduction to Ergonomics Productivity Business Design Method Study Human Factor in Work Study Applications Work Measurement Learning Curves Introduction to Human Factors Engineering Anthropometry Accumulation of Injury Physical Factors Mental activities Fatigue, Break and Shift Systems The Future of Human Factors Engineering

Evaluation	:	Assessment	Number	MINIMUM SCORE	GRADE PERCENTAGE

		Mid Term Exam	1	50	% 24
		Final Exam	1	50	% 60
		Class Performance	1	50	% 16
		Make-up exam	1	50	%100
		Single Course Exam	1	50	%100
Resources	:	1. Mühendisler İçin Ergonomi, Fatih Babalık 			
		1. Ergonomics Foundational Principles, Applications and Technologies, Pamela McCauley Bush, CRC Press; 1st edition 			

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,					X
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the engineering problems				X	
6	To identify and apply the appropriate method for problem solving,				X	
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,			X		
11	To have the professional and ethical responsibility,			X		
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,				X	
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,				X	
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk’s principles and reforms,					
15	Ability to have a good command of Turkish language,					
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.				X	
17	Information on business practices such as project management, risk management and change management; awareness of entrepreneurship, innovation and sustainable development.					

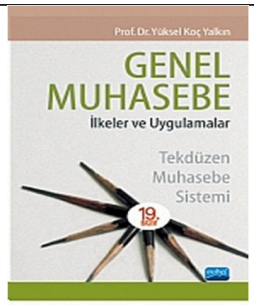
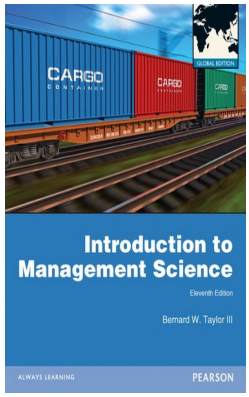
WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Introduction to Ergonomics
2	Ergonomic Systems Approach
3	Anthropometry
4	Work Physiology
5	Biomechanics
6	Working downtime
7	Manual Material Handling
8	Light , Toxic Substances
9	**Midterm Exam Week**
10	Noise, Vibration , Thermal Comfort
11	Civil and Mechanical Saver
12	Civil and Mechanical Saver
13	Risk Assessment
14	Risk Assessment
15	Man-Machine Interaction
16	Ergonomics in Product Design

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	--	--	--
	Group or Self study	15	2	30
Completion of Assignments and Submission as Reports		--	--	--
Term Project		--	--	--
Presentation		--	--	--
Other Works (Midterm)		--	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		3 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
ENGINEERING ECONOMY	ENM-321	3/2	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Introduction to Industrial Engineering
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is enable students to learn the engineering economic analysis and financing techniques useful to making decision regarding engineering.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Learn the basic principles of engineering economics. 2. Learn the cost concepts. 3. Learn the time value of money and the ability to use it problem solving. 4. Learn the renewal investments and project selection by means of the cost analysis 5. Doing the risk analysis. 6. Establishing the investment model
Course Content	:	Basic principles, interest, taxes , time value of money, net present value, ROR, NPV, EUAC, EUAS, PBP, BCR, renovation investments.
Evaluation	:	Assessment / Number / MINIMUM SCORE / GRADE PERCENTAGE Mid Term Exam / 1 / 50 / % 24 Final Exam / 1 / 50 / % 60 Class Performance / 1 / 50 / % 16 Make-up exam / 1 / 50 / %100 Single Course Exam / 1 / 50 / %100
Resources	:	1. Genel Muhasebe İlkeleri ve Uygulaması, Prof.Dr. Yalçın KOÇ

		
		1. Introduction To Management Science, TAYLOR 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering			X		
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,					
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,			X		
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,					
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,					
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk’s principles and reforms,					
15	Ability to have a good command of Turkish language,					
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.					
17	Information on business practices such as project management, risk management and change management; awareness of entrepreneurship, innovation and sustainable development.					X

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Introduction to Engineering Economics and Basic Concepts
2	Cost Concept - Cost types - Cost functions - Comparative cost models
3	Money Time Relations - Cash flow - Cash flow diagrams - The time value of money
4	Money Time Relations - P/F, F/P, P/A, F/A - Uniform Series - Gradient series - Algebraic relations
5	Discrete and Periodic Accumulation and Mathematical Modeling
6	Continuous compounding Nominal and effective interest Discrete payment Continuous payment
7	Equivalence - Economic equivalence - Share and bono evaluation - MARR valuation
8	PW, FW, EUAS/EUAC
9	**Midterm Exam Week**
10	CE, NPV,
11	IROR, EROR
12	PBP, BCR
13	Selection between investment alternatives
14	Replacement investments - Renewal Decision - Economic life of the asset - Replacement investments of mathematical modeling
15	Replacement investments - Replacement investments of mathematical modeling
16	Effects of inflation and depreciation and price changes

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	--	--	--
	Group or Self study	15	2	30
Completion of Assignments and Submission as Reports		--	--	--
Term Project		--	--	--
Presentation		--	--	--
Other Works (Midterm)		--	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		3 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

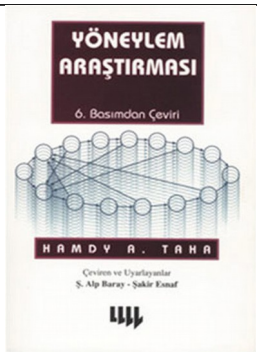
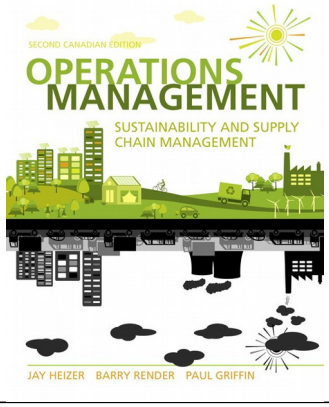
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
OPERATIONS RESEARCH - 2	ENM-322	3/2	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Operations Research - 1
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is to enable learners to solve decision-making problems using integer programming, goal programming and nonlinear programming techniques and to interpret and analyze the results.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Determine the decision-making problems. 2. Model the decision-making problems using integer programming, goal programming and nonlinear programming techniques. 3. Solve the goal, integer, and nonlinear programming problems 4. Analyze the solutions. 5. Interpret solutions in a language understood by the decision makers. 6. Test the sensitivity of the different parameters of the solution.
Course Content	:	Integer Programming modeling techniques. Branch and bound technique. Cutting plane algorithm. Non-linear programming modeling techniques. Quadratic and separable programming. Goal programming and solution techniques. Dynamic programming. Assembling line balancing and solutions.

Evaluation :

Assessment	Number	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	%100
Single Course Exam	1	50	%100

Resources	:	1. Yöneylem Araştırması, Hamdy A. TAHA (6.Baskı)

		
		1. Operations Management, Jay Heizer 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,					
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,					
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk’s principles and reforms,					
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		
17	Information on business practices such as project management, risk management and change management; awareness of entrepreneurship, innovation and sustainable development.				X	

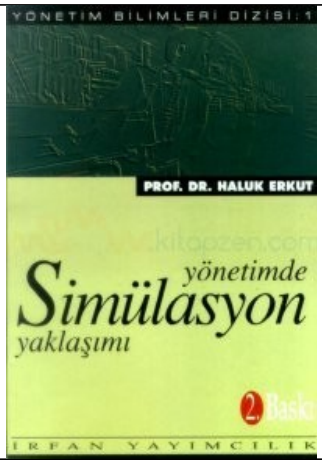
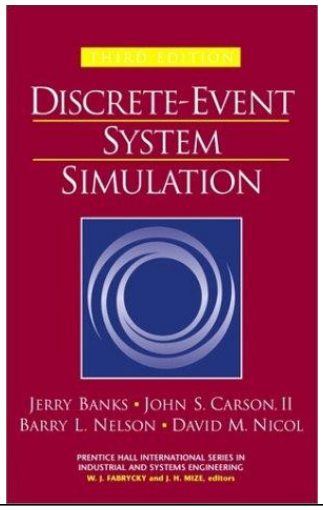
WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Integer Programming (IP) - Modeling Techniques - LP relief forms and graphics solutions
2	Integer Programming - Cutting plane algorithm - Pure IP solution with the branch and bound technique
3	Integer Programming - Mixed IP solution with branch and bound technique - Branch and bound technique to solving the Knapsack Problem
4	Integer Programming - Solving problems with the branch and bound technique TSP - Implicit Enumeration technique
5	Nonlinear Programming (NLP) - Modeling Techniques - Convex and concave functions - Univariate NLP solutions - Golden Section Search method
6	Nonlinear Programming - Multivariable unconstrained NLP solutions - Lagrange multiplier method - Kuhn Tucker conditions
7	Nonlinear Programming - Quadratic Programming - Wolfe method - Removable programming
8	Goal Programming - Weighted goal programming - Primary objective programming - Target programming Simplex method
9	**Midterm Exam Week**
10	Dynamic Programming (DP) - Dynamic programming concept - DPA solution with the shortest path problem
11	Dynamic Programming - Solving the Knapsack Problem with DP - Inventory solution with the DP models
12	Dynamic Programming - Stochastic dynamic programming - Solutions to stochastic inventory model with DP
13	Merge Line Balancing - Mathematical models - Determination of the lower and upper limits of workstation
14	Merge Line Balancing - COMSOAL intuitive method - RPW intuitive method - Solution with branch and bound technique
15	Single Machine Sequencing and Scheduling Models - Notation and definitions - Scheduling classes - Completion time models - Maximum lateness models
16	Single Machine Sequencing and Scheduling Models - Tardiness models - Earliness and Tardiness models

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	-	-	-
	Group or Self study	15	2	30
Completion of Assignments and Submission as Reports		-	--	--
Term Project		-	--	--
Presentation		-	--	--
Other Works (Midterm)		-	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		3 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
SYSTEM SIMULATION	ENM-323	3/2	3+2	4	5

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Probability, Stochastic Processes
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is inform learners about simulation techniques and industrial applications after providing basic understanding of simulation and modeling. Examining the system behavior in different situations through installation of computer based models and simulation test of the real system is the issue underlined.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Comprehend the importance of simulation in terms of grip and industrial engineering applications. 2. Understand the statistical substructure of simulation applications 3. Build simulation models for typical applications in industrial engineering and manufacturing solutions to problems 4. Analyze the solution. 5. Interpret solutions to a language understood by the decision makers. 6. Test the sensitivity of the different parameters of the solution
Course Content	:	Simulation modeling principles, types, purposes, manual a simple system simulation, time processing , probability distributions again , random numbers and values, a random value production , input analysis, distribution fitting, output analysis, validation techniques.
Evaluation	:	Assessment / Number / MINIMUM SCORE / GRADE PERCENTAGE Mid Term Exam / 1 / 50 / % 24 Final Exam / 1 / 50 / % 60 Class Performance / 1 / 50 / % 16 Make-up exam / 1 / 50 / %100 Single Course Exam / 1 / 50 / %100
Resources	:	1. Yönetimde Sistem Yaklaşımı, Haluk Erkut

		
		1. Discrete Event System Simulation, Jerry Banks 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics , science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,					
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,					
11	To have the professional and ethical responsibility,					
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,					
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness of serving dedicated to the fundamentals of democratic, secure and social law state in accordance with Atatürk’s principles and reforms,					
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		
17	Information on business practices such as project management, risk management and change management; awareness of entrepreneurship, innovation and sustainable development.				X	

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Simulation introduction , objectives
2	Simulation types, deterministic and stochastic simulation
3	Conceptual model development, process simulation project
4	One tail - one presenter manual simulation
5	Discrete and continuous probability distributions
6	Input analysis
7	Random number generation
8	Detailed modeling arena
9	**MIDTERM EXAM WEEK**
10	Sampling methods, inverse transformation method
11	Acceptance-rejection method
12	Compliance test
13	Output analysis , steady state, there is the warm-up period
14	Finding the number of repetitions and length ,
15	Validation methods
16	Queuing theory and analytic queuing models

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	15	2	30
Guided Problem Solving	Course Work	-	-	-
	Group or Self study	15	4	60
Completion of Assignments and Submission as Reports		-	--	--
Term Project		-	--	--
Presentation		-	--	--
Other Works (Midterm)		-	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		150 Hours		
ECTS CREDITS		5 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

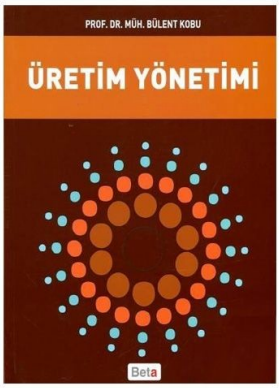
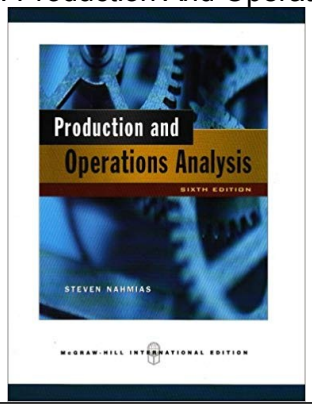
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
PRODUCTION PLANING AND CONTROL	ENM-411	4/1	4+0	4	4

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Operations Research – 1, Operations Research – 2, Statistics
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is to enable learners to learn production systems, production planning and MRP concepts, and analysis methodologies to solve related problems.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Determine and classify production planning problems. 2. Create forecasting models using forecasting techniques. 3. Determine Material Requirement Planning (MRP) problems and generate solutions 4. Calculate lot sizes. 5. Analyze the solution. 6. Interpret solutions in a language understood by the production planners. 7. Test the sensitivity of the different parameters of the solution.
Course Content	:	Production, production systems, forecasting, inventory, inventory management, MRP, lot size.

Evaluation :

Assessment	Number	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	% 100
Single Course Exam	1	50	% 100

Resources	:	1. Üretim Yönetimi, Bülent Kobu (6.Baskı)

		
		1. Production And Operations Analysis, Steven Nahmias 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics, science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the complex engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,				X	
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,	X				
11	To have the professional and ethical responsibility,		X			
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,			X		
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness about environmental, health and security aspects of engineering applications both socially and globally	X				
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		
17	Ability to have the knowledge about project, risk and change management and conciousness about innovation and entrepreneurship.			X		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Production planing and basic concepts
2	Production systems - Elements of a production system - Classification of production systems - Continuous, discrete and project based production systems
3	Forecasting demand - Forecasting concepts and classification - Forecasting techniques
4	Forecasting demand - Methods and performance criteria
5	Forecasting demand methods - Randomness, seasonality and trend
6	Inventory management - Basic concepts
7	Deterministic inventory models
8	Stochastic inventory models
9	**Midterm Exam Week**
10	Master planning - Importance, strategies, Gantt diagramming
11	Master Plan Schedule, product tree, time based product structure
12	MPS and MRP relation
13	MRP
14	EOQ, POQ, PPB
15	Silver meal, least unit cost, dynamic models
16	Capacity planning

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	4	60
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	-	-	-
	Group or Self study	15	3	45
Completion of Assignments and Submission as Reports		-	--	--
Term Project		1	--	--
Presentation		-	--	--
Other Works (Midterm)		4	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		120 Hours		
ECTS CREDITS		4 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

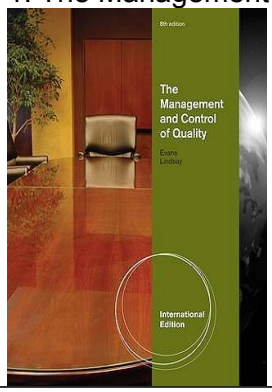
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
STATISTICAL QUALITY CONTROL	ENM-412	4/1	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Introduction to Industrial Engineering, Statistics
Instructor	:	Industrial Engineering Instructor
Aims	:	It provides Industrial Engineering students insights into quality engineering, Total Quality Management (TQM) and how processes are controlled and monitored to ensure high quality products.
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Understand the basic concepts of quality monitoring. 2. Understand the statistical underpinnings of quality monitoring. 3. Learn various available statistical tools of quality monitoring. 4. Learn the statistical and economical design issues associated with the monitoring tools. 5. Learn TQM philosophy. 6. Demonstrate the ability to design and implement these tools.
Course Content	:	Statistical quality control techniques, process control, frequency control, control charts, confidence intervals, hypothesis testing, TQM Systems.

Evaluation :

ASSESSMENT	NUMBER	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	% 100
Single Course Exam	1	50	% 100

Resources	:	1. Kalite Yönetimi Ve Planlaması, Ahmet Öztürk

		
		1. The Management and Control of Quality (Evans,Lidsay). 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics, science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the complex engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,				X	
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,	X				
11	To have the professional and ethical responsibility,		X			
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,			X		
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness about environmental, health and security aspects of engineering applications both socially and globally	X				
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		
17	Ability to have the knowledge about project, risk and change management and conciousness about innovation and entrepreneurship.			X		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Quality definition and basics - Definitions - Quality concept - History of quality control - Quality chain, customers, process and system concepts
2	Quality costs - Loq quality cost - Failure costs - Expected cost
3	Quality development and decreasing costs - Hidden costs - Root-cause diagrams, Histograms - Pareto analysis
4	Quality development and decreasing costs - Comparison - SWOT - QFD
5	Control diagrams and process capability analysis - Main structure of control diagrams - X diagrams - R diagrams - Applications
6	Control diagrams and process capability analysis - C diagrams - U diagrams - Process capability analysis
7	Test Samples - Sampling–Methods - Sampling –Applicaitons
8	Hypothesis testing - Simple hypothesis tests - Bilinmeyen varyansla normal dağılıma sahip bir kitlenin hipotez testi - Bilinmeyen varyansla normal dağılıma sahip bir ortalaması için kitlenin hipotez testi - Güven ararlıklarının ve hipotez testinin karşılaştırılması
9	**MIDTERM EXAM WEEK**
10	Hypothesis testing - Hypothesis testing of a normally distributed sample for variance and standard deviation - Hypothesis testing of normally distributed two samples for mean - Hypothesis testing of normally distributed two samples for variance
11	F and variance analysis - Variance analysis - One sided variance analysis - Two sided variance analysis - Applications
12	F and variance analysis - Two sided variance analysis (For multiple observations) - Latin squares and Greko-Latin squares
13	TQM - TQM philosophy - TQM principles - TQM applications
14	FMEA - Failure mode analysis - FMEA applications

15	Seven new tools in quality management - Affinity, Relations ,Tree and Matrix diagrams - Matrix data analysis, Arrow and PDPC diagrams
16	Seven new tools in quality management - Affinity, Relations ,Tree and Matrix diagrams - Matrix data analysis, Arrow and PDPC diagrams

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	-	-	-
	Group or Self study	15	2	30
Completion of Assignments and Submission as Reports		-	--	--
Term Project		-	--	--
Presentation		-	--	--
Other Works (Midterm)		-	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		3 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

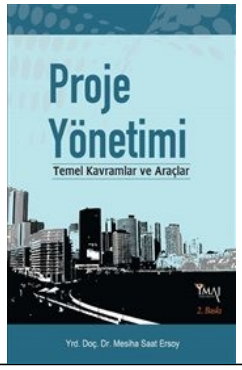
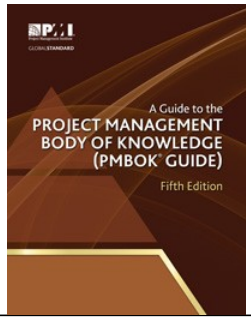
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
PROJECT MANAGEMENT	ENM-421	4/2	3+0	3	3

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Operations Research – 1, Statistics
Instructor	:	Industrial Engineering Instructor
Aims	:	This course examines project management in theory and practice and the roles and responsibilities of the project manager. The course offers a practical approach to managing projects, focusing on organizing, planning, and controlling the efforts of the project.
Course Acquirements	:	The students who successfully complete the course will be able to; 1. Recognize the 9 Project Management knowledge areas with key inputs, tools and techniques and outputs. 2. Fully understand the PMI policies and procedures required to fulfill your Professional Responsibility. 3. Share "Best Practices" of the 9 Project Management knowledge areas. 4. Apply Project Management principles through class exercises in project scope management, project time management and teaming.
Course Content	:	Selection of projects with feasibility analysis, cost foırecast techniques, work structure breakdown, CPM and PERT, balancing and optimizing project resources, Quality and Risk Management.

Evaluation :

ASSESSMENT	NUMBER	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	% 100
Single Course Exam	1	50	% 100

Resources	:	1. Proje Yönetimi (Temel Kavramlar Ve Araçlar), Mesiha, Saat, ERSOY

		
		1. A guide to project management body of knowledge PMBOK Guide, 5th edition 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics, science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the complex engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,				X	
8	To develop customized computer software for an algorithm in accordance with proposed solutions,	X				
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,	X				
11	To have the professional and ethical responsibility,		X			
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,			X		
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness about environmental, health and security aspects of engineering applications both socially and globally	X				
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		
17	Ability to have the knowledge about project, risk and change management and conciousness about innovation and entrepreneurship.			X		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Introduction to PM - Contents of PM - History - Life Cycle concept
2	Feasibility studies in PM - Project selection techniques
3	Cost and cost forecasting in PM - Cost types - Cost forecasting techniques
4	Work breakdown structure - Time planning - Gantt diagram - Network diagram
5	CPM - Earliest and latest start times - Total ptoject time - Critical activities
6	CPM - Use of Linear Programming in CPM - Use of matrices in CPM
7	CPM - Idle activities
8	PERT
9	**Ara Sınav Haftası**
10	Probability in PERT computations
11	PERT Cost analysis - Activity durations and cost relation - Parametric analysis
12	Resource balancing - Use of resources in activities - Time analysis and resource relation - Parametric analysis
13	Project control - Project control and monitor - Earned value analysis
14	Project quality management - Quality definitions - Quality costs - Quality planning
15	Project risk management - Risk - Defining and measuring of risks - Risk control
16	Successful project management examples

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	-	-	-
	Group or Self study	15	2	30
Completion of Assignments and Submission as Reports		-	--	--
Term Project		1	--	--
Presentation		-	--	--
Other Works (Midterm)		4	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		90 Hours		
ECTS CREDITS		3 Credits		

NAVAL ACADEMY
DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE DESCRIPTION

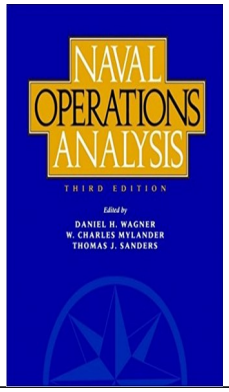
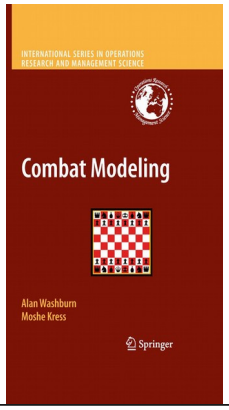
Course	Code	Class/Term	Class hour (T+P+L)	Credit	ECTS
OPERATIONS RESEARCH - 3	ENM-422	4/2	3+0	3	4

Language of Instruction	:	Turkish
Level of the Study	:	Bachelor's Degree
Prerequisite Course	:	Probability, Stochastic Models, Operations Research – 1, Operations Research - 2
Instructor	:	Industrial Engineering Instructor
Aims	:	The aim of the course is to enable learners model, solve and analysis basic military operational problems by using industrial engineering techniques
Course Acquirements	:	The students who successfully complete the course will be able to: 1. Determine military operations research problems 2. Solve and model military operations research problems by industrial engineering and probability theorems 3. Analyze solutions 4. Discuss and comment on solutions with the decision maker 5. Conduct sensitivity analysis of the solutions.
Course Content	:	Detection theory, lateral range curves, sweep width and search theory, ASW, AAW, MW, system reliability, statistical analysis of gunfires, Lanchester models, simulation and wargames.

Evaluation :

Assessment	Number	MINIMUM SCORE	GRADE PERCENTAGE
Mid Term Exam	1	50	% 24
Final Exam	1	50	% 60
Class Performance	1	50	% 16
Make-up exam	1	50	% 100
Single Course Exam	1	50	% 100

Resources	:	1. Naval Operations Analysis, WAGNER, MYLANDER,

		SANDER 
		1. Combat Modelling, WASHBURN, KRESS 

No	Program Proficiency	Course Contribution Scale				
		1	2	3	4	5
1	Ability to apply knowledge acquired in Mathematics, science and engineering					X
2	Identification of the problems encountered; ability to use the solutions, applications, algorithms, basic concepts of Industrial Engineering and Operations Research during the solution and analysis,				X	
3	Ability to design experiments, analyze and interpret data,					X
4	Ability to set up a process, operate and manage a component of a system to meet the desired needs under realistic, economic, environmental, social , political, ethical , healthy and safe constraints to be produced and to be continued,				X	
5	Ability to solve, formulate and identify the complex engineering problems					X
6	To identify and apply the appropriate method for problem solving,					X
7	To use the information technology applications in Industrial Engineering,				X	
8	To develop customized computer software for an algorithm in accordance with proposed solutions,					
9	Ability to use the simulation, optimization, and statistical software packages in order to analyze the problems of industrial engineering,					X
10	Ability to communicate effectively with customers and team members orally and in writing within business ethics,	X				
11	To have the professional and ethical responsibility,		X			
12	To develop themselves by following the innovations in science and technology through understanding the importance of lifelong learning,			X		
13	Ability to express ideas clearly and to communicate orally and in writing as having the faculty of independent decision-making and self study,					X
14	Ability to have the consciousness about environmental, health and security aspects of engineering applications both socially and globally	X				
15	Ability to have a good command of Turkish language,			X		
16	Ability to have the knowledge of a foreign language at a level of communicating with their colleagues and using resources related to their field in international environments; and ability to use a second foreign language at an intermediate level.			X		
17	Ability to have the knowledge about project, risk and change management and conciousness about innovation and entrepreneurship.			X		

WEEKLY AGENDA	
WEEK	**SUBJECTS**
1	Introduction to military OR
2	Search theory - Glimpse methods - Detection probability in terms of distance - Signal detection theory
3	Lateral range curves (LRC) - Definition of LRC - Detection functions - Sweep width
4	Search theory - Search methods - Parallel search - Expanding area search
5	Patrol - Barrier patrol - Optimization of search effort
6	ASW - Barrier patrol effectiveness - Torpedo hit probabilities
7	ASW - Screening - Convoy approach
8	AAW - AAW trials - Trial analysis
9	**MIDTERM EXAM WEEK**
10	MW - Mine types - Systematic mining - Random mining
11	System reliability - Structure functions - Minimum path
12	System reliability - Expected time between failures - Failure ratio examples
13	Lanchaster models - Target features - Failure circles
14	Lanchaster models - Linera law - Square law
15	Lanchaster models - Stochastic Lanchaster models - Heterogeneous combat models
16	Simulation and wargames - Definition of wargames - Classification of wargames - Using wargames in selection of weapon systems

ECTS CREDITS/ WORKLOAD TABLE				
ACTIVITIES		**NUMBER**	**DURATION (Hour)**	**TOTAL WORKLOAD (Hour)**
Theoretical Course	Theoretical Instruction	15	3	45
	Laboratory Practice	--	--	--
Guided Problem Solving	Course Work	-	-	-
	Group or Self study	15	4	60
Completion of Assignments and Submission as Reports		-	--	--
Term Project		1	--	--
Presentation		-	--	--
Other Works (Midterm)		4	--	--
Midterm Exam	Exam	1	2	2
	Self study for exam	1	5	5
Final Exam	Exam	1	2	2
	Self study for exam	1	6	6
TOTAL WORKLOAD (Hour)		120 Hours		
ECTS CREDITS		4 Credits		