

GAZI UNIVERSITY
FACULTY OF ENGINEERING AND ARCHITECTURE
DEPARTMENT OF INDUSTRIAL ENGINEERING

EUROPEAN CREDIT TRANSFER SYSTEM
INFORMATION PACKAGE
FOR UNDERGRADUATE PROGRAM

MAT 101 MATHEMATICS I		INDUSTRIAL ENGINEERING DEPARTMENT	
<i>Semester</i>	<i>Kredi Dağılımı</i>		
	<i>Lecture</i>	<i>Recitation</i>	<i>Laboratory</i>
1	4	0	0
<u>Language</u>	English		
<u>Compulsory / Elective</u>	Compulsory		
<u>Prerequisites</u>	None		
<u>Catalog Description</u>	Introduction to Calculus. Definition of functions and their properties. Definition of limit, continuity and their related properties. Definition of derivative and its applications to engineering. Maximum and minimum problems and their applications. Sketching curves with details.		
<u>Course Objectives</u>	To give fundamental definitions about mathematical analysis and teaching their application in the engineering.		
<u>Course Outcomes</u>	Understanding of fundamental information using in mathematics. Preparing the basis to differential equations.		
Text books and/or References	1. Prof.Dr.H.H. Hacısalihoğlu,(1998) Fundamental and General Mathematics, Vol 1. 2. Prof.Dr.M. Balcı,(1999) General Mathematics, Vol 1. 3. Edwards, C.H. and Penney, D.E., Calculus and Analytic Geometry; Prentice Hall, Inc., (Translation: Prof.Dr.Ö. Akın , Palme Press)(2002) 4. Ross L. Finney, Dale T. Hoffman, Judah L. Schwartz, Carroll O. Wilde,(1984) Calculus and Analytic Geometry; Addison-Wesley Publ. Comp.		
Assessment Criteria		Quantity	Percentage
	<u>Midterm Exams</u>	1	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Cathegory by	<u>Mathematics and Basic Sciences</u>	80	
Content (%)	Engineering Science	20	
Instructors	Assist.Prof.Dr.Ogün DOĞRU		

COURSE PLAN				
Week	Topics			
1	FUNCTIONS: Definition of function. Determining of domain and range sets of functions. One on one and cover functions. Finding inverse of functions. Some special types functions.			
2	LIMIT: Definition of limit and its basic properties. One hand side limits. Infinity as a limit.			
3	CONTINIUTY: Definition of continuous functions and types of discontiniuty.			
4	DERIVATIVE: Definition of derivative and its basic properties. Geometrical mean of derivative. Derivative of polynomial functions and polynomial approximation with the help of derivative. Chain rule.			
5	DERIVETIVE OF SOME SPECIAL FUNCTIONS: Derivatives of trigonometric, inverse trigonometric and hyperbolic functions.			
6	PARAMETRIC DERIVATIVE: Derivatives of functions given by parametric equations			
7	IMPLICIT DIFFERENTIATION : The method for Implicit differentiation of functions given by implicit form.			
8	FUNDAMENTAL THEOREMS RELATED BY DERIVATIVE: Rolle’s theorem, and the Mean Value Theorem. Taylor expansion of MVT and estimate of approximation error.			
9	INDETERMINATES: Indeterminate forms in limit and l’Hopital’s rule.			
10	MAXIMUM AND MINIMUM PROBLEMS: Investigation of sign of first derivative, maximum-minimum problems and their applications.			
11	MIDTERM EXAM			
12	CONVEXITY AND CONCAVITY: Investigation of sign of second derivative, determining of convexity and inflection points.			
13	ASYMPTOTES : Definition of asymptotes and finding vertical, horizontal and oblique asymptotes.			
14	DRAWING CURVE: Sketching of curve of a function in all details.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Assist.Prof.Dr. Ogün DOĞRU

MAT102 MATHEMATICS - II		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Kredi Dağılımı		
	Lecture	Recitation	Laboratory
2	4	0	0
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Introduction to Integral. Definition of indefinite integrals and basic integration formulas. Taking integrals by several methods. Definition of definite integral and the fundamental theorems of integral calculus. Application of definite integrals. Improper integrals. Basic properties of Laplace transformations. Definition of sequences and infinite series and investigation of their convergence with the help of related tests. Power series and their convergence for functions. Taylor formula.		
Course Objectives	To give fundamental definitions about mathematical analysis and teaching their application in the engineering.		
Course Outcomes	Understanding of fundamental information using in mathematics. Preparing the basis to differential equations.		
Text books and/or References	1. Prof.Dr.H.H. Hacısalihoğlu,(1998) Fundamental and General Mathematics, Vol 1. 2. Prof.Dr.M. Balcı,(1999) General Mathematics, Vol 1. 3. Edwards, C.H. and Penney, D.E., Calculus and Analytic Geometry; Prentice Hall, Inc., (Translation: Prof.Dr.Ö. Akın , Palme Press)(2002) 4. Ross L. Finney, Dale T. Hoffman, Judah L. Schwartz, Carroll O. Wilde,(1984) Calculus and Analytic Geometry; Addison-Wesley Publ. Comp.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Cathegory by Content (%)	Mathematics and Basic Sciences	80	
	Engineering Science	20	
Instructors	Assist.Prof.Dr.Ogün DOĞRU		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION TO INTEGRAL: Definitions of differential and indefinite integral.			
2	BASIC INEGRATION FORMULAS: Basic inegration formulas using for taking integral.			
3	TAKING INTEGRALS BY SEVERAL METHODS: Integration by substitution, integration by parts, partial fractions.			
4	INTEGRAL OF TRIGONOMETRIC FUNCTION: Some special trigonometric substitutions in integrals, products and powers of trigonometric functions, even and odd powers of sines and cosines in integrals.			
5	DEFINITE INTEGRAL : Lower and uper Riemann sums, definiton of definite integral and its properties.			
6	FUNDAMENTAL THEOREMS: Fundamental theorems of integral calculus, Newton Leibnitz formula.			
7	APPLICATION OF DEFINITE INTEGRALS: The area under a curve, area between two curves, calculating volumes by slicing and shell methods, length of a plane curve, area of a surface, average value of a function, moments and center of mass.			
8	IMPROPER INTEGRALS: Types of Improper integrals and their convergence.			
9	SPECIAL TRANSFORMATIONS :Basic properties of Laplace and Fourier transformations. Beta and Gamma functions.			
10	SEQUENCES AND INFINITE SERIES: Definition of sequences and infinite series and investigation of their convergence with the help of related tests.			
11	MIDTERM EXAM			
12	POWER SERIES : Definition of power series and their convergence for functions and tests. Taylor expansions and Taylor formula.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Assist.Prof.Dr. Ogün DOĞRU

<u>KİM 103 CHEMISTRY</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>1</u>	<u>3</u>	<u>1</u>	<u>0</u>
<u>Language</u>	<u>English</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Chemical equations and reactions, gases, thermochemistry, the periodic table and some atomic properties, chemical bonding, liquids, solids and intermolecular forces, solutions, chemical equilibrium, acids, bases and equilibrium in aqueous solutions, thermodynamic, electrochemistry, nuclear chemistry, organic chemistry.</u>		
<u>Course Objectives</u>	<u>We are aware that most general chemistry students have career interests not in chemistry but in biology, medicine engineering, and environmental and agricultural sciences as well as in many other fields. Therefore, the general principles and modern applications are aimed in this course.</u>		
<u>Course Outcomes</u>	<u>To solve the problems about biological sciences, engineering and environmental sciences, this course contains a number of special features designed to help the students gain an understanding of the basic concepts and methods.</u>		
<u>Textbook and /or References</u>	1) <u>Ralph H. Petrucci, William S. Harwood, F. Geoffy Herring, General Chemisty ,renciples and modern applications, Prentice-Hall, Inc (2002), New Jersey</u> 2) <u>Charles E. Mortimer, Chemistry, A conceptual approach, D. Van Nostrand company , New York</u>		
<u>Assessment Criteria</u>		<u>Quantity</u>	<u>Percentage</u>
	<u>Midterm Exams</u>	1	50
	<u>Quizzes</u>	-	-
	<u>Homeworks</u>	-	-
	<u>Projects</u>	-	-
	<u>Term Paper</u>	-	-
	<u>Laboratory Work</u>	-	-
	<u>Other</u>	-	-
	<u>Final Exam</u>	1	50
<u>Course Category by Content (%)</u>	<u>Mathematics and Basic Sciences</u>	75	
	<u>Engineering Science</u>	20	
	<u>Engineering Design</u>	5	
	<u>Social Sciences</u>	0	
<u>Instructors</u>	<u>Prof.Dr. Nurcan KARACA</u>		

COURSE PLAN	
Week	Topics
1	CHEMICAL EQUATIONS AND REACTIONS: Chemicals, measurement, SI units, Early chemical discoveries, Dalton atomic theory, isotopes, Avogadro constant, mole concept, empirical molecular formulas, chemical equations and stoichiometry, limiting reactant, percent yield, electrolyte and non-electrolyte solutions, acid and base reactions, neutralization, precipitation, oxidation and reduction reactions, molarity, stoichiometry of reactions.
2	GASES : properties of gases : gas pressure, pressure, volume and temperature relationships, the ideal gas equation, applications of the ideal gas equations, gases in chemical reactions, mixtures of gases, Dalton's law of partial pressure, kinetic-molecular theory of gases, Graham's law of effusion, real gases.
3	THERMOCHEMISTRY : kinetic and potential energy, heat and work, heat of reaction and calorimetry, the first law of thermodynamics, enthalpy(H) , internal energy(E), Hess's law, enthalpies of formation
4	THE PERIODIC TABLE AND SOME ATOMIC PROPERTIES: Electromagnetic radiation and atomic spectra, quantum theory , Bohr's model of atom , wave mechanics, uncertainty, quantum numbers and electron orbitals, periodic table, the sizes of atoms and ions, ionization energy, electron affinity and magnetic properties.
5	CHEMICAL BONDING: Lewis theory , covalent bonding, electronegativity and polarity of bonds, writing Lewis structures, formal charge and resonance.
6	LIQUIDS, SOLIDS AND INTERMOLECULAR FORCES: some properties of liquids, some properties of solids, intermolecular forces (van der Waals forces hydrogen bonding), phase diagrams, crystal structures, crystal lattice, X- ray diffraction.
7	SOLUTIONS: percent concentration, mole fraction, molarity, molality, enthalpy of dissolution, intermolecular forces in solutions, temperature effect on solubility, solubilities of gases and effect of pressure and temperature, vapor pressure of solutions, Raoult's law, colligative properties of electrolyte and non-electrolyte solutions (freezing point depression and boiling point elevation, vapor pressure lowering and osmotic pressure), solutions of electrolytes.
8	CHEMICAL EQUILIBRIUM: Reaction rates, collision and transition state theory, dynamic equilibrium in chemical equilibrium, the equilibrium constant expression, K_c and K_p , homogeneous and heterogeneous equilibrium, predicting of the direction of a net reaction, altering equilibrium conditions : Le Chatelier's principle.
9	ACIDS, BASES AND EQUILIBRIUM IN AQUEOUS SOLUTIONS : The Arrhenius theory, Bronsted-Lowry theory, the self-ionization of water and pH scale, strong acids and bases, weak acids and bases, calculations on acid-base reactions, the common-ion effect in acid-base equilibria, buffer solutions, solubility equilibria, the solubility product constant, K_{sp} , criteria for precipitation (Q_{cc} and K_{cc}) , fractional precipitation.
10	THERMODYNAMIC: Spontaneous and non-spontaneous change, entropy and free energy, second law of thermodynamics, third law of thermodynamics, ΔG and equilibrium, ΔG° and K_{eq} as functions of temperature
11	Mid-Term exam.
12	ELECTROCHEMISTRY : electrode potentials and their measurements, standard electrode potentials, E_{cell} and spontaneous change, E_{cell} as a function of concentration, relation between E_{cell} and K_{eq} , Nernst equation, electrolysis, determination by electrolysis.
13	NUCLEAR CHEMISTRY : Radioactivity, alpha, beta and gamma rays, electron captures, nuclear reactions and artificially induced radioactivity, transuranium elements, rate of radioactive decay, energies of nuclear reactions, nuclear stability, fission and fusion, effect of radiation on matter, applications of radioisotopes
14	ORGANIC CHEMISTRY: Organic compounds and structures, alkanes, alkenes and alkynes, aromatic hydrocarbons, nomenclatures, alcohols, phenols and ethers, aldehydes and ketones, carboxylic acids , amines, heterocyclic compounds.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by Prof.Dr. Nurcan KARACA

Date : 01/15/2003

<u>MM103 COMPUTER AIDED TECHNICAL DRAWING</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>1</u>	<u>2</u>	<u>1</u>	
<u>Language</u>	<u>English</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Introduction to computerb aided technical drawing. Geometrical constructions. Principles of orthographic projection; projection of principal views from three dimensional models. Drawing techniques for basic manufacturing processes and standart features. Projection of third principal view from two given principal views; free hand drawing techniques. Three dimensional drawing techniques; simple shapes, inclined surfaces, skew surfaces. Principles of dimensioning. Principles of sectioning; full and half sections. Further work on sectioning, conventional practices. Screw threads and threaded fasteners.		
<u>Course Objectives</u>	<u>Machine design and technical drawing with standards for production.</u>		
<u>Course Outcomes</u>	<u>Application of student with design and reviable.</u>		
Textbook and /or References	Giesecke, E. Frederick et. al., (2000), Technical Drawing (Eleventh Edition) Upper Saddle River, N.J.:Prentice Hall. (Textbook)		
Assessment Criteria		Quantity	Percentage
	<i>Midterm Exams</i>	1	30
	Quizzes	-	-
	Homeworks	25	20
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	-	
	Engineering Science	-	
	Engineering Design	100	
	Social Sciences	-	
Instructors	Assist.Prof.Dr. Nihat GEMALMAYAN-		

COURSE PLAN	
Week	Topics
1	INTRODUCTION TO TECHNICAL DRAWING.
2	GEOMETRICAL DRAWING.
3	PROJECTION OF PRINCIPAL VIEWS.
4	PRINCIPAL VIEWS.FROM THREE DIMENSIONAL MODEL.
5	DRAWING.TECHNIQUES AND STANDARDS
6	THIRD PRINCIPAL VIEW FROM TO GIVEN VIEWS.
7	DIMENSIONS.
8	THREE DIMENSIONAL DRAWING
9	THREE DIMENSIONAL DRAWING
10	MIDTERM EXAM
11	THREE DIMENSIONAL DRAWING FROM SOLID MODEL.
12	SECTIONS
13	APPLICATION OF SECTIONS
14	SCREW THREADS AND FASTANERS.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1: None 2: Partially 3: Completely				

Prepared by: Assist.Prof.Dr. Nihat GEMALMAYAN

Date : 02/10/2002

<u>FIZ103 PHYSICS I</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>1</u>	<u>3</u>	<u>1</u>	<u>2</u>
<u>Language</u>	<u>English</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Vectors, Motion in one Dimension, Motion in two dimension, the Laws of Motion, Circular Motion and Other application of Newtons’ Laws, Work and energy, Potential Energy and Conservation of energy, Linear Momentum and collisions, Rotation of a Rigid body about a fixed Axis and Torque, Rolling Motion, Angular Momentum and Torque, Static Equilibrium and Elasticity, Oscillatory Motion</u>		
<u>Course Objectives</u>	<u>To provide the student with a clear and logical presentation of the basic concept and principles of physics, and to strengthen an understanding of concepts and principles through abroad range of interesting application to the real world. It is also attempted to motivate the students through physical examples that demonstrate the role of physics in other disiplines.</u>		
<u>Course Outcomes</u>	<u>It is provided students with an improvment in capability of solving engineering problems and analysing them.</u>		
<u>Textbook and /or References</u>	1. Raymond A. S., (1992), Physics For Scientist and Engineers, 3 rd Edition, Saunders College Publishing, Florida. (Textbook) 2. Halliday D. ve Resnick, (1974), Fundamentals of Physics, 3 rd Edition, John Wiley Inc. New York.		
<u>Assessment Criteria</u>		<u>Quantity</u>	<u>Percentage</u>
	<u>Midterm Exams</u>	2	50
	<u>Quizzes</u>	-	-
	<u>Homeworks</u>	-	-
	<u>Projects</u>	-	-
	<u>Term Paper</u>	-	-
	<u>Laboratory Work</u>	-	-
	<u>Other</u>	-	-
	<u>Final Exam</u>	1	50
<u>Course Category by Content (%)</u>	<u>Mathematics and Basic Sciences</u>	80	
	<u>Engineering Science</u>	20	
	<u>Engineering Design</u>	-	
	<u>Social Sciences</u>	-	
<u>Instructors</u>	<u>Assist. Prof. M.Mahir Bülbül</u>		

COURSE PLAN	
Week	Topics
1	VECTORS.
2	MOTION IN ONE DIMENSION.
3	MOTION IN TWO DIMENSION.
4	THE LAWS OF MOTION.
5	CIRCULAR MOTION AND OTHER APPLICATION OF NEWTONS' LAWS.
6	WORK AND ENERGY.
7	POTENTIAL ENERGY AND CONSERVATION OF ENERGY, LINEAR MOMENTUM AND COLLISION.
8	FIRST MIDTERM EXAM.
9	ROTATION OF A RIGID BODY ABOUT A FIXED AXIS AND TORQUE.
10	ROLLING MOTION, ANGULAR MOMENTUM AND TORQUE.
11	SECOND MIDTERM EXAM.
12	STATIC EQUILIBRIUM AND ELASTICITY.
13	OSCILLATORY MOTION.
14	THE LAW OF UNIVERSAL GRAVITATION.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Assist. Prof. Dr. M.Mahir Bülbül..... Date : .13../.01../2003.....

ENF 104 BASIC INFORMATION		INDUSTRIAL ENGINEERING DEPARTMENT	
TECHNOLOGY			
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
1	1	2	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Introduction to the computer. MS-DOS, Windows, Windword, Excel, Powerpoint, Access, Internet.		
Course Objectives	To introduce computer applications. To teach MS-DOS, Windows, Winword, Excel, Access, Powerpoint, Internet.		
Course Outcomes	Understanding of computer applications. Learning MS-DOS, Windows, Winword, Excel, Access, Powerpoint, Internet.		
Textbook and References	1. Shelly, G.B., (2001), Microsoft Office 2000 Introductory Concepts and Techniques, Course Technology, Incorporated. (Textbook) 2. Shelly, G.B., (2001), Microsoft Office 2000 Advanced Concepts and Techniques, Course Technology, Incorporated. 3. Grauer, R., Barber, M., (1999), Exploring Microsoft Office Professional 2000, Volume I, Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	30
	Quizzes	-	-
	Homeworks	2	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	1	10
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	20	
	Engineering Science	30	
	Engineering Design	50	
	Social Sciences	0	
Instructors	Dr. M. Ali AKCAYOL		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION: History of the computer, Computer hardware and software.			
2	MS-DOS: System files, Configuration files, DOS commands.			
3	WINDOWS: Desktop, Working windows, Files and Directories, Optimization of desktop and taskbar, Start menu.			
4	WINDOWS: Control panel, Display settings, Hardware add/remove, Floppy disk and harddisk operations, Printer setup, Programs add/remove.			
5	WINWORD: Word window and toolbars, Files, Print, Edit menu, View menu.			
6	WINWORD: Insert menu, Tools menu, Table operations.			
7	MIDTERM EXAM I			
8	EXCEL: Excel window, Toolbars and customize, Selecting and formatting cells, Files operations, Print, Edit menu, View menu.			
9	EXCEL: Insert menu, Tools menu, Data sorting and filtering, Functions, Chart preparation.			
10	ACCESS: Introduction to database, Tables, Forms, Controls.			
11	ACCESS: Query, SQL, Reports, Macros.			
12	MIDTERM EXAM II			
13	POWERPOINT: Introduction presentation preparation, Presentation formatting, Templates using, Insert object to presentation, Animations.			
14	INTERNET: E-Mail send/receive, Browser using, News groups, Chat, Download and upload, Searching on the WEB.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr. M. Ali AKCAYOL

Date : 17/12/2002

FIZ 104 PHYSICS II		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
2	3	1	0
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Charges and electrical fields. Gauss' law , Electrical potential. Capacitor and capacitance. Current and resistance. Electromotive force, circuits and magnetic fields. Ampere's law and Faraday's induction law. Inductance and magnetic properties of materials. Electromagnetic waves.		
Course Objectives	This introductory physics has two main objectives: 1. To provide the students with a clear and logical presantation of the basic consepts and prnrinciples of physics, 2. To understand of the concepts and to make the applications to the real world.		
Course Outcomes	To strengthen an understanding of concepts and methods, problem- solving methodology, to advance the role of engineering disciplines		
Textbook and /or References	Serway-Beichner, Physics for Scientist and Engineers with Modern Physics, Fifth Edition, Saunders College Publishing, 2000		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	-	-
	Homeworks	1-2	0
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	90	
	Engineering Science	10	
	Engineering Design	0	
	Social Sciences	0	
Instructors	Assist. Prof.Dr. M.Mahir BÜLBÜL		

COURSE PLAN	
Week	Topics
1	ELECTRIC FIELDS:
2	GAUSS'S LAW
3	ELECTRIC POTENTIAL:
4	CAPACITANCE AND DIELECTRICS:
5	GENERAL APPLICATIONS AND 1. MIDTERM EXAM
6	CURRENT AND RESISTANCE
7	DIRECT CURRENT CIRCUITS
8	MAGNETIC FIELDS
9	SOURCE OF THE MAGNETIC FIELD
10	FARADAY'S LAW
11	INDUCTANCE
12	GENERAL APPLICATIONS AND 2. MIDTERM EXAM
13	ALTERNATING CURRENT CIRCUITS
14	ELECTROMAGNETIC WAVES

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Assist. Prof.Dr. M.Mahir BÜLBÜL..... Date : 16.../..01./..2003.....

ENF 106 BASICS OF COMPUTER AND C/C++ PROGRAMMING		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
2	2	2	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	C functions, Variables, Constants, Operators, Program control statements, Library functions, Arrays, Pointers, Bitwise operators, Files.		
Course Objectives	To learn structure of the C and programming. Modeling and writing program by using C language for problems.		
Course Outcomes	Learning structure of the C and programming. Learning program writing by using C language for problems.		
Textbook and /or References	1. Kernighan, B.W., Ritchie, D.M., (1988), The C Programming Language : ANSI C Version, , Prentice Hall. (Textbook) 2. Dale, N., Headington, M.R., Chip Weems, (1999), Programming and Problem Solving with C++, Jones and Bartlett Publishers. 3. Linden,P.V.D., (1997), Expert C Programming, Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	30
	Quizzes	-	-
	Homeworks	2	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	1	10
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	15	
	Engineering Science	25	
	Engineering Design	60	
	Social Sciences	0	
Instructors	Dr. M. Ali AKCAYOL		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION: ANSI C and C++, C functions, main() function.			
2	VARIABLES, CONSTANTS, OPERATORS: Variables types and definition, Constant definition, Operator types.			
3	PROGRAM CONTROL STATEMENTS: Compare statements, Loop statements, Break, Continue, and Goto statements.			
4	FUNCTIONS: Function definition, Parameter send, Header files.			
5	LIBRARY FUNCTION: Standart I/O functions, Mathematical functions, Caharacter functions, Date and time functions.			
6	ARRAYS: One dimensional arrays, Multi dimensional arrays, Matrix, Arrays send to functions.			
7	MIDTERM EXAM I			
8	POINTERS: Pointer definition and using, Pointer mathematics, Pointer compare, Dynamic arrays.			
9	STRUCTURAL DATA TYPES: TypeDef, Struct, Union statements.			
10	NEW DATA TYPES: New data types definiton, New data types operations.			
11	FILES: Text files, Binary files open/close.			
12	FILES: Access to files and operations.			
13	PRECOMPILED COMMANDS: #define, #undef, #ifndef, #include, #if, #endif, #elif, #ifdef, #line, #pragma, #error commands.			
14	GRAPH: Plot mode, Graph functions, Plot functions, Text functions.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr. M. Ali AKCAYOL

Date : 17/12/2002

ENM 106 INTRODUCTION TO INDUSTRIAL ENGINEERING		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
2	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	History of engineering and development of Industrial Engineering. The relationship with other engineering disciplines. Sytem approach and the basic concepts of Industrial Engineering .		
Course Objectives	The introducing of Industrial Engineering		
Course Outcomes	The basic information of Industrial Engineering and to learn of professional topics..		
Textbook and /or References	1. Turner, W. C., Mize, J.H., Case, K.E., (1987), Introduction to Industrial and Systems Engineering, 2 nd .edition, Prentice-Hall. (Textbook) 2. 2- Vaughn, R.C., (1977), Introduction to Industrial Engineering, 2 nd . Edition, Iowa State University Pres. 3. 3- Stevenson, W. J., (1993), Production/ Operations Management, 4 th . Edition, Irwin.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	—	—
	Homeworks	—	—
	Projects	—	—
	Term Paper	—	—
	Laboratory Work	—	—
	Other	—	—
	Final Exam	1	50
	Mathematics and Basic Sciences	25	
	Engineering Science	50	
	Engineering Design	20	
	Social Sciences	05	
Instructors	Dr. Bahar ÖZYÖRÜK Dr. Ediz ATMACA		

COURSE PLAN	
Week	Topics
1	ENGINEERING PROCESS AND INDUSTRIAL ENGINEERING : The chronology of industrial engineering and the relationship with other engineering disciplines.
2	ENGINEERING PROCESS AND INDUSTRIAL ENGINEERING : Activities of Industrial Engineering and organization structure, Systems concept
3	FACILITIES LOCATION : Decisions of facility location.
4	FACILITIES LOCATION : Transportation problems.
5	FACILITIES LAYOUT . Basic types of layout and cellular layouts.
6	MIDTERM EXAM I
7	PRODUCTION PLANNING AND CONTROL.: The classification of production systems and investigation of demand type.
8	PRODUCTION PLANNING AND CONTROL : Planning studies and scheduling
9	ENGINEERING ECONOMY : Cost volume analysis
10	ENGINEERING ECONOMY : The time value of money
11	OPERATION RESEARCH TECHNIQUES: Search for solution to industrial and economical problems by quantitative techniques.
12	MIDTERM EXAM II
13	MANAGEMENT SYSTEMS DESIGN: Organization design and management control
14	MANAGEMENT SYSTEMS DESIGN : Computers and Information Systems

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr. Bahar ÖZYÖRÜK, Dr. Ediz..ATMACA

Date : .28../09.../2002.....

ING 113 READING &WRITING SKILLS I		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
1	3	0	0
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	ING 113 aims to develop reading comprehension and writing skills along with advanced grammar topics. Developing analytical and critical thinking skills through the selected text s, students will be able to evaluate, synthesize and respond to the ideas in the texts. in addition, students are equipped with basic principles and mechanics of writing a paragraph along with advanced grammar topics.		
Course Objectives	To help the students to: -develop analytical and criticaI thinking skills. -evaluate, synthesize and respond to the ideas in the texts. -enlarge their active vocabulary size by student-centered vocabulary tasks. -practice paragraph writing which is the basic unit for academic writing (term papers, reports)		
Course Outcomes	Students will be equipped with analytical and critical thinking skills. Through the process of reading texts, students will evaluate, synthesize and respond to the ideas in the texts, and enlarge their vocabulary size to write a paragraph.		
Textbook and /or References	ING 113 & 114 Lecture Notes by Ali Evler, Can Gür, Engin Alkan		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	15	
	Engineering Science	-	
	Engineering Design	-	
	Social Sciences	85	
Instructors	Ali EVLER, Can GÜR, Engin ALKAN		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION, ORIENTATION, INTRODUCTION TO READING SKILLS			
2	READING SKILLS (ANTICIPATION, POINTS OF REFERENCE); PASSIVE VOICE			
3	READING SKILLS (RAPID READING AND UNDERSTANDING); INVERSION			
4	READING SKILLS (PRACTICE); ADJECTIVE CLAUSES			
5	WHAT IS A PARAGRAPH? (PARTS), VOCABULARY BUILDING, ADJECTIVE CLAUSES			
6	PARAGRAPH (ENUMERATION, UNITY AND COHERENCE), VOCABULARY BUILDING, NOUN CLAUSES			
7	PARAGRAPH (CLASSIFICATION), VOCABULARY BUILDING, NOUN CLAUSES			
8	MIDTERM EXAM I			
9	PARAGRAPH (PROCESS AND CHRONOLOGY), READING 1 (PRACTICE), ADVERBIAL CLAUSES			
10	PARAGRAPH (CAUSE & EFFECT), READING 2 (PRACTICE), ADVERBIAL CLAUSES			
11	PARAGRAPH (COMPARISON & CONTRAST), READING 3 (PRACTICE), ADVERBIAL CLAUSES			
12	READING 4,5,6 (PRACTICE),			
13	MIDTERM EXAM II			
14	PARAGRAPH (DEFINITION), FEEDBACK FOR THE SECOND MIDTERM			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Can GÜR

Date: 27/12/2002.

ING 114 READING & WRITING SKILLS II		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
2	3	0	0
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	ING 114 enables students to write term paper, report, and unified and coherent essay (expository and persuasive) of 350-500 words using information from the various sources they have exploited and integrate it into their own writing. Furthermore, students are equipped with the principles and techniques of oral presentation skills in order to enable them to communicate in public settings		
Course Objectives	To help the students to: -express themselves writing unified and coherent expository essays of350 words and 500 word persuasive essay using authentic sources, -appropriately synthesize information from the various sources they have exploited and integrate it into their own writing, -develop their oral presentation skills.		
Course Outcomes	Students will be equipped with writing skills to write expository and persuasive essays exploiting referencing and quoting techniques, and oral presentation skills to make oral presentatioEJEypublic settings		
Textbook and References	ING 113 & 114 Lecture Notes by Ali Evler, Can Gür, Engin Alkan		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	25
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	1	25
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	15	
	Engineering Science	-	
	Engineering Design	-	
	Social Sciences	85	
Instructors	Ali EVLER, Can GÜR, Engin ALKAN		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION; REVIEW OF PARAGRAPH			
2	EXPANDING PARAGRAPH INTO ESSAY, PARTS OF AN ESSAY (INTRODUCTION, BODY, CONCLUSION)			
3	EXPOSITORY ESSAY (DESCRIPTION), REFERENCING AND QUOTING			
4	EXPOSITORY ESSAY (CLASSIFICATION)			
5	EXPOSITORY ESSAY (CAUSE –EFFECT)			
6	EXPOSITORY ESSAY (COMPARISON -CONTRAST)			
7	ARGUMENTATIVE ESSAY, CHOOSING TOPICS FOR THE TERM PAPER			
8	MIDTERM EXAM I			
9	ORAL PRESENTATION SKILLS			
10	OTHER TYPES OF WRITING (CV, LABORATORY REPORT FORMAT)			
11	11 ORAL PRESENTATIONS OF THE TERM PAPERS BY STUDENTS (GROUP 1)			
12	12 ORAL PRESENTATIONS OF THE TERM PAPERS BY STUDENTS (GROUP 2)			
13	13 ORAL PRESENTATIONS OF THE TERM PAPERS BY STUDENTS (GROUP 3)			
14	14 ORAL PRESENTATIONS OF THE TERM PAPERS BY STUDENTS (GROUP 4)			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 202 OPERATIONS RESEARCH I		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
4	4	0	0
<u>Language</u>	<u>English</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>202</u>		
<u>Catalog Description</u>	Introduction to linear programming. Modeling. Graphical solution. Simplex and dual simplex method. Duality and sensitivity analysis. Transportation and assignment problems.		
<u>Course Objectives</u>	<u>For effective management of contemporary organizations, to provide a decision support tool from the point of view of problem solving and decision making.</u>		
<u>Course Outcomes</u>	<u>Application of operations research, being as an interdisciplinary science, on production and service systems as a means of problem solving to develop proficiency knowledge and capability.</u>		
<u>Textbook and /or References</u>	1. Taha, H.,(2003), An Introduction to Operations Research, 7 th Ed., Prentice Hall. (Textbook) 2. Winston, W.L., (1993), An Introduction to Operations Research, 3 rd Ed., McGraw Hill.		
<u>Assessment Criteria</u>		<u>Quantity</u>	<u>Percentage</u>
	Midterm Exams	2	35
	Quizzes	2	10
	Homeworks	2	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
<u>Course Category by Content (%)</u>	Mathematics and Basic Sciences	90	
	Engineering Science	10	
	Engineering Design	0	
	Social Sciences	0	
<u>Instructors</u>	Assist. Prof. Dr. Mehmet Atak, Assoc.Prof.Dr. Ö.Faruk Baykoç		

<u>COURSE PLAN</u>	
<u>Week</u>	<u>Topics</u>
1	INTRODUCTION, DEFINITION OF OPERATIONS RESEARCH: A brief history and development of operations research, definition of basic concepts in OR.
2	MODELING: Verbal definition of linear programming problems, construction of mathematical model of various decision problems.
3	GRAPHICAL SOLUTION METHODS: Plotting a linear programming problem with two variables on a two dimensional graph, denoting the feasible solution space and finding the optimal. Graphical post-optimal analysis of the objective coefficients.
4	GRAPHICAL SOLUTION METHODS: Graphical sensitivity analysis on the constraints' right-hand-side constants. Special solution cases that might be encountered in the graphical solutions of linear programming problems (Alternative, infeasible, degeneracy and unbounded solutions).
5	MIDTERM EXAM I
6	ALGEBRAIC METHOD SIMPLEX METHOD: Statement of constraints system in the standard form as the simultaneous equations, and based on this form application of the algebraic technique the Simplex method. Application of the algorithm for maximization and minimization problems.
7	ALGEBRAIC METHOD SIMPLEX METHOD: Post-optimality (sensitivity) analysis for the objective coefficients and the right-hand-side constants.
8	DUALITY: Primal-dual relationship. Forming dual forms when Primal models are given. Methods for finding Dual forms. Complementary-Slackness condition for optimal and feasible solutions.
9	DUAL-SIMPLEX METHOD: Solution to optimal but infeasible problems.
10	DUAL-SIMPLEX METHOD: Solution to nonoptimal and infeasible problems.
11	MIDTERM EXAM II.
12	MATRIX METHOD: Matrix representation of basis and basis inverse. Sensitivity analysis carried out by means of matrix computations.
13	TRANSPORTATION METHOD: Transportation of commodities from m sources to n destinations as the per unit transportation costs are given.
14	ASSIGNMENT PROBLEM: Assignment of n jobs to n workers or job stations. Generalized assignment problems

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course: 1: None 2: Partially 3: Completely				

Prepared by: Assist.Prof.Dr. Mehmet ATAK Assoc.Prof.Dr. Ö.Faruk BAYKOÇ

Date: 16/09/2002

<u>ENM 205 LINEAR ALGEBRA</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>3</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>English</u>		
<u>Compulsory</u> / <u>Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Introduction to linear algebra. Linear equations systems.Matrix algebra. Vector space Determinants. Eigenvalues and Eigenvectors. Matrix diagonalization.		
<u>Course Objectives</u>	<u>Developement of basic concepts of linear algebra, emphazing concepts encountered in the engineering applications and illustration of these concepts by examples.</u>		
<u>Course Outcomes</u>	<u>Maintaining an infrustructure of linear optimization in operations research.</u>		
<u>Textbook and /or References</u>	3. Kolman, B., Hill, D.R. (2000), Elementary Linear Algebra, 7 th ed., Prentice Hall. (Textbook) 4. Nicholson, W.K. (2002), Elementary Linear Algebra, 1 st ed., McGraw Hill.		
<u>Assessment Criteria</u>		Quantity	Percentage
	<i>Midterm Exams</i>	2	35
	Quizzes	2	10
	Homeworks	2	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
<u>Course Category by Content (%)</u>	Mathematics and Basic Sciences	90	
	Engineering Science	10	
	Engineering Design	0	
	Social Sciences	0	
<u>Instructors</u>	Assist. Prof. Dr. Mehmet ATAĞ, Prof.Dr. Bilal TOKLU		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION, LINEAR EQUILITIES: Basic concepts, system of linear equations.			
2	MATRICES: Matrices, matrix operations and their algebraic properties.			
3	MATRICES: Special type of matricesand partitioned matrices. Echolon form of matrices and elementary matrices.			
4	MATRICES: Inverse of the matrices, equivalent matrices, LU factorization.			
5	REAL VECTOR SPACES: Vectors in plane and space, vector spaces, span and lineer independency, basis and dimension.			
6	R ⁿ VECTOR SPACE: Homogen systems. Coordinates and ve İsomorphism. Rank of a matrix. Orthogonality, projections and approachs.			
7	INNER PRODUCT SPACES: Standard inner product on R ² and R ³ , inner product spaces, Gram-Schmidt process.			
8	MIDTERM EXAM I.			
9	LINEAR TRANSFORMATIONS VE MATRICES: Definition and examples, matrix of linear transformation, similarity.			
10	DETEMINANTS: Definition, properties of determinants özellikleri, inverse of a matrix.			
11	DETEMINANTS: Other applications of determinants, determinants with regard to computations.			
12	MIDTERM EXAM II.			
13	QUADRATIC FORMS: Quadratic forms, positive definit matrices, constrained optimizasyon			
14	EIGENVALUE AND EIGENVECTORS: Eigenvalue and Eigenvectors, diagonalization and similar matrices.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course: 1: None 2: Partially 3: Completely				

Prepared by: Assist.Prof.Dr. Mehmet ATAĞ, Prof.Dr. Bilal TOKLU

Date: 16/09/2002

<u>ENM 206 DIFFERENTIAL EQUATIONS</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>4</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>English</u>		
<u>Compulsory</u> / <u>Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	First order equatios. Second order linear equations. Solutions of linear differential equations . Laplace transform. Linear equations systems and their solutions.		
<u>Course Objectives</u>	<u>Developement of basic concepts of differential equations, emphazing concepts encountered in the engineering applications and illustration of these concepts by examples.</u>		
<u>Course Outcomes</u>	<u>Providing a mathematical infrastrucuture to linear and nonlinear optimization.</u>		
Textbook and /or References	1.Boyce, W.E., DiPrima, R.C., (1996), Elementary Differential Equations, 6 th Edition, Wiley (Textbook)		
Assessment Criteria		Adet	Yüzde
	Midterm Exams	2	35
	Quizzes	2	10
	Homeworks	2	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	90	
	Engineering Science	10	
	Engineering Design	0	
	Social Sciences	0	
Instructors	Assist. Prof. Dr. Mehmet Atak, Prof.Dr. Bilal Toklu		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION, BASIC CONCEPTS: Ordinary differential equations. Order and degree. Linear differential equations. Linear equations			
2	FIRST-ORDER DIFFERENTIAL EQUATIONS: Standard form and differential form. Homogeneous equations. Separable equations.			
3	SEPARABLE FIRST-ORDER DIFFERENTIAL EQUATIONS: Initial value problem			
4	HOMOGENEOUS AND EXACT FIRST-ORDER DIFFERENTIAL EQUATIONS: Methods of solutions.			
5	INTEGRATING FACTORS: Integrating factor.			
6	LINEAR FIRST-ORDER DIFFERENTIAL EQUATIONS: An integrating factor. Various applications			
7	LINEAR DIFFERENTIAL EQUATIONS: Definitions. Uniqueness theorem. Linear differential operator. Linear dependence. Linear independence.			
8	MIDTERM I.			
9	SECOND-ORDER LINEAR HOMOGENEOUS DIFFERENTIAL EQUATIONS: The characteristic equation. Solution in terms of the characteristic roots.			
10	N TH -ORDER LINEAR HOMOGENEOUS DIFFERENTIAL EQUATIONS: The characteristic equation. Solution in terms of the characteristic roots.			
11	LINEAR EQUATIONS WITH VARIABLE COEFFICIENTS : Introduction. Analytic functions. Ordinary points and singular points.			
12	II. ARASINAV.			
13	LAPLACE TRANSFORM: Improper integrals. Definition. Convergence of the Laplace transform.			
14	INVERSE LAPLACE TRANSFORM: Uniqueness theorem. Definition of the Laplace transform. Convergence of the Laplace transform.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course: 1: None 2: Partially 3: Completely				

Prepared by: Assist.Prof.Dr. Mehmet Atak, Prof.Dr. Bilal Toklu

Tarih : 16/09/2002

ENM 207 PROBABILITY		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
3	3	0	0
Language	English / Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Basic probability concepts. Set theory. Random variables. Discrete and continuous probability distributions. Expected value. Moments. Moment generating functions. Joint probability distributions.		
Course Objectives	To introduce importance of probability theory in engineering applications. To teach methods used in describing random variation in systems.		
Course Outcomes	To get an ability for understanding basic properties of the systems which have random variation and for using appropriate mathematical models to analyze these systems.		
Textbook and References	1. Walpole, R.E., Myers, R.H., Myers S.L., Ye, K., (2002), Probability and Statistics for Engineers and Scientists, Prentice Hall. (Textbook) 2. Devore, J.L., (1990), Probability and Statistics for Engineers and the Scientists, Brooks/Cole Publishing Company. 1. Hines, W.W., Montgomery, D.C., (1990), Probability and Statistics in Engineering and Management Scientists, John Wiley and Sons.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	35
	Quizzes	-	-
	Homeworks	6	15
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	60	
	Engineering Science	25	
	Engineering Design	15	
	Social Sciences	0	
Instructors	Prof.Dr. Fevzi KUTAY, Prof.Dr. Berna DENGİZ, Assoc.Prof. Dr. Fulya ALTIPARMAK		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION: Set theory and counting sample points.			
2	INTRODUCTION TO PROBABILITY: Probability concept and basic theorems, Conditional probability.			
3	INTRODUCTION TO PROBABILITY: Independency, Bayes’ Theorem, Concept of random variable.			
4	RANDOM VARIABLE: Discrete and continuous random variables, Probability and probability density functions, Distribution functions.			
5	EXPECTATION: Expected value and variance of a random variable, Moments and moment generating functions.			
6	SOME IMPORTANT DISCRETE RANDOM VARIATES: Discrete uniform, Bernoulli, Binom random variates and their properties.			
7	MIDTERM EXAM I			
8	SOME IMPORTANT DISCRETE RANDOM VARIATES: Hypergeometric, Negative Binom random variates and their properties.			
9	SOME IMPORTANT DISCRETE RANDOM VARIATES: Geometric, Poisson random variates and their properties.			
10	SOME IMPORTANT CONTINUOUS RANDOM VARIATES: Continuous uniform, Normal and Standart Normal random variates and their properties.			
11	SOME IMPORTANT CONTINUOUS RANDOM VARIATES: Exponential, Gamma, Chi-Square, Weibull, Beta random variates and their properties.			
12	MULTIPLE RANDOM VARIATES: Joint distributions for two dimensional random variables, Joint distribution functions			
13	MIDTERM EXAM II			
14	MULTIPLE RANDOM VARIATES: Marginal distributions, Conditional distributions			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Prof. Dr. Fevzi KUTAY, Assoc.Prof. Dr. Fulya ALTIPARMAK

Date : 09/10/2002

<u>ENM 208 ENGINEERING STATISTICS</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>4</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Basic concept related to statistics. Data organization. Measures of central tendency and variability. Sampling distributions. Statistical estimation. Statistical hypotheses and tests of hypotheses. Regression and corelation analysis.</u>		
<u>Course Objectives</u>	<u>To introduce importance of statistics in engineering applications. To teach the techniques related to data collection, organization and summarization and statistical inference.</u>		
<u>Course Outcomes</u>	<u>To get an ability for using appropriate statistical techniques as a decision making tool in uncertain environment.</u>		
Textbook and /or References	1. Walpole, R.E., Myers, R.H., Myers S.L., Ye, K., (2002), Probability and Statistics for Engineers and Scientists, Prentice Hall. (Ders Kitabı) 2. Hines, W.W., Montgomery, D.C., (1990), Probability and Statistics in Engineering and Management Scientists, John Wiley and Sons. 3. Devore, J.L., (1990), Probability and Statistics for Engineers and the Scientists, Brooks/Cole Publishing Company.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	4	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	25	
	Engineering Design	25	
	Social Sciences	-	
Instructors	Prof.Dr. Fevzi KUTAY, Prof.Dr. Berna DENGİZ, Assoc.Prof.Dr. Fulya ALTIPARMAK		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Basic concepts related to statistics, data collection and organization.
2	MEASURES OF CENTRAL TENDENCY: Mean, median, mode, etc.
3	MEASURES OF DIPERSION : Range, variance, etc, coefficient of skewness.
4	SOME IMPORTANT CONTINUOUS DISTRIBUTIONS: Normal and Student-t distributions.
5	SOME IMPORTANT CONTINUOUS DISTRIBUTIONS: Chi-Square and F random distributions
6	ESTIMATION AND INTERVAL ESTIMATION: Point estimation and properties, Interval estimation for population mean.
7	INTERVAL ESTIMATION: Interval estimation for population variance and proportion.
8	MIDTERM EXAM I
9	STATISTICAL HYPOTHESES AND TESTS OF HYPOTHESES: Tests of hypotheses on mean, Variance and proportion for one sample.
10	STATISTICAL HYPOTHESES AND TESTS OF HYPOTHESES: Tests of hypotheses on the equalities of two means, Variances and proportions for two samples.
11	NONPARAMETRIC TESTS: Goodness of fit tests and independency test.
12	CORRELATION: Coefficient of Pearson correlation, correlation coefficient test.
13	MIDTERM EXAM II
14	REGRESSION: Types of regression, Simple and multiple linear regression.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			x
2	An ability to design and conduct experiments, as well as to analyze and interpret data			x
3	An ability to design a system, component, or process to meet desired needs			x
4	An ability to function on multi-disciplinary teams			x
5	An ability to identify, formulate, and solve engineering problems		x	
6	An understanding of professional and ethical responsibility	x		
7	An ability for effective written and oral communication in Turkish and English		x	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			x
9	A recognition of the need for, and ability to engage in life-long learning		x	
10	A knowledge of contemporary issues		x	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		x	
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Prof. Dr. Fevzi KUTAY

Date : 09/10/2002.....

ENM 211 GENERAL ECONOMICS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
3	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Basic economics concepts. Production factors. Production theory. Consumption theory. Market Mechanism. Supply and demand. Macro economics concepts.		
Course Objectives	Giving basic information about economical concepts.		
Course Outcomes	Maintaining the students point of view to every kind of economical events by means of general economical concepts.		
Textbook and /or References	1. Türkay,O.,(2001), Mikro İktisat Teorisi, İmaj Yayınevi, Ankara (Textbook) 2. Üstünel,B.,(1998), Ekonominin Temelleri,Güven Yayınları. 3. Öçal,T.,(1999),İktisat,Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi yayınları, Ankara.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	1	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	20	
	Engineering Design	0	
	Social Sciences	50	
Instructors	Hasan H. DOĞAN		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION TO ECONOMICS: General definitions.			
2	HUMAN REQUIREMENTS : Explaining the requirements, goods and service concept.			
3	PRODUCTION-CONSUPTION			
4	PRODUCTION TYPES AND FACTORS:			
5	INCOME: Nominal income, Reel income, National Income.			
6	MARKET MEKHANISM:Supply-demand, Findind the Market balance and the market price.			
7	MIDTERM EXAM I			
8	SUPPLY-DEMAND ANALYSIS : Interference of public to market, Defined price.			
9	SUPPLY-DEMAND ANALYSIS: Effect of taxes, Policy of government for supporting the agriculture			
10	CUSTOMER THEORY: Benefit , Customer behaviours, Maximization of Benefits.			
11	PRODUCER THEORY : Cost concept, Average, fixed ,variable, marginal costs.			
12	BALANCE OF THE FIRM: Firm balances of complete compation and monopoly markets.			
13	MIDTERM EXAM II			
14	INCOME DISTRIBUTION: Funtional distiribution, Lorenz curves.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Hasan H. DOĞAN..... Date : .25/09/2002

TÜR 211 TURKISH I		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
3	2	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Definition of language and its characteristics, definition of culture and civilization. Place of Turkish language among all other languages. Charateristics of sounds and their changes in particular words. Writing rules. Punction marks.		
Course Objectives	Young person who has (finished) graduated from university shoduld know its native languges grammer structure, usage and characteristic. It should be taken attention on correct speaking and writing.		
Course Outcomes	To understand logic of language. Teaching how to use native language correctly writing and speaking is one of the main purposes of this lesson		
Textbook and /or References	1.Örnekli ve Uygulamalı Türk Dili ve Komp., Ertuğrul YAMAN Mehmet KÖSTEKÇİ IV. Baskı Gazi Kitabevi-ANKARA- 2000. 2.Kültür ve Dil, Mehmet KAPLAN, VII. Baskı Dergah Yayınları İSTANBUL-1992. 3. Türk Dili ve Komp. Bilgileri, Z. Korkmaz, A. Bican Ercilasun, H. Zülfikar, M. Akalın, T. Gülensoy, İ. Parlatur, N. Birinci, IV.Baskı, Ankara, 1997.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	0	
	Engineering Science	0	
	Engineering Design	0	
	Social Sciences	100	
Instructors	Murat LÜLECİ, Cafer ŞEN		

COURSE PLAN	
Week	Topics
1	WHAT IS LANGUAGE? IMPORTANCE OF LANGUAGE IN HUMAN SOCIETY.
2	RELATIONSHIP BETWEEN LANGUAGE AND CULTURE.
3	LANGUAGES IN THE WORLD.
4	PLACE OF TURKISH LANGUAGE AMONG ALL OTHER LANGUAGES IN THE WORLD.
5	DEVELOPMENT OF TURKISH HANGUAGE AND ITS HISTORICAL PERIODS.
6	SOUNDS IN TURKISH LANGUAGE AND THEIR CLASSIFICATION.
7	CHARECTERISTICS OF SOUNDS IN TURKISH LANGUAGE.
8	STUDY OF SOUNDS IN TURKISH LANGUAGE AND RELECTED RULES.
9	STUDY OF SYLLABLES.
10	WRITING RULES AND THEIR USAGE.
11	WRITING RULES AND THEIR USAGE.
12	PUNCTION MARKS AND THEIR USAGE.
13	SUFFIXES IN TURKISH LANGUAGE.
14	USAGE OF SUFFIXES IN TURKISH LANGUAGE.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Murat LÜLECİ, Cafer ŞEN..... Date : ..31../12../2002.....

TÜR 212 TURKISH II		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
4	2	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	"Turkish affixes and their applications. Composition writing rules. Planning of composition writing and its applications. Turkish nouns and verbs. Composition expression and its applications. Turkish adverbs and prepositions."		
Course Objectives	Young person who has (finished) graduated from university shoduld know its native languges grammer structure, usage and characteristic. It should be taken attention on correct speaking and writing.		
Course Outcomes	To understand logic of language. Teaching how to use native language correctly writing and speaking is one of the main purposes of this lesson		
Textbook and /or References	1.Örnekli ve Uygulamalı Türk Dili ve Komp., Ertuğrul YAMAN Mehmet KÖSTEKÇİ IV. Baskı Gazi Kitabevi-ANKARA- 2000. 2.Kültür ve Dil, Mehmet KAPLAN, VII. Baskı Dergah Yayınları İSTANBUL-1992. 3. Türk Dili ve Komp. Bilgileri, Z. Korkmaz, A. Bican Ercilasun, H. Zülfikar, M. Akalın, T. Gülensoy, İ. Parlatur, N. Birinci, IV.Baskı, Ankara, 1997.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	0	
	Engineering Science	0	
	Engineering Design	0	
	Social Sciences	100	
Instructors	Murat LÜLECİ, Cafer ŞEN		

COURSE PLAN	
Week	Topics
1	ELEMENTS OF SENTENCES, ANALYSIS OF SENTENCE,
2	ELEMENT OF A SENTENCE.
3	KINDS OF SENTENCES.
4	ANALYSES OF SENTENCES.
5	GENERAL KNOWLEDGE CONCERNAL WITH COMPOSITION.
6	PLAN USED IN WRITTING A COMPOSITION.
7	KINDS OF EXPRESSIONS.
8	THE COMMON EXPRESSING MISTAKES IN TURKISH.
9	MISTAKES IN USING SENTENCES.
10	EXPRESSION AND VARIOUS EXPRESSIN MISTAKES.
11	KINDS OF WRITTING COMPOSITION.
12	KINDS OF WRITTING COMPOSITION.
13	RULES APPLIED WHEN PREPARING SCIENTIFIC WRITTINGS.
14	STUDIES ON TEXTS SELECTED FROM TURK AND WORLD-FAMOUS LITERATURE AND THOUGHT HISTORY.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Murat LÜLECİ, Cafer ŞEN..... Date : ..31../12../2002.....

ENM 215 COST ANALYSIS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
3	3	0	0
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Cost concepts.Types of cost. The objectives of cost analysis. The cost in composed manufacturing. Standard cost system. Profit function. Profitable analysis of product.		
Course Objectives	Creation of cost consciousness, teaching and methods of determining and analyzing costs.		
Course Outcomes	Students of technical education are subject to the cost conception and are taught how to determine and use cost for decision making purposes.		
Textbook and /or References	5. Büyükmirza, K., (2000), Maliyet ve Yönetim Muhasebesi, 8. Baskı, Barış Publishing Company (Textbook)		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	40	
	Engineering Science	10	
	Engineering Design	-	
	Social Sciences	50	
Instructors	Prof.Dr. Kamil BÜYÜKMİRZA		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Financial statements. Structure and scope of balance sheet and income statements
2	CONCEPT OF COST: Accounting and opportunity cost.
3	CONCEPT OF EXPENSE: Flow of costs and expenses to financial statements.
4	DETERMINATION OF MATERIAL COSTS.
5	DETERMINATION OF LABOR COSTS.
6	DETERMINATION OF FACTORY OVERHEAD COSTS.
7	DETERMINATION OF PERIOD COSTS. DEPRICIATION AND OTHER PARTICULAR COSTS.
8	COST ALLOCATION AMONG COST CENTERS. MIDTERM EXAM I .
9	COST APPLICATION UNDER JOB-ORDER COSTING.
10	COST APPLICATION UNDER PROCESS COSTING. MIDTERM EXAM II.
11	COST- VOLUME RELATIONSHIPS: Fixed, variable, semi-variable and semi-fixed costs.
12	METHODS OF ASSESSING COST FUNCTIONS: Industrial engineering method. Account classification method.Mathematical and statistical techniques.
13	COST-VOLUME-PROFIT ANALYSIS AND DECISION MAKING APPLICATIONS.
14	RELEVANT COST ANALYSIS AND DECISION MAKING APPLICATIONS.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Prof.Dr. Kamil BÜYÜKMİRZA

Date : 9/12/2002

<u>ENM 219 ELECTRICAL CIRCUITS AND CONTROL</u>		<u>INDUSTRIAL ENGINEERING</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>3</u>	<u>2</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>English</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Circuit analysis methods. Alternating current circuits. Electrical machines and introduction to industrial electronics. Semiconductor electronics. Operational amplifiers and their applications. Logic circuits and their applications.</u>		
<u>Course Objectives</u>	<u>To teach the principles of electrical engineering to the Industrial Engineering students.</u>		
<u>Course Outcomes</u>	<u>Learning the fundamentals of electrical energy usage and operating principles of various electrical and electronics systems. Acquaring the knowledge that may be necessary in the work environment.</u>		
Textbook and /or References	1) Rizzoni, G.,(2000), Principles and Applications of Electrical Engineering, Mc Graw Hill (Textbook) 2) Aydemir, M.T., Nakiboğlu, C.,(1999); Elektrik Devreleri, (Translation), Schaum Books.		
Assessment Criteria		Quantity	Percentage
	<i>Midterm Exams</i>	2	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	20	
	Engineering Science	70	
	Engineering Design	10	
	Social Sciences	0	
Instructors	Asst.Prof.Dr. Timur AYDEMİR		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION: Basic concepts. Electric current. Potencial difference. Ground concept. Resistors and Ohm’s Law. Power.			
2	DC CIRCUITS: Ideal voltage source. Current source. Serieal and parallel connections. Circuit analysis by using loop current and node voltage equations.			
3	DC CIRCUITS: Thevenin equivalent circuit and superposition principle.			
4	AC CIRCUITS: Alternating current concept. Types of alternating current. Frequency, period, amplitude and phase concepts. Average and effective values.			
5	AC CIRCUITS: Complex numbers and calculations. Capacitor and inductor components. Complex impedance.			
6	MIDTERM EXAM I			
7	AC CIRCUITS: AC circuit analysis. Input impedance and power factor. Phase shifting. Resonance circuits. Average power. Active and reactive power.			
8	ENERGY SYSTEMS: Principles of electric energy generation and transmission. Transformers. Reactive power compensation. Grounding.			
9	ELECTRIC MACHINERY: Electromechanic energy conversion. DC and AC motors and their control. Robots.			
10	ANALOG ELECTRONICS: Diodes and transistors. Rectifiers.			
11	MIDTERM EXAM II			
12	ANALOG ELECTRONICS: Operational amplifiers. Comparators. Measurement circuits and sensors.			
13	DIGITAL ELECTRONICS: Boolean Algebra. Logic circuit components.			
14	DIGITAL ELECTRONICS: Logic circuit design and applications.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 223 MATERIAL SCIENCE		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>3</u>	<u>3</u>	<u>0</u>	<u>1</u>
<u>Language</u>	<u>English</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Classification of engineering materials: metals, plastics, ceramics. Metals and alloys. Material testing. Mechanical properties of materials. Production of iron and steel. Heat treatment.</u>		
<u>Course Objectives</u>	<u>Understanding of basic principles relating to engineering materials</u>		
<u>Course Outcomes</u>	<u>To gain the knowledge about atomic and crystal structures, diffusion in metals, alloys and phase diagrams, materials test methods and mechanical properties, heat treatments, material standards, classification of engineering materials</u>		
Textbook and /or References	1) D.R. Askeland, The Science and Engineering of Materials, PWS-Kent Publishing Co., Third Edition, 1995. 2) W.D. Callister, Materials Science and Engineering: An Introduction, John Wiley and Sons, Fifth Edition, 2000, ISBN 0-471-32013-7 3) S. Saritaş, Engineering Metallurgy and Materials, Gazi University, 1995.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	5	10
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	2	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	50	
	Engineering Design	20	
	Social Sciences	-	
Instructors	Prof. Dr. Süleyman SARITAŞ, Prof. Dr. Can ÇOĞUN		

COURSE PLAN	
Week	Topics
1	CLASSIFICATION OF ENGINEERING MATERIALS: Metals, polymers and ceramics.
2	CLASSIFICATION OF ENGINEERING MATERIALS: Steels and cast irons.
3	CLASSIFICATION OF ENGINEERING MATERIALS: Non-ferrous metals and their industrial alloys
4	CLASSIFICATION OF ENGINEERING MATERIALS: Atomic structure, crystal structure
5	CLASSIFICATION OF ENGINEERING MATERIALS:, Crystal defects
6	CLASSIFICATION OF ENGINEERING MATERIALS: Microstructural examination of materials.
7	DIFFUSION IN METALS
8	PHASE DIAGRAMS.
9	IRON-CARBON PHASE DIAGRAM
10	MATERIAL TEST METHODS AND MECHANICAL PROPERTIES: Tensile, Hardness, Bending, Shear.
11	MATERIAL TEST METHODS AND MECHANICAL PROPERTIES:Torsion, Impact, Fatigue, Creep.
12	MATERIAL TEST METHODS AND MECHANICAL PROPERTIES: Friction-wear, Corrosion tests
	STRENGTHENING MECHANISMS: Grain refinement, Cold working, Dispersion hardening, Aging.
13-14	STRENGTHENING MECHANISMS: Quench hardening and other heat treatments

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning	X		
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 224 MANUFACTURING PROCESSES		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
4	3	0	0
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Foundry and casting processes. Welding methods. Cold and hot working of metals. Powder metallurgy. Metal cutting principles and machining processes.		
Course Objectives	Understanding of basic principles and capabilities of commonly used manufacturing processes in industry		
Course Outcomes	To gain the knowledge about casting, metal working, machining methods, powder metallurgy, welding techniques and the principles of dimension measurement devices.		
Textbook and /or References	1) P. F. Ostwald and J., Munoz, (1997), Manufacturing Processes and Systems, 9th Edition, John Wiley and Sons Ltd., New York, (Textbook) 2) E. P. Degarmo, J.T. Black and R. A. Kohser, (1997), Materials and Processes in Manufacturing, Prentice Hall Int., New Jersey. 3) M. P. Groover, (1996), Fundamentals of Modern Manufacturing, Prentice Hall Int., New Jersey.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	30
	Quizzes	6	10
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	2	10
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	40	
	Engineering Design	30	
	Social Sciences	-	
Instructors	Prof. Dr. Can ÇOĞUN, Prof. Dr. Süleyman SARITAŞ		

COURSE PLAN	
Week	Topics
1	FOUNDRY AND SPECIAL CASTING PROCESSES: Sand casting, Die casting.
2	FOUNDRY AND SPECIAL CASTING PROCESSES: Investment casting.
3	FOUNDRY AND SPECIAL CASTING PROCESSES: Centrifugal casting.
4	WELDING: Classification, Arc welding, Resistance welding.
5	WELDING: Oxy-gas welding, Other welding processes
6	COLD AND HOT WORKING OF METALS: Definitions, Rolling, Forging, Extrusion, Wire drawing, Other plastic deformation processes.
7	SHEET METAL WORKING: Piercing,/blanking, Deep drawing, MIDTERM EXAM I.
8	POWDER METALLURGY: Powder production, Pressing, Sintering, Applications
9	METAL CUTTING: Cutting theory, Cutting tools, Chip formation.
10	METAL CUTTING: Cutting fluids, Machinability.
11	METAL CUTTING: Tool life.
12	METAL CUTTING OPERATIONS AND MACHINE TOOLS: Turning, Milling.
13	METAL CUTTING OPERATIONS AND MACHINE TOOLS: Drilling, Grinding. MIDTERM EXAM II.
14	METROLOGY: Terminology, Basic linear measurements.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English	X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning	X		
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

MM226 ENGINEERING MECHANICS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
4	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	FİZ 103		
Catalog Description	General principles, power vectors, equilibrium of a particulate, structural analysis, inner powers, friction, center of weight and surface, stress and strain, stress concentration, torsion, and bending.		
Course Objectives	The main objective of the course is to develop a clear understanding of principles of rigid body mechanics and relationship between the loads applied to elastic bodies and the resultant stresses, strains and deformations.		
Course Outcomes	Understanding of basic principles of rigid body mechanics. Learning both the theory and the application of the fundamental principles of mechanics of materials		
Textbook and References	1. Hibbeler, R. C., (1995), ‘Engineering Mechanics-Statics’, 7 th edition, Prentice-Hall Inc., New Jersey, USA. (Textbook) 2. Hibbeler, R. C., (2000), ‘Mechanics of Materials’, 4 th edition, Prentice-Hall Inc., New Jersey, USA..		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	50	
	Engineering Design	20	
	Social Sciences	-	
Instructors	Assist Prof. Dr. O. Selim TÜRKBAŞ, Assoc.Prof.Dr. Müfit GÜLGEÇ		

COURSE PLAN	
Week	Topics
1	GENERAL PRINCIPLES
2	FORCE VECTORS AND ANALYSIS
3	EQUILIBRIUM OF A PARTICLE
4	FORCE SYSTEM RESULTANTS
5	EQUILIBRIUM OF A BODY
6	STRUCTURAL ANALYSIS
7	INTERNAL FORCES
8	CENTER OF GRAVITY, MIDTERM EXAM I
9	MAIN PRINCIPLES OF MECHANICS OF MATERIALS
10	STRESS CONCEPT
11	AXIAL LOADING
12	BENDING STRESS
13	TORSION, MIDTERM EXAM II
14	STRESS ANALYSIS

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English	X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning	X		
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 253 HISTORY OF ART		INDUSTRIAL ENGINEERING	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
4	2	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	To bring up the universal values and intercultural relations of all kinds of works of art created in various regions and eras of the history of humanity, by examining them from the aspects of social, cultural and natural conditions.		
Course Objectives	The acquirement of a social and an artistical point of view together with the taste and the love of art within the frame of the universal and the cultural values of the world art; the perception of the unifying character of art.		
Course Outcomes	To know the cultural and artistical values of different societies from various periods and geographies; besides, to learn his additions to the world’s civilization and the universal art by also knowing his own cultural and artistical values; to gain a social point of view to the other societies and to the life.		
Textbook and /or References	1. Akurgal, E.(1985), Ancient Civilizations and Ruins of Turkey from Prehistoric Times Until the End of the Roman Empire, Hachette Yayınevi., Istanbul. 2. Akurgal, E. (1995), Anadolu Uygarlıkları, Net Turistik Yayınlar, Istanbul, 3. Rice, T.T.(1959), Art Byzantin, Elsevier Publ.,Paris. 4. Turani, A. (1971), Dünya Sanati Tarihi, Is Bankası Yayınları, Ankara. 5. Gombrich, E.H.(1997), Sanatin Öyküsü, Remzi Kitabevi, İstanbul. 6. Aslanapa, O.(1990), Türk Sanatı, Kültür Bakanlığı Yayınları, Ankara. Sözen, M.(1975), Türk Mimarisinin Gelisimi ve Mimar Sinan, Türkiye Is Bankası Kültür Yayınları, İstanbul.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	-	
	Engineering Science	-	
	Engineering Design	-	
	Social Sciences	100	
Instructors	Dr. Nakış AKGÜL		

COURSE PLAN				
Week	Topics			
1	What is art?, The rise, the aim, the need of art; the factors affecting art / The earliest examples of art, Ancient Mesopotamia and Iran (Sumer, Assur, Parthian and Sasanid- architecture, sculpture, reliefs)			
2	Ancient Anatolia and Egypt (pre-Hitits, Hitits- architecture, sculpture, reliefs; Egyptian temples, pyramids, sculpture, painting)			
3	Greek Art (The philosophy, The Archaic, Classical, Hellenistic Periods- architecture, sculpture, ceramics, mosaics)			
4	Roman Art and Byzantine Art (architecture, sculpture, ceramics, painting, mosaics)			
5	European Art: Romanesque, Gotique, Renaissance (The philosophies, architecture, sculpture, reliefs, painting)			
6	Renaissance (continue), Baroc, Rococo (architecture, sculpture, reliefs, painting)			
7	MIDTERM EXAM I			
8	Far Eastern, Indian and Middle Asian Arts (The philosophies, architecture, sculpture, reliefs, painting, minor arts)			
9	Muslim Art: Umayyad, Abbasid, Memluk, Andoulisia,The Great Seljuks- (The philosophy, architecture, reliefs, mosaics, ceramics, miniatures)			
10	Turkish Art: Anatolian Seljuks and The Emirates (architecture, reliefs, minor arts- tiles, ceramics, metalwork, woodwork, carpet, miniatures and the other arts of book)			
11	Ottoman Art (The Early, Classical, Late Periods- architecture, reliefs, minor arts- tiles, ceramics, metalwork, woodwork, carpet, miniatures and the other arts of book)			
12	Ottoman Art (continue)			
13	The Turkish Republican Art (architecture, painting, sculpture)			
14	MIDTERM EXAM II			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr. Nakış AKGÜL..... Date : ..17./12./2002

ENM 254 PUBLIC RELATIONS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
4	2	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Definitions of public relations and historical evolution, Public relation concepts,Public relations materials, techniques and methods, and its applications, analysis of case studies.		
Course Objectives	This course is aimed to provide better understanding of purposes and processes of communication and public relations in business and teaching public relations methods used in internal and external relationships such as media, public.		
Course Outcomes	Understanding the importance of effective relationships with many different audiences or publics in order to reach the goals of Institutions and learning the required information about public relations techniches and their applications.		
Textbook and References	1. Sabuncuoğlu, Z. (1998), İşletmelerde Halkla İlişkiler, 4. Baskı, Ezgi Kitapevi, Bursa. (Textbook) 2. Tengilimoğlu, D. (2001), Sağlık Kuruluşlarında Halkla İlişkiler, Gazi Kitabevi, Ankara. 3. Calwood, C. L. (1997), The Handbook of Staregic Public Relations snd Integrated Communications, Mc GrawHill, New York. 4. Scot M., C., Allen H. C., Glen M. B., (1985) Effective Public Relations 6 th Edition, Prentice Hall , New Jersey.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	30
	Quizzes	-	
	Homeworks	1	20
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	5	
	Engineering Science	5	
	Engineering Design	-	
	Social Sciences	90	
Instructors	Assoc.Prof. Dr. Dilaver TENGİLİMOĞLU		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION TO PUBLIC RELATIONS: Definitions of public relations and evolution of the concept.			
2	PUBLIC RELATIONS CONCEPT: Public Relations Versus Marketing, Pulicity, Advertising,, Communication, Publicity.			
3	FUNCTIONS AND AIMS OF PUBLIC RELATIONS IN THE BUSINESS			
4	ORGANIZATIONAL CONTEXT OF PUBLIC RELATIONS: Organization charts, Working with consultant firm.			
5	PLANNING AND PROGRAMMING OF THE PUBLIC RELATIONS IN THE BUSINESS: Investigation, Planning, Implementation and control.			
6	PUBLIC RELATIONS ACTIVITY: Publicity, Lobbying, Sponsoring, Making Business Image.			
7	MEDIA AND THE COMMUNITY RELATIONS.			
8	MIDTERM EXAM I.			
9	THE INTERNAL PUBLIC RELATIONS ACTIVITY: Communications and work relations, Goals of employee relations.			
10	PUBLIC RELATIONS MATERIALS, TECHNIQUES AND METHODS: Organizational publications, Brochures, Bulletins, etc.			
11	ORGANIZATIONAL COMMUNICATIONS AND COMMUNICATION ELEMENTS: Source, Message, Channel, Receiver, Perceiving.			
12	EFFECTIVE READING, LISTENING, WRITING AND SPEAKING TECHNIQUES.			
13	PUBLIC RELATIONS ETHICS.			
14	CASE STUDY: The higher education, Healt care organizations.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : .Assoc.Prof.Dr. Dilaver TENGİLİMOĞLU.....Date : 12.18.2002

ENM 305 OPERATIONS RESEACRH II		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5	4	0	
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	ENM 202		
Catalog Description	Integer Programming and solution techniques (Branch and bound, cutting plane algorithms). Network Models : minimum spanning trees, shortest path, maximum flow and network simplex. Nonlinear programming		
Course Objectives	Emphasizing the places and importance of Integer programming, Network Analysis and Nonlinear Programming in Operations Research. Introducing the basic concepts and related applications. Learning the modeling and solution techniques.		
Course Outcomes	Gaining the background about real life applications and solution methods of Integer Programming, Network Analysis and Nonlinear Programming. Learning the use of them in managerial problems.		
Textbook and /or References	6. Winston, W. L., (1994), Operations Research: Applications and Algorithms, Third.edition, Duxbury press. (Textbook) 7. Taha, H.A., (1997), Operations Research an Introduction, 6 th edition, Prentice hall. 8. Taha, H.A., (1975), Integer Programming Theory, Applications and Computations, Academic press.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	4	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	25	
	Engineering Science	35	
	Engineering Design	40	
	Social Sciences	0	
Instructors	Assoc.Prof.Dr. Cevriye GENCER , Assoc.Prof. Dr. Ö. Faruk BAYKOÇ		

COURSE PLAN					
Week	Topics				
1	INTRODUCTION: Definitions, discrete optimization, integer optimization, mathematical models. OVERVIEW OF CONTINUOUS OPTIMIZATION: Graphical solutions, primal simplex and dual simplex algorithm.				
2	INTRODUCTION TO INTEGER PROGRAMMING: Definition of integer programming, pure and mixed integer programming, FORMULATING INTEGER PROGRAMMING PROBLEMS: Either-Or Constraints				
3	If-Then Constraints, SOLUTION METHODS FOR INTEGER OPTIMIZATION: The branch-and-bound method, Gomory (cutting) method.				
4	THE BRANCH-AND-BOUND METHOD: Definition, rules of branch-and-bound method and branching strategies				
5	THE BRANCH-AND-BOUND METHOD: Graphical and table solutions and example.				
6	THE CUTTING PLANE METHOD: Definitions Gomory method, cutting graphic and example.				
7	0-1 MODELLING: Definition of 0-1 variables, 0-1 integer modeling, set covering problems, production planning problems, 0-1 cargo loading (knapsack) problems.				
8	SOLVING KNAPSACK PROBLEMS BY THE BRANCH-BOUND METHOD, MIDTERM EXAM I.				
9	NETWORK MODELS: Introduction and basic concepts, shortest path problem, shortest path algorithms in acyclic and cyclic networks				
10	MINIMUM SPANNING TREE PROBLEM: Prim and Kruskal algorithms MAXIMUM FLOW PROBLEM: max flow - min cut theorem, labeling algorithms				
11	MINIMUM COST NETWORK FLOWS: Network simplex method				
12	NONLINEAR PROGRAMMING: Basic concepts, solution of single and multi variable problems.				
13	MIDTERM EXAM II, OPTIMIZATION IN EQUALITY CONSTRAINED PROBLEMS: Lagrange multipliers				
14	OPTIMIZATION IN EQUALITY CONSTRAINED PROBLEMS : Kuhn-Tucker conditions.				
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM					
	Program Outcomes	1	2	3	
1	An ability to apply knowledge of mathematics, science, and engineering		X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X			
3	An ability to design a system, component, or process to meet desired needs			X	
4	An ability to function on multi-disciplinary teams		X		
5	An ability to identify, formulate, and solve engineering problems			X	
6	An understanding of professional and ethical responsibility		X		
7	An ability for effective written and oral communication in Turkish and English		X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X		
9	A recognition of the need for, and ability to engage in life-long learning		X		
10	A knowledge of contemporary issues		X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X	
Contribution of the course : 1: None 2: Partially 3: Completely					

Prepared by: Assoc.Prof.Dr. Cevriye GENCER, Assoc.Prof.Dr. Ö. Faruk BAYKOÇ

Date : 02/10/2002

ENM 306 OPERATIONS RESEARCH III		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
6	3	0	
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	ENM 207		
Catalog Description	Deterministic and stochastic dynamic programming, Introduction to stochastic process, Queueing models, Markov processes, Game theory.		
Course Objectives	Determining the role of probabilistic models within operations research, Introducing the models and teaching related solution techniques, Reviewing the associated real life applications.		
Course Outcomes	Getting an ability on conceiving and modeling skills of real life probabilistic models in accordance with operations research process, Learning the use of related models in managerial problems.		
Textbook and /or References	9. Hillier, F.S. and Lieberman, G.J., (1995), Introduction to Operations Research,, McGraw-Hill, 6. th edition.(Text book) 2. Winston, W. L., (1994), Operations Research: Applications and Algorithms,. Duxbury press, 3 rd.edition. 3. Taha, H.A., (1997), Operations Research an Introduction, Prentice hall, , 6 th edition		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	4	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	80	
	Engineering Science	10	
	Engineering Design	10	
	Social Sciences	0	
Instructors	Assoc. Prof. Dr. Cevriye GENCER, Assoc. Prof. Dr. Faruk BAYKOÇ and Assist. Prof. Dr. Mehmet ATAĞ		

COURSE PLAN				
Week	Topics			
1	DYNAMIC PROGRAMMING: Characteristic of Dynamic programming, Mathematical formulation and solution procedure. DETERMINISTIC DYNAMIC PROGRAMMING: Network Problem, Resource Allocation Problems			
2	DETERMINISTIC DYNAMIC PROGRAMMING: Knapsack Problems, Inventory Problems			
3	PROBABILISTIC DYNAMIC PROGRAMMING: Determining Reject Allowances, Winning in Las Vegas			
4	THE GAMES THEORY: The game concept and its scope and applications areas THE KINDS OF GAMES: The static games and dynamic games, The madelling of a game problem			
5	STATIC GAMES: Concept and features, Static games of complete and in complete information DYNAMIC GAMES: Concept and features, Dynamic games of complete and incomplete information.			
6	THE SOLUTION OF GAME PROBLEMS USING THE LINEAR PROGRAMMING METHOD: Simplex algorithm.			
7	MIDTERM EXAM I			
8	INTRODUCTION TO STOCHASTIC PROCESSES: Markov chains, Markovian property n-STEP TRANSITION PROBABILITIES: Chapman-Kolmogorov Equations			
9	CLASSIFICATION OF STATES IN A MARKOV CHAIN, STEADY-STATE: Steady-stade probabilities, Mean first passage times, ABSORBING CHAINS			
10	QUEUEING SYSTEMS: Reason for evaluating queueing systems, Components of queueing systems, Modelling of arrival and service processes, Birth-Death Processes			
11	THE M/M/1 QUEUEING SYSTEMS, THE M/M/S QUEUEING SYSTEMS			
12	FINITE SOURCE MODELS, EXPONENTIAL QUEUES IN SERIES AND OPEN QUEUEING NETWORK			
13	MIDTERM EXAM II			
14	PRIORITY QUEUEING MODELS			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1: None 2: Partially 3: Completely				

Prepared by: Assoc. Prof. Dr. Cevriye GENCER, Assoc. Prof. Dr. Faruk BAYKOÇ and
Assoc. Prof. Dr . Fulya ALTIPARMAK

Tarih : 16/09/2002

ENM 307 ENGINEERING ECONOMY		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Economical decision analysis , interest rate and economic equivalence, effective interest rate, methods for comparing alternatives, sensitivity analysis, replacement analysis, depreciation and tax considerations, decision making under inflation.		
Course Objectives	Decision made during the engineering design and manufacturing, and quality control of the product phase are most important subjects in the decision making in rising of industrial commpetition of nowadays. The aim of the engineer must be to produce the product and services with minimum cost and maximum quality. For this reason, engineering economy lectures have goal to select the best economically fit alternative between favourable alternatives.		
Course Outcomes	To understand the money and time concept. To learn the methods to select the best economically fit alternative between favourable alternatives. Replacement analysis and applying decision criteria with inflation depreciation and taxes.		
Textbook and /or References	1. Park, C. S., (2001), Contemporary Engineering Economics, 3 th Edition, Prentice Hall,. (Textbook). 2. Fabrycky, W. J., Thuesen, G. J., (1998), Economic Decision Analysis, Prentice Hall. (Ders kitabı). 3. Degarmo, E. P., Sullivan W. G. and. Bontadelli, J. A., (1990), Engineering Economy, 8 th Edition, Macmillan Publishing Company.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	4	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	30	
	Engineering Design	-	
	Social Sciences	20	
Instructors	Prof. Dr. Zülal Güngör		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION: Economic decision making in engineering, The aid of engineering economics in engineering.			
2	BASIC CONCEPTS: Basic concepts in engineering economics, the criterion in comparing alternatives.			
3	THE TIME VALUE OF MONEY: The cost of money and economic equivalence, calculation of interest rates.			
4	EVALUATION OF INTEREST RATES: Nominal and effective interest rates; derivation of nominal and effective interest rates, using the Excel Tables of interest factors.			
5	PROPERTIES OF METHODS FOR COMPARING INVESTMENT ALTERNATIVES: Financial and non financial investments, strategies of investments.			
6	METHODS FOR COMPARING INVESTMENT ALTERNATIVES: Present worth comparisons.			
7	MIDTERM EXAM I			
8	METHODS FOR COMPARING INVESTMENT ALTERNATIVES: Annual equivalent comparisons.			
9	METHODS FOR COMPARING INVESTMENT ALTERNATIVES: Rate of return comparisons, comparisons based on layout period.			
10	METHODS FOR COMPARING INVESTMENT ALTERNATIVES: Future worth comparisons, profit-cost ratio analysis.			
11	SENSITIVITY ANALYSIS: Effectiveness of changing investment parameters in engineering economy, break-even analysis involving price.			
12	DECISION MAKING WITH INFLATION: Effects of inflation on engineering economy calculations and adaptation of methods of comparing investment alternatives techniques to inflation.			
13	MIDTERM EXAM II			
14	SPECIAL TOPICS IN ENGINEERING ECONOMY: Replacement analysis, calculation of economic-life of investments.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : ..Prof. Dr. Zülal Güngör..... Date : .25../09.../2002.....

ENM 312 PRODUCTION PLANNING AND INVENTORY CONTROL		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Application</u>	<u>Laboratuary</u>
<u>6</u>	<u>4</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Structure of production planning in manufacturing systems. Product design and process selection. Forecasting. Capacity planning. Master production planning. Production scheduling. Inventory control and management.		
<u>Course Objectives</u>	To give some information about production, production planning and inventory systems. To teach and apply basic methods and techniques for production-inventory systems design, planning and implementation		
<u>Course Outcomes</u>	<u>To get an ability for designing of production systems under resource restrictions, for solving of production planning, scheduling and inventory problems occurred in manufacturing and service industries</u>		
<u>Textbook and /or References</u>	1. Jay Heizer and Barry Render(2000), Principles of Operations Management, Prentice Hall. (Text book) 2. Nahmias, S., (1993), Production and Operations Analysis, Irwin Inc. 3. Johnson and Montgomery, (1974), Operations Research in Production Planing, Scheduling and inventory control, John Wiley. 4. Elsayed, E. A., (1994), Baucher, T.O., Analysis and Control of Production Systems, Prentice Hall. 5. Sipper,D., and Bulfin Jr.R., (1997), Production Planning, Control, and Integration, The Mc Graw – Hill Comp. Inc.		
<u>Assessment Criteria</u>		<u>Quantity</u>	<u>Percentage</u>
	<i>Midterm Exams</i>	2	35
	Quizzes	4	10
	Homeworks	4	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
<u>Course Category by Content (%)</u>	Mathematics and Basic Sciences	35	
	Engineering Science	35	
	Engineering Design	30	
	<i>Social Sciences</i>	0	
<u>Instructors</u>	Prof. Dr. Serpil EROL, Prof. Dr. Bilal TOKLU, Assoc.Prof Dr. Ertan GÜNER, Assoc.Prof Dr. Hadi GÖKÇEN		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Production systems, Production Planning and Control, Decisions in Production Systems.
2	PRODUCT AND SERVICE DESIGN: Product and service selection, Product development, Issues for Product Design, Defining the Product, Service design .
3	FORECASTING: What is forecasting, Types of Forecasts, Forecasting approaches; overview of qualitative methods, overview of quantitative methods, Forecasting in the service sector.
4	PROCESS SELECTION AND CAPACITY PLANNING: Process strategies, Process analysis and design, Service process design, Selection of equipment and technology, Capacity.
5	INVENTORY MANAGEMENT: Functions of inventory, Inventory management.
6	INVENTORY MANAGEMENT: Inventory models.
7	INVENTORY MANAGEMENT: Inventory models.
8	MIDTERM EXAM I.
9	AGGREGATE PLANNING: Concept of aggregate planning, Methods of aggregate planning.
10	AGGREGATE PLANNING, MASTER PRODUCTION SCHEDULING (MPS): Aggregate planning strategies, Master production scheduling.
11	MATERIAL REQUIREMENTS PLANNING (MRP): Concept of Dependent and Independent Demand, MRP Inputs, Bill of Material (BOM), MRP Outputs.
12	MATERIAL REQUIREMENTS PLANNING (MRP): Lot sizing techniques.
13	MIDTERM EXAM II.
14	SCHEDULING: The strategic importance of short term scheduling, Scheduling process-focused work centers, Loading jobs in work centers.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1: None 2: Partially 3: Completely				

Prepared by: Prof. Dr. Serpil EROL, Prof. Dr. Bilal TOKLU, Assoc. Prof Dr. Ertan GÜNER,

Assoc. Prof Dr. Hadi GÖKÇEN

Date: 10/01/03

ENM 316 SIMULATION		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
6	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	ENF 106, ENM 208		
Catalog Description	Simulation concept. Modeling and analysis of a system with simulation technique. Application areas of simulation as a decision tool. Simulation models. Discrete event simulation. Modeling of service and production systems usign simulation language (SIMAN etc.). Random number and random variable generation. Selecting input probability distribution. Output analysis.		
Course Objectives	To introduce importance of simulation technique in modeling and analysis of complex systems. To examine applications of simulation in service and production systems with the purposes of performance analysis in a system, comparing of alternative systems and optimization.		
Course Outcomes	To get an ability for modeling and analysis of a system with simulation technique and designing new systems and comparing them. Improve the ability of desicion making.		
Textbook and /or References	1. Law, A.M., Kelton, W.D., (2000), Simulation Modelling and Analysis, McGraw Hill Inc. (Textbook) 2. Pegden, C.D., Shannon, R.E., and Sadowski, R.P., (1995), Introduction to Simulation Using SIMAN, McGraw Hill Inc. 3. Banks, J., Carson, J.S., (2000), Discrete Event System Simulation, PrenticeHall		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	30
	Quizzes	-	-
	Homeworks	6	15
	Projects	1	20
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	35
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	40	
	Engineering Design	30	
	Social Sciences	0	
Instructors	Prof.Dr. Berna DENGİZ, Assoc.Prof. Dr. Fulya ALTIPARMAK		

COURSE PLAN					
Week	Topics				
1	INTRODUCTION: Description of simulation, System, Model. Simulation models, Advantage and disadvantage of simulation, Application areas of simulation and Monte Carlo simulation.				
2	DISCRETE EVENT SIMULATION: Discrete event simulation, Manual simulation, Simulation of a single server queueing system.				
3	SIMAN SIMULATION LANGUAGE: Basic concepts, SIMAN Blocks (CREATE, QUEUE)				
4	SIMAN SIMULATION LANGUAGE: SIMAN Blocks (SEIZE, DELAY, RELEASE, COUNT)				
5	SIMAN SIMULATION LANGUAGE: Experiment Elements in SIMAN (PROJECT, DISCRETE, etc.)				
6	SIMAN SIMULATION LANGUAGE: SIMAN Blocks (BRANCH) and experiment elements (DSTATS, TALLIES, STORAGES)				
7	MIDTERM EXAM I				
8	SELECTING INPUT PROBABILITY DISTRIBUTION: Histograms, Point estimations, Probability graphs in selecting input probability distributions.				
9	SELECTING INPUT PROBABILITY DISTRIBUTION: Estimation of parameters and goodness of fit tests using UNIFIT in selecting input probability distributions.				
10	RANDOM NUMBER AND RANDOM VARIATE GENERATION: Random Number generators, Linear congruential generators,etc. Generating random variates with inverse transform				
11	RANDOM VARIATE GENERATOR: Generating random variates with Acceptance-Rejection, Composition and Convolution.				
12	OUTPUT ANALYSIS: Types of simulations with regard to output analysis, Output analysis of a single system				
13	MIDTERM EXAM II				
14	COMPARING OF ALTERNATIVE SYSTEMS AND VARIANCE REDUCTION: Confidence intervals for the difference between performance measures of two systems and variance reduction techniques (common random number, antithetic variates).				
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM					
	Program Outcomes	1	2	3	
1	An ability to apply knowledge of mathematics, science, and engineering			X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X	
3	An ability to design a system, component, or process to meet desired needs			X	
4	An ability to function on multi-disciplinary teams		X		
5	An ability to identify, formulate, and solve engineering problems			X	
6	An understanding of professional and ethical responsibility	X			
7	An ability for effective written and oral communication in Turkish and English		X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X		
9	A recognition of the need for, and ability to engage in life-long learning		X		
10	A knowledge of contemporary issues	X			
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X	
Contribution of the course : 1:None 2:Partially 3:Completely					

Prepared by : Prof. Dr. Berna DENGİZ, Doç.Dr. Fulya ALTIPARMAK..... Date : .09/10/2002

ENM 317 FACILITIES PLANNING		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Basic facilities planning concepts and system concept and its kinds in terms of facilities planning. Plant layout and design. Process design. Some calculations used in layout. Layout approaches in facilities. Warehouse systems layouts. Computer aided facility layout. Graph theory and layout approaches. Discrete facility layout and covering problems. Material handling systems and analysis. Automated guided vehicle systems.		
Course Objectives	Facilities planning subject contains functions which directly effects productivity and rantability of the business. Because of this, facilities planning is presented in a disciplinary approach. It is examined in terms of location selection and design operations. Facility layout ensures the ability on how to find the solutions for complex problems in the facility and provides application of suitable qualitative and quantitative techniques for them.		
Course Outcomes	With a disciplinary approach, facility layout is to provide the ability on engineering design processes in a facility, the capability on defining the problem and its analysis, developing the alternative solutions and their evaluation, selecting the favorable design and application design skills as a formation.		
Textbook and/or References	1. Francis, R.L., Leon, F. McGinnis, Jr. and White, J.A., (1992), Facility layout and location: An analytical approach, Prentice Hall, Englewood Cliffs, N.J. (Textbook) 2. Sule, D.R., (1988), Manufacturing facilities: Location planning and design, PWS-KENT Pub.Com., Boston. 3. Daskin, M.S., (1995), Network and discrete location: Models, algorithms, and applications, John Wiley and Sons, Inc., N.Y. 4. Mirchandani, P.B., Francis, R.L., (1990), Discrete location theory, Mc Graw-Hill Book Co., Inc., N.Y.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	1	5
	Projects	-	-
	Term Paper	1	5
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	20	
	Engineering Science	40	
	Engineering Design	40	
	Social Sciences	0	
Instructors	Prof. Dr. Orhan TÜRKBEY, Dr. Ediz ATMACA		

COURSE PLAN				
Week	Topics			
1	BASIC DEFINITIONS: Basic facilities planning concepts and system concept and its kinds in terms of facilities planning.			
2	PLANT LOCATION: Factors affecting location, Location models.			
3	PLANT DESIGN: Phases of design, Product design, Process design and location types.			
4	PLANT LAYOUT DESIGN: Reasons of layout in available systems, Main subjects in layout problem and plant buildings.			
5	AUXILIARY CALCULATIONS: Some calculations used in layout, Distance calculations, Area, manpower and equipment requirements.			
6	MIDTERM EXAM I, HOMEWORK I			
7	PLANT LAYOUT MODELS: Layout approaches in facilities, Systematic layout planning, Some model and techniques used in layout.			
8	WAREHOUSE SYSTEMS LAYOUT: Some layout models used in warehouse systems.			
9	COMPUTER AIDED FACILITIES LAYOUT: Computer aided facilities layout algorithms and their applications.			
10	GRAPH BASED PLANT LAYOUT: Graph theory and plant layout approaches.			
11	DISCRETE FACILITY LAYOUT: Some algorithms and set covering problems used in discrete facility layout.			
12	MIDTERM EXAM II, HOMEWORK II			
13	MATERIAL HANDLING SYSTEMS: Analysis of Material handling systems and its performance measurements.			
14	AUTOMATED GUIDED VEHICLE SYSTEMS (AGVs): Analysis of automated guided vehicle systems and their performance measurements.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 321 HUMAN FACTORS ENGINEERING		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Objectives of ergonomics. Basic anatomy and body mechanisms. Anthropometric principles in workstation and equipment design. Physiology-workload and work capacity. Physical environment design. Ergonomics workplace design. Office ergonomics..Man-machine interaction. Occupational health and safety. Work organization.		
Course Objectives	Fitting job to the man, design of a work environment regarding to performance limit of worker and productivity of work.		
Course Outcomes	Students will gain new perspectives on importanceny of human in working environment, increase their productivity conscious and integrate into working life.		
Textbook and /or References	1. Kroemer K., Kroemer H., Kromer-Elbert K., (2001) Ergonomics: How to design for ease and efficieny, Second Edition, Prentice Hall. (Textbook) 2. Dizdar E.N., Kurt M., (2001), İş Güvenliği. 3. Tayyari F, Smith J.L, (1997),Occupational Ergonomics : Principles and Applications , Chapman and Hall		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	25
	Quizzes	-	-
	Homeworks	-	-
	Projects	1	25
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	10	
	Engineering Science	35	
	Engineering Design	25	
	Social Sciences	30	
Instructors	Assoc.Prof.Dr. Mustafa KURT, Dr. Erol ŞAHİN		

COURSE PLAN	
Week	Topics
1	INTRODUCTION : Ergonomics and its objectives, Basic terminology, Results of ergonomics application.
2	BIOMECHANIC: Anatomical and mechanical structure of human body: The Skeletal system, The Back structure ,The Hand structure, Muscular system, Basic biomechanical analysis and models.
3	ANTHROPOMETRY : Basic ergonomic design philosophies, Statistical basic of anthropometry, Anthropometrical data, Anthropometrical workstation design.
4	WORK PHYSIOLOGY : Energy requirement of body, Respiratory and circulatory system, Fatigue and its evaluation, Physical work capacity.
5	WORKING ENVIROMENT : Lighting , Vibration.
6	WORKING ENVIROMENT : Hazardous materials , Noise.
7	WORKING ENVIROMENT :Thermal environment , Effect of color .
8	MIDTERM EXAM
9	PERSONEL PROTECTIVE EQUIPMENTS and MACHINE GUARDING
10	HUMAN-MACHINE INTERACTION.
11	MANUAL MATERIALS HANDLING: Manual lifting task evaluation, NIOSH lifting equation, Back injury prevention techniques.
12	MUSCULOSKELETAL DISORDERS
13	SYSTEM APPROACH TO ERGONOMICS : Work organization and worksystem design : Motivation and job satisfaction, Sociotechnical system design.
14	PRESENTATION OF STUDENT PROJECTS'.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 322 WORK STUDY		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
6	3	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Definition of work study. Flow organization. Time study. Method study.Flow analysis. 6 step method in method improving. Job sampling. Synthetic motion-time systems.		
Course Objectives	Researching all sources and factors effected by a definite event or an activity hierarchically by the mean of economical and factorial way. Investigating human work in a wide range.		
Course Outcomes	Students will gain new perspectives on importanceney of work study science increase their productivity conscious and integrate into working life.		
Textbook and /or References	4. Meyers, F.E., Stewart, J.R., (2002), Motion and Time Study for Lean Manufacturing 3rd Edition,Prentice Hall.(Textbook) 5. MPM-REFA, İş Etüdü ve Yöntem Bilgisi, (1988), Milli Prodüktivite Merkezi Yayınları,Yayın No:544. 6. Kanawaty, G., (1997), İş Etüdü, Uluslararası çalışma örgütü, Milli Prodüktivite Merkezi Yayınları,Yayın No:29. 7. 4 Niebel, B., Freivalds, A., (2002), Methods, Standards and Work Design, 11th edition, McGraw-Hill.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	20
	Quizzes	4	20
	Homeworks	-	-
	Projects	1	10
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	10	
	Engineering Science	60	
	Engineering Design	10	
	Social Sciences	20	
Instructors	Assoc.Prof.Dr. Mustafa KURT		

COURSE PLAN				
Week	Topics			
1	WORK STUDY: Definition and importance the work study, Direct methods increase the productivity, Work study techniques and relations, Basic phase of work study.			
2	DETERMINE TO DATA: Data types, Flow types, Data collection techniques, Use of data for work study.			
3	FLOW ORGANIZATION: Flow types for man and machine, Determining the techniques real and suggest time and showing symbols.			
4	MOTION STUDY: Introduction motion study and selection jobs, Recording, Examination, Developing, Material flow and manipulation, Develop the layout, Material handling.			
5	MOTION STUDY: Worker movement and work station, Work station design, Worker and material movement, use of related diagrams, Definition, Application and continue.			
6	WORK MEASUREMENT: Definitions and goal the work measurement, Direct and indirect work measurement techniques.			
7	TIME STUDY: What is the time study, Tools for time study, Forms for time study, Selection and measurement of work, Phase of time study, Data collection and the records, Components of work.			
8	TIME STUDY: Qualified worker, Average worker, Determining the performance, the individual rest rate, dispersion time rate, Work measurement, Calculating the standard time.			
9	MIDTERM EXAM and solutions of exam problems.			
10	TIME STUDY: Time study applications for different sectors.			
11	PREDETERMINED TIME STANDARDS SYSTEMS (PTS): Definition and mean of PTS, MTM method and application area, MTM applications.			
12	WORK SAMPLING: General information about sampling, Determining the safety rate and the number of observation, Work sampling forms.			
13	WORK SAMPLING: Random observations, Scheduling the observations on the form, Evaluating data, Use of nomogram and sufficiency test.			
14	GROUP WORKING: Group working and multi-position working, Comparison and estimate the method.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

<u>ENM 344 SEMINAR</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>6</u>	<u>2</u>	<u>2</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Developing writing skills at research reports under the supervising of an advisor. Analysis of a problem and representation of the final report.</u>		
<u>Course Objectives</u>	<u>To teach research method and reporting techniques.</u>		
<u>Course Outcomes</u>	<u>To get an ability to students in searching, reporting and presenting on a special topic.</u>		
Textbook and /or References	(Under supervising of an advisor)		
Assessment Criteria		Quantity	Percentage
	<i>Midterm Exams</i>	-	-
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	presentation	100
Course Category by Content (%)	Mathematics and Basic Sciences		
	Engineering Science		
	Engineering Design		
	Social Sciences		
Instructors	All members of department		

COURSE PLAN	
Week	Topics
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RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by: Department Chairperson..... Tarih : ..02./12./2002

ENM 351 PROJECT MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5-6	3	0	0
Language	English		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Definitions on project management. Classification of projects. Project planning. Organization charts of project management. CPM and PERT methods. Finding the completing time of project and the critical path, Resource allocation. Time-cost analysis. Computers applications.		
Course Objectives	To teach the project management, solving methods of project planning and control technique, resource planning, project money plan.		
Course Outcomes	To get an idea about the resource allocation, time cost analysis, solving methods of project planning and control technique.		
Textbook and /or References	1. Cleland, D. I. and King, W.R., (1998), Systems Analysis and Project Management, Third edition, MGMT (Textbook) 2. Ritz, G.J., (1990), Total Engineering Project Management, McGraw-Hill. 3. Winston, W. L., (1994), Operations Research: Applications and algorithms,.Third edition, Duxbury press .		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	25
	Quizzes	-	-
	Homeworks	1	25
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	10	
	Engineering Science	40	
	Engineering Design	50	
	Social Sciences	0	
Instructors	Assoc. Prof. Dr. Cevriye GENCER		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: The concept of project and project management, Project life cycles, The classification of project.
2	PROJECT PLANNING: Usefulness of planning, Project control, Establishing the project team,
3	ORGANIZATION CONCEPTS OF PROJECT MANAGEMENT : Evolving principles of organizations, various forms of organizations, planning the matrix organizations
4	TIME SCHEDULING: Gantt charts, Definitions PERT and CPM, Difference PERT and CPM
5	NETWORKS: The rules of drawing network, activity on arc and activity on node
6	CRITICAL PATH METHOD (CPM), COMPUTATION OF EARLY EVENT TIME AND LATE EVENT TIME: Finding a critical path and critical activity
7	FLOATS: Total float, Free float, Independent float and safety float
8	EVALUATION AND REVIEW TECHNIQUE (PERT): Difficulties of PERT and PERTs calculations
9	MIDTERM EXAM I
10	PROJECT RESOURCE PLANNING: Definitions, Methods
11	PROJECT MONEY PLAN: Finding to T-day project deadline and cost
12	PROJECT MONEY PLAN: Finding to T-day project deadline and cost
13	LP MODEL FOR PROJECT PLANNING: Using linear programming to find a critical path
14	MIDTERM EXAM II, PROJECT PRESENTATION.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct.. experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Assoc. Prof. Dr. Cevriye GENCER..... Date : 24/09/2002...

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ENM 352 DATA STRUCTURE		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5-6	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Arrays, Lists, Stacks, Recursive functions. Searching and sorting algorithms, Queues.		
Course Objectives	To teach arrays, Lists, Stacks, Recursive functions. Searching and sorting algorithms, Queues.		
Course Outcomes	Learning Arrays, Lists, Stacks, Recursive functions. Searching and sorting algorithms, Queues.		
Textbook and /or References	1. .Kruse, R.J., (1997), Data Structure and Program Design Prentice Hall. (Textbook) 2. Sedgewick, R., (1992), Algorithms in C++, Addison Wesley. 3. Tremblay, J.P., Cheston, G.A., (2002), Data Structures and Software Development in an Object Oriented Domain, Eiffel Edition, Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	2	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	15	
	Engineering Science	25	
	Engineering Design	60	
	Social Sciences	0	
Instructors	Dr. M. Ali AKCAYOL		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Programming strategies, Methods, C language syntax.
2	LISTS: Linked lists and operations.
3	ARRAYS, TREES: Arrays and trees operations.
4	QUEUES STRUCTURE: Queues and operations.
5	STACKS: Stacks operations.
6	MIDTERM EXAM I
7	SEARCHING: Sequential, Binary search.
8	SORTING: Sorting algorithms. Selection sort, Insertion sort, Bubble sort.
9	SORTING: Shell sort, Quick sort.
10	MIDTERM EXAM II
11	RECURSION: Recursive algorithms, Recursive binary-tree algorithms.
12	GRAPH ALGORITHM: List representation, Matrix representation, Shortest path, All shortest path.
13	GRAPH ALGORITHM: Graph searching, Transitive closure, Topological sort.
14	DYNAMIC ALGORITHMS: Fibonacci, Optimum binary search.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English	X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr. M. Ali AKCAYOL
17/12/2002

Date : _____

<u>MANAGEMENT</u>			
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5-6	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Human resource management and it’s importance. Work analysis and design. Human resource planning and selection.Techniques for determination of personnel requirement. Performance evaluation. Career planning. Wages management system in organization. Work safety. Worker-employer relationship.		
<u>Course Objectives</u>	Constitution and development of human resources management functions in business.		
<u>Course Outcomes</u>	Students will learn importance and role of a good human resorces management functions in order to reach organizational goals and come to a stage that they can apply their human resources management knowledge to real life management		
Textbook and /or References	1. Decenzo, D.A., Robbins, S.P., (1999), <i>Human Resource Management</i> , 6 th John Wiley and Soons. 2. Özgen, H., Öztürk, A., Yalçın, A., (2002), <i>İnsan Kaynakları Yönetimi</i> , Nobel Kitabevi, Adana. Kaynak, T., ve ark., (1998), İnsan Kaynakları Yönetimi, İstanbul Üniversitesi İşletme Fakültesi Yayınları, No:276, İstanbul.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	25
	Quizzes		
	Homeworks		
	Projects	1	25
	Term Paper		
	Laboratory Work		
	Other		
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	10	
	Engineering Science	30	
	Engineering Design	-	
	Social Sciences	60	
Instructors	Assoc.Prof.Dr. Mustafa KURT		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Fundamentals of Human resources management (HRM). A closer look at the foundations of HRM. HRM in small business and global marketplace.
2	MOTIVATION: Characteristics of motivation. A model of motivation. Implications of the model for motivating. Job design to increase motivation (Job enrichment, job rotation, flexible hours etc.).
3	EMPLOYMENT PLANNING AND ANALYSIS: Linking organizational strategy to employment planning. Determining essentials skills, knowledge and abilities for work. Current trends in employment planning.
4	RECRUITING AND FOUNDATIONS OF PERSONEL SELECTION: Recruiting goals. Recruiting sources. Selection process and techniques.
5	CAREER PLANNING: Definition of career. Career stages. Career choices and preferences. Managing your career.
6	PERFORMANCE EVALUATION: Performance management systems. The appraisal process. Appraisal methods.
7	SAFETY AND HEALTH PROGRAMS: Occupational safety. Maintaining a healthy work environment. Work-related stress.
8	MIDTERM EXAM
9	TRAINING: Determining training needs. Training programmes design. Evaluation of training programmes.
10	PAYMENT: Wage systems. Incentives. Job evaluation based payment.
11	LABOR RELATIONS AND UNIONS: Employee rights. Labor legislation. Unions.
12	PRESENTATIONS' OF STUDENTS PROJECTS.
13	PRESENTATIONS' OF STUDENTS PROJECTS.
14	PRESENTATIONS' OF STUDENTS PROJECTS.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 355 BUSINESS MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5-6	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Basic concepts connected with business and business management, Management thought system, Management functions, Decision making and organizational communication, Business management techniques, New current subjects, Connected with business management.		
Course Objectives	To teach analytically the necessary knowledge, Methods and strategies for the efficient management getting the healthy managerial structure.		
Course Outcomes	To get the necessary background for realizing the effective managerial implementation.		
Textbook and References	1) Akat, İ., Budak, G., Budak, G., (2002), İşletme Yönetimi, 4. Baskı, İstanbul, Beta Basım Yayım A.Ş.(Textbook) 2) Can, H., (2002), Organizasyon ve Yönetim, Ankara, 6.Baskı, Adım Yayıncılık. 3) Akat, İ., Üner, N., (2002), İşletme Yönetimi, İzmir, Doğruluk Matbaacılık San. Tic. Ltd. Şti.. 4) Koontz, H., Fulmer, M.R., (1991), A Practical Introduction to Business, Ontario, Irwin Dorsey Ltd..		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	45
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	1	5
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	0	
	Engineering Science	0	
	Engineering Design	0	
	Social Sciences	100	
Instructors	Dr. Erol ŞAHİN		

COURSE PLAN	
Week	Topics
1	BASIC CONCEPTS CONNECTED WITH BUSINESS MANAGEMENT: Business, enterprise, enterprising, manager.
2	MANAGEMENT THOUGHT SYSTEM (MTS): Historical development of management thought, The school approach.
3	MANAGEMENT THOUGHT SYSTEM (MTS): Evaluation of MTS.
4	MANAGEMENT FUNCTIONS: Management.
5	MIDTERM EXAM I MANAGEMENT FUNCTIONS: Planning.
6	MANAGEMENT FUNCTIONS: Organizing.
7	MANAGEMENT FUNCTIONS: Directing.
8	MANAGEMENT FUNCTIONS: Coordination, Control.
9	CONNECTION PROCESS' IN MANAGEMENT: Decision making, Organizational communication.
10	BUSINESS MANAGEMENT TECHNIQUES: Managing with exceptions, Managing according to goals.
11	MIDTERM EXAM II NEW CURRENT SUBJECTS CONNECTED WITH BUSINESS MANAGEMENT: Organizational efficiency, Approaches connected with organizational efficiency,
12	NEW CURRENT SUBJECTS CONNECTED WITH BUSINESS MANAGEMENT: Organizational changing, Organization development, Organization culture, Contradiction in organization and contradiction management.
13	NEW CURRENT SUBJECTS CONNECTED WITH BUSINESS MANAGEMENT: Crisis management, Stress management.
14	NEW CURRENT SUBJECTS CONNECTED WITH BUSINESS MANAGEMENT: Career management, Strategic management.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr. Erol ŞAHİN

Date : 23/01/2003

ENM 356 STATISCAL DATA ANALYSIS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5 - 6	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Heuristic ans statistical techniques for goodness of fit tests. Linear and nonlinear multiple regression models. Design of experiments for single and several factors. Nonparametric tests.</u>		
<u>Course Objectives</u>	<u>To introduce the importance of statitical data analysis in engineering applications. To teach the selection of appropriate probability distribution in describing systems and methods to analyze and design of experiments for systems under uncertainty.</u>		
<u>Course Outcomes</u>	<u>To get an ability of defining systems under uncertainty using appropriate mathematical models and decision making according to results of experimental design with several factors for systems under uncertainty.</u>		
Textbook and /or References	3. Walpole, R.E., Myers, R.H., Myers S.L., Ye, K., (2002), Probability & Statistics for Enginers and Scientists, Prentice Hall. (Textbook) 4. Devore, J.L., (1990), Probability and Statistics for Engineers and the Scientists Brooks/Cole Publishing Company. 5. Hines, W.W., Montgomery, D.C., (1990), Probability and Statistics in Engineering and Management Scientists, John Wiley and Sons.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	35
	Quizzes	-	-
	Homeworks	5	15
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	25	
	Engineering Design	25	
	Social Sciences	-	
Instructors	Prof.Dr. Fevzi KUTAY, Assoc.Prof. Dr. Fulya ALTIPARMAK		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Basic concepts, Data collection, Types of data and sampling
2	DATA DESCRIPTION: Graphical and numerical methods for describing qualitative and quantitative data
3	GOODNESS OF FIT TESTS: Graphical methods and ChiSquare, Kolmogrov Smirnov Tests.
4	ANALYSIS OF VARIANCE WITH SINGLE FACTOR: Design and analysis of single factor experiments, Fixed effects models.
5	ANALYSIS OF VARIANCE WITH SINGLE FACTOR: Tests on individual treatments (Least Significant Difference Method, Duncan's method)
6	ANALYSIS OF VARIANCE WITH SINGLE FACTOR: Random effects models.
7	MIDTERM EXAM I
8	DESIGN OF EXPERIMENTS WITH SEVERAL FACTORS: Factorial experiments, Two factor factorial experiments, Fixed effects model, Random effects model
9	SIMPLE LINEAR REGRESSION: Simple linear regression, Hypothesis testing in simple linear regression
10	SIMPLE LINEAR REGRESSION: Interval estimation in simple linear regression, Measuring the adequacy of the regression model, Correlation.
11	MULTIPLE REGRESSION: Multiple regression models, estimation of parameters, Confidence intervals and hypothesis testing in multiple linear regression
12	MULTIPLE REGRESSION: Measures of model adequacy, Polynomial regression.
13	MIDTERM EXAM II
14	NONPARAMETRIC TESTS: Sign test, Wilcoxon Signed Rank test, Mann-Whitney U test, Kruskal-Wallis test.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Prof. Dr. Fevzi KUTAY, Assoc.Prof. Dr. Fulya ALLTIPARMAK

Date : 09/10/2002

<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5-6	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>The importance of forecasting in decision making. Qualitative and quantitative foecasting methods. Analysis of time series, moving average and exponential smoothing. Other forecasting methods.</u>		
<u>Course Objectives</u>	<u>To introduce importance of forecasting in engineering applications. To teach the techniques (extrapolation technqiues) for forecasting future values of a time series from past values of a time series.</u>		
<u>Course Outcomes</u>	<u>To get an ability for using appropriate forecasting techniques as a decision making tool in uncertain environment.</u>		
Textbook and /or References	6. Montgomery, D.C., Johnson, L.A., Gardiner, J.S., (1990), Forecasting and Time Series Analysis, McGraw Hill. (Textbook) 7. Wilson, J.H., Keating, B., (1990), Business Forecasting, Irwin. 8. Wheelwright, S.C., Makridakis, S., (1980), Forecasting Methods for Management, John Wiley and Sons.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	35
	Quizzes	-	-
	Homeworks	5	15
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	35	
	Engineering Design	15	
	Social Sciences	-	
Instructors	Prof.Dr. Fevzi KUTAY		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Basic concepts in forecasting.
2	CLASSIFICATION OF FORECASTING TECHNIQUES: Qualitative and quantitative forecasting techniques.
3	QUALITATIVE FORECASTING TECHNIQUES: Delphi and Naive techniques.
4	TIME SERIES: Descriptions and movements in time series
5	TIME SERIES ANALYSIS: Trend analysis
6	TIME SERIES ANALYSIS: Analysis of seasonal movement and seasonal index.
7	SMOOTHING TECHNIQUES AND FORECASTING: Simple and double moving average techniques
8	MIDTERM EXAM I
9	SMOOTHING TECHNIQUES AND FORECASTING: Simple and double exponential smoothing techniques
10	SMOOTHING TECHNIQUES AND FORECASTING: Linear exponential smoothing technique with two parameters, Triple exponential smoothing technique
11	SMOOTHING TECHNIQUES AND FORECASTING: Linear exponential smoothing technique with two parameters, Triple exponential smoothing technique
12	SMOOTHING TECHNIQUES AND FORECASTING: Winter's linear and seasonal exponential smoothing techniques
13	MIDTERM EXAM II
14	COMPARISON OF SMOOTHING TECHNIQUES: Comparatively discussing the advantages and disadvantages of smoothing techniques.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Prof. Dr. Fevzi KUTAY

Date : 09/10/2002

ENM 358 NUMERICAL ANALYSIS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5-6	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	General view of search methods, Gradient methods, Newton Rapson method, general theory of one point iterations, atiken search, golden section search, Fibonacci search, Powel method, stepest descent method, stepest ascent method, Fletcher-Reeves method, penalty functions, barrier functions, quadratic programming, seperable programming, rate of convergence of algorithms, sensitivity analysis.		
<u>Course Objectives</u>	<u>Real life problems are mostly nonlinear form. Therefore the primary purpose of this course is the exposition of algorithms for solving nonlinear optimization problems. This course also contains the theory of nonlinear optimization, mostly concerned with the characteristics of optimal points.</u>		
<u>Course Outcomes</u>	<u>To solve nonlinear real life optimization problems, to find optimal points of nonlinear function.</u>		
Textbook and /or References	4. Chapra, S.C., and Canale, P.R., (1998), Numerical Methods for Engineering, McGraw -Hill, New York. 5. Mc Cormic, G. P., (1983), Nonlinear Programming, John Wiley and Sons. 6. Hoffman, J., (1992), Numerical Methods for Engineers and Scientists, McGraw-Hill, New York.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	4	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	70	
	Engineering Science	20	
	Engineering Design	-	
	Social Sciences	10	
Instructors	Prof. Dr. Zülal GÜNGÖR		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: General view of search methods. Nature of optimization problems.
2	BASIC CONCEPTS: Basic concepts in numerical analysis. Analytical background.
3	BASIC CONCEPTS : Convexity, Optimal condition of unconstrained method.
4	EVALUATION OF NONCONSTRAINED ALGORITHMS: Newton Rapson method.
5	EVALUATION OF NONCONSTRAINED ALGORITHMS : Atiken search, Golden section search, Fibonacci search.
6	EVALUATION OF NONCONSTRAINED ALGORITHMS: Powel method, Stepest descent method, Stepest ascent method.
7	MIDTERM EXAM I.
8	OPTIMALITY CONDITIONS FOR CONSTRAINED PROBLEMS: First and second order necessary conditions, Development of optimality conditions.
9	APPLICATION OF OPTIMALITY CONDITIONS FOR CONSTRAINED PROBLEMS: Fletcher-Reeves method, Penalty functions, Barrier functions.
10	APPLICATION OF OPTIMALITY CONDITIONS FOR CONSTRAINED PROBLEMS: Quadratic programming, Separable programming, Rate of convergence of algorithms, Sensitivity analysis.
11	PRESENTATION OF STUDENT PROJECT:
12	PRESENTATION OF STUDENT PROJECT:
13	MIDTERM EXAM II.
14	PRESENTATION OF STUDENT PROJECT :

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : ..Prof. Dr. Zülal GÜNGÖR..... Date : .25../09../2002.....

ENM 359 PROGRAMMING LANGUAGES		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5-6	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Comparison of high level languages. Object oriented and object based languages. Algorithms. Data types. Control structures. Arrays. Complex data structures. Subroutines. Pointers. File structures. Interface design. Teaching one of the latest languages for examples.		
<u>Course Objectives</u>	To teach the object oriented, object based language and algorithm preperation. To teach the visual programming and database programming.		
<u>Course Outcomes</u>	Learning object oriented, object based language and algorithm preperation. Learning visual programming and database programming.		
Textbook and /or References	1. Joy, J.E., (1996), Hello Delphi: An Introduction to Programming with Borland Delphi for Windows, , Hello Wiorld Pub. (Textbook) 2. Cantu, M., (2001), Mastering Delphi X, Sybex Inc. 3. Pacheco, X., Teixeira, S., (2001), Delphi 6 Developers Guide, Sams.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	30
	Quizzes	-	-
	Homeworks	2	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	1	10
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	15	
	Engineering Science	25	
	Engineering Design	60	
	Social Sciences	0	
Instructors	Dr. M. Ali AKCAYOL		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Object oriented and object based programming. Visual programming.
2	PROGRAMMING: Data types, Control structures, Arrays, Subroutines, Pointers.
3	INTERFACE : Form creation, Menu, ImageList, Button, Toolbar, and Coolbar components.
4	INTERFACE : Label, Edit, Memo, CheckBox, RadioGroup, GroupBox and Panel components.
5	INTERFACE : ListBox, ComboBox, MaskEdit, Images, Shape, Bevel components.
6	INTERFACE : StringGrid, and DrawGrid, TrackBar, ProgressBar, UpDown components.
7	INTERFACE : Standart dialog windows, NoteBook, Tabset, PageControl, TabControl.
8	INTERFACE : ListView, TreeView, HeaderControl, Date and Time components.
9	MIDTERM EXAM I
10	DATABASE : Database structure, Field types, Field sizes, Database accessing.
11	DATABASE : Indexes, Lookup tables, Master/detail tables.
12	DATABASE : Table, Query, Datasource, Database, StoredProc components.
13	DATABASE : Database accessing components.
14	REPORTS: Reports preperation, Reports customize, Reports components..

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English	X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr. M. Ali AKCAYOL
17/12/2002

Date : _____

ENM 360 FINANCIAL MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5-6	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Financial purpose, Financial management, Financial tableus analysis, Simple approachs on financial tableus analysis, Ratio analysis, Break even analysis, Financial planning, Investment decisions, Financing decisions.</u>		
<u>Course Objectives</u>	<u>To teach necessary information, Methods and calculations for both making investment and financing decisions and determining the financial situation of firms</u>		
<u>Course Outcomes</u>	<u>To evaluate the financial structures of firms, To make investment decision and To gain background needed for financing the investment.</u>		
Textbook and /or References	1. Akgüç, Ö., (1998), Finansal Yönetim, Arcıol Basım Yayın, 7.Baskı, İstanbul.(Textbook) 2. Brealey, R.A., Myers, S.C., Marcus, A.S., (1999), İşletme Finansının Temelleri, 3. . Baskı, McGraw-Hill-Literatür Yayıncılık. 4. Bolak, M., (2001), İşletme Finansı, 7.Baskı, Birsen Yayınevi. 5. Ceylan, A., (2000), İşletmelerde Finansal Yönetim, Ekin Kitabevi.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	45
	Quizzes	-	-
	Homeworks	1	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	10	
	Engineering Design	0	
	Social Sciences	40	
Instructors	Dr. Erol ŞAHİN		

COURSE PLAN	
Week	Topics
1	FINANCIAL GOAL AND CONCEPTS OF FINANCIAL MANAGEMENT: Finance function, Financial decision.
2	ANALYSIS OF FINANCIAL TABLEUS: Balance sheet, Income statment tableau, Cash flow tableau, Funds flow.
3	SIMPLE APPROACHS ON FINANCIAL TABLEU ANALYSIS: Comperative analysis, Trend percent analysis.
4	RATIO ANALYSIS: Liquidty ratios, Leverage ratios, Activity ratios, Profitability ratios.
5	MIDTERM EXAM I BREAK EVEN ANALYSIS: Break even analysis under linearyty assumption.
6	FUNDS FLOW ANALYSIS: Source and application of funds.
7	FINANCIAL PLANNING: Pro-forma balance sheets.
8	FINANCIAL PLANNING: Cash Budgets.
9	INVESTMENT DECISIONS: Evaluation of current assets.
10	MIDTERM EXAM II INVESTMENT DECISIONS: Time value of money.
11	INVESTMENT DECISIONS: Evaluation of fixed assests.
12	INVESTMENT DECISIONS: Evaluation of stocks and bonds.
13	FINANCING DECISIONS: Short term financial sources.
14	FINANCING DECISIONS: Cost of capital, Divident distributing decisions.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility			
7	An ability for effective written and oral communication in Turkish and English	X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr.Erol ŞAHİN

Date : 22/01/2003

<u>ENM 361 MARKETING</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5-6	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Subject of marketing, Contents, Strategic marketing, Marketing informatrion systems and Marketing research, Consumer and Industrial buyer behaviors and Markets, Market segmentation, Selection of target market and demand forecasting, product, Pricing, Promotion and distribution, Organization, Application and control, International marketing, Service marketing, Direct marketing, Marketing on internet		
<u>Course Objectives</u>	To emphasize the place and role of basic marketing mix consisting of product, Price, Promotion and Distribution in firms and marketing, to introduce basic concept and application, to teach to requirret strategy and policy.		
<u>Course Outcomes</u>	Gaining backround about determining policy, Strategy and tactics based on basic marketing mix and to learn its use on marketing applications.		
Textbook and /or References	1. Kotler, P., (1994), Marketing Management, 8 th edition,Prentice Hall International Inc.(Textbook) 2. Pride, W., Ferrell, M., (1995), Marketing,.. 9 th edition,. Hough Mifflen Co 3. Mucuk, İ., (2002), Pazarlama İlkeleri, 13. Baskı, Türkmen Kitabevi.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	45
	Quizzes	-	-
	Homeworks	2	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	0	
	Engineering Science	5	
	Engineering Design	5	
	Social Sciences	90	
Instructors	Dr. Erol ŞAHİN		

COURSE PLAN	
Week	Topics
1	BASIC CONCEPTS: Marketing subject and its contents, Development of marketing, Marketing concept.
2	MARKETING ENVIRONMENT: Marketing systems, Macro and Micro environments strategic planning, Marketing management process.
3	MARKETING INFORMATION SYSTEMS (MIS) AND MARKETING RESEARCH (MR): Knowledge requirements for marketing decisions, MIS and Marketing , MR process and planning, Data collection methods.
4	CONSUMER MARKETS AND CONSUMER BEHAVIORS: Market and consumer types, Economic and Demographic characteristics of consumer markets, Consumer behavior factors, Consumer's buying decision process.
5	INDUSTRIAL MARKETS AND INDUSTRIAL BUYER BEHAVIORS: Nature, Importance and Kinds of industrial markets, Structure of industrial markets and its characteristics, Industrial buyer behaviors.
6	MIDTERM EXAM I , MARKET SEGMENTATION, SELECTION OF TARGET MARKET AND DEMAND FORECASTING: Basic market segmentation criters, Target market and selecting strategies, Identifying markets, Sales forecasting.
7	PRODUCT: Product, Concepts connected with products, Classification, Product planning, Product life cycle, Branding, Packaging, Service and Quality strategies, Product modifications, Fasion.
8	PRICE AND PRICING: Importance of price, Pricing targets, Pricing methods in applications, New product pricing strategies, Price elasticity of demand.
9	PROMOTION: Advertising, Sales development, Personel selling function, Presentation, Communication process, Promotion functions, Basic promotion methods.
10	DISTRIBUTION, DISTRIBUTION CHANNELS AND PHIYSICAL DISTRIBUTION: Channels of distribution, Selection of distribution channels, Basic distribution policies, Phiysical distribution.
11	MIDTERM EXAM II ORGANIZING AND CONTROL IN MARKETING MANAGEMENT: Nature and importance of organizing, The place of marketing department in bussines administration, Organization and control of marketing department.
12	INTERNATIONAL MARKETING: International marketing management, Envoriment factors in international marketing, Type of enterence to international markets.
13	SERVICE MARKETING: Definition and types of service, Marketing concept in service firms, Marketing strategies in service firms.
14	DIRECT MARKETING AND MARKETING ON INTERNET: Definition of direct marketing, Goals, Its advantages, Basic types of marketing, Electronic trade and marketing internet, Characteristics of internet users, Internet marketing strategies.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Dr. Erol ŞAHİN

Date : 22/01/2003

ENM 363 TECHNOLOGY MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
5-6	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Basic terms related with Technology Managemet, Technology selection on project base, Technology transfer methods (Licence agreements, Foreign investment, etc.), Industial properties (Patent, Utility model, Industial design, etc.), Technology production and R-D activities,Technoparks, Country experiments, Science and technology policies.		
<u>Course Objectives</u>	<u>To provide the industrial engineering student with a conceptual understanding of technology management (transfer and production).</u>		
<u>Course Outcomes</u>	<u>To provide the industrial engineering student with applications and experiments of technology management methods.</u>		
<u>Textbook and /or References</u>	1. Şimşek, S., (1993), Lisans Anlaşmaları Yoluyla Teknoloji Transferi, TOBB Yayınları 2. Sarihan, H.İ., (1998), Teknoloji Yönetimi, Desnet Yayınları.		
<u>Assessment Criteria</u>		<u>Quantity</u>	<u>Percentage</u>
	Midterm Exams	2	30
	Quizzes	2	10
	Homeworks	1	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
<u>Course Category by Content (%)</u>	Mathematics and Basic Sciences	30	
	Engineering Science	50	
	Engineering Design	0	
	Social Sciences	20	
<u>Instructors</u>	Dr. Mahmut ÖZDEMİR		

COURSE PLAN	
Week	Topics
1	TERMS AND DEFINITIONS RELATED WITH TECHNOLOGY MANAGEMENT
2	TECHNOLOGY SELECTION ON PROJECT BASE
3	GENERAL INFORMATION ABOUT TECHNOLOGY MANAGEMENT
4	TECHNOLOGY TRANSFER BY LICENCE AGREEMENTS - I
5	TECHNOLOGY TRANSFER BY LICENCE AGREEMENTS - II
6	KNOW-HOW AND TRADE MARK LICENCE AGREEMENTS
7	TECHNOLOGY TRANSFER BY DIRECT FOREIGN INVESTMENTS/ MIDTERM EXAM I
8	INDUSTRIAL PROPERTIES
9	PRODUCTION OF TECHNOLOGY AND RESEARCH-DEVELOPMENT ACTIVITIES
10	UNIVERSITY AND INDUSTRY COOPERATIONS
11	TECHNOPARKS
12	ENCOURAGEMENT SYSTEMS OF TECHNOLOGY PRODUCTION
13	SCIENCE AND TECHNOLOGY POLICIES / MIDTERM EXAM II
14	COUNTRY EXPERIMENTS ON TECHNOLOGY PRODUCTION AND TRANSFER

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1: None 2: Partially 3: Completely				

Prepared by: Dr. Mahmut ÖZDEMİR

Date : 10.01.2003

ENM 364 FEASIBILITY ANALYSIS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5-6	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Growing idea of investment and investment types, benefit and necessity of feasibility work, selection of plant location, demand forecast, capacity determination, determination of investment budget, financing of investment price estimation, marketing techniques, income-expense study and evaluation.		
Course Objectives	Directing the scarce resources of the country and investors to suitable investment areas. Giving some information to select of the best alternative investment facilities.		
Course Outcomes	Directing the resource of investor to the suitable investment area.		
Textbook and /or References	1-Sariaslan, H.,(2000),Yatırım Projelerinin Hazırlanması ve Değerlendirimesi, Güven Yayınları (Textbook) 2-İlter,N., (2001), Kamu Yatırımlarının Hazırlanması ve Değerlendirilmesi,Devlet Planlama Teşkilatı Yayınları, Ankara. 3- Türkiye Kalkınma Bankası, (1991),Yatırım Projelerinin Değerlendirilmesi, Kalkınma Bankası Yayınları, Ankara.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	25
	Quizzes	-	-
	Homeworks	1	25
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	20	
	Engineering Design	-	
	Social Sciences	50	
Instructors	Hasan H. Doğan		

COURSE PLAN	
Week	Topics
1	INVESTMENT CONCEPT : Investment, New investment, Capacity development investment, Modernization investment.
2	EKONOMICAL ANALYSIS : Foundation place selection, Area selection.
3	EKONOMICAL ANALYSIS : Exact foundation place selection.
4	MARKETING RESEARCH : Marketing supply, Current facilities, Probable investments, Demand forecasting.
5	TECHNICAL ANALYSIS : Capacity determination, Technology selection.
6	TECHNICAL ANALYSIS : Determination of investment, building , machine costs.
7	TECHNICAL ANALYSIS : Investment term interest rate, Price increasement values, turn – over capital calculation.
8	MIDTERM EXAM I.
9	FINANCIAL ANALYSES: Investment finance.
10	FINANCIAL ANALYSES: Credit pay – back table.
11	FINANCIAL ANALYSES: Income–expense analysis.
12	FINANCIAL ANALYSES: Project evaluation criterias.
13	MIDTERM EXAM II
14	FUND FLOW TABLE AND APPLIED EXAMPLES.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Hasan H. DOĞAN..... Date : 25/09/2002

ENM 369 JOB ANALYSIS AND EVALUATION		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
5-6	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Definition of job analysis. Application and usage areas. Scope of job evaluation. Job evaluation’s aim and applications. Analytical and non analytical job evaluation techniques. Wage management. Classical and non classical wage systems, merit and factors affecting it.		
Course Objectives	Gathering all the information for jobs. Use these data for evaluation and organization of business. Creating wage system according to job analysis and evaluation.		
Course Outcomes	Students will learn how to use the job analysis and evalaution methods in business and apply their knowledge gained in the class to real life business problems		
Textbook and /or References	1. Decenzo, D.A., Robbins, S.P., (1999), Human Resource Management, 6th John Wiley and Sons. (Textbook) 2. Özgen, H., Öztürk, A., Yalçın, A., (2002), İnsan Kaynakları Yönetimi, Nobel Kitabevi, Adana. 3. Kaynak, T., ve ark., (1998), İnsan Kaynakları Yönetimi, İstanbul Üniversitesi İşletme Fakültesi Yayınları, No:276, İstanbul.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	25
	Quizzes	-	-
	Homeworks	-	-
	Projects	1	25
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	40	
	Engineering Design	-	
	Social Sciences	30	
Instructors	Assoc. Prof. Dr. Mustafa KURT		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Definiton, Development and application areas of job analysis. Payments, organization and manpower planning, Job safety and health, Labor relationships, Job design.
2	JOB ANALYSIS: Job analysing process. Preparation period of a job analysis study. Gathering information for job analysis.
3	JOB ANALYSIS: Data collection techniques in job analysis: Questionnaires, interviews, diaries. Functional job analysis. Job requirements. Job standarts and introducing of job analysis forms.
4	JOB ANALYSIS: Application of job analysis data. Important points in application of a job analysis.
5	JOB EVALUATION: Definition of job evaluation. Principles and purpose of job evaluation. Importancey of job evaluation in the process of payment management. Examples of job analysis methods.
6	JOB EVALUATION: Stages and process of a job evaluation study. Job analysis's data. Deciding factors and its coverage. Selection the techniques in the evaluation process. Application of the method to organization and creating payment structure for organization.
7	JOB EVALUATION TECHNIQUES: Job evaluation techniques. Non-analytical methods. Enumeration method. Classification method. Advantages and disadvantages of non-analytical methods.
8	JOB EVALUATION TECHNIQUES: Analytic methods, scoring methods, determining of the factors and sub factors. Determining of the factors degrees: minimum weighting, maximum weighting, balanced weighting. Prepare the score plan. Score the jobs. Advantages and disadvanteges of the scoring technique.
9	JOB EVALUATION TECHNIQUES: Factor comparing techniques. Selection and definiton of factors. Selection of key factors. Sorting of the key jobs according to the factors. Allocation of key jobs wages to factors. Evaluation of other jobs. Advantages and disadvantages of factor comparing techniques.
10	MIDTERM EXAM
11	WAGE MANAGEMENT: Utilizing the result of job evaluations in wage management. Drawing the wage line or curve of the organization and arrange the wage brackets.
12	WAGE SYSTEMS: Base payment structure, incentive payment systems, wage per produced parts, contract to a lump price, prim based wages, sharing firms profit.
13	PRESENTATIONS OF STUDENTS PROJECTS
14	PRESENTATIONS OF STUDENTS PROJECTS

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Assoc. Prof.Dr. Mustafa KURT

Date : 25/09/2002

ENM 403 PRODUCTION SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Uygulama</u>	<u>Laboratuvar</u>
<u>7</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Aggregate production planning. Material management and material requirement planning. Manufacturing resources planning (MRP II). Modern manufacturing systems such as JIT, OPT, FMS. Current production management systems: ERP, SCM, etc.		
<u>Course Objectives</u>	<u>To provide some information about modern manufacturing systems and to teach some techniques employed for designing and planning of these systems.</u>		
<u>Course Outcomes</u>	<u>Understanding of manufacturing systems technologies. To get an ability for following of the technological improvement, for solving of manufacturing system problems and, for applying of production management softwares</u>		
<u>Textbook and /or References</u>	1. Heizer J. and Render B.,(2000), Principles of Operations Management, Prentice Hall. (Textbook) 2. Nahmias, S., (1993), Production and Operations Analysis, Irwin Inc. 3. Johnson, L.A. and Montgomery, D.C.,(1974), Operations Research in Production Planing, Scheduling and Inventory Control, John Wiley. 4. Elsayed, E. A., and Baucher, T.O., (1994), Analysis and Control of Production Systems, Prentice Hall. 5. Sipper,D., and Bulfin Jr.R., (1997), Production Planning, Control and Integration, The Mc Graw – Hill Comp. Inc.		
<u>Assessment Criteria</u>		<u>Quantity</u>	<u>Percentage</u>
	<i>Midterm Exams</i>	2	25
	Quizzes	2	5
	Homeworks	4	10
	Projects	-	-
	Term Paper	1	10
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
<u>Course Category by Content (%)</u>	Mathematics and Basic Sciences	20	
	Engineering Science	60	
	Engineering Design	20	
	<i>Social Sciences</i>	0	
<u>Instructors</u>	Prof.Dr. Serpil EROL, Prof. Dr. Bilal TOKLU, Assoc.Prof. Dr. Ertan GÜNER, Assoc.Prof. Dr. Hadi GÖKÇEN		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION: Comparison of Production Systems			
2	MATERIALS MANAGEMENT AND MATERIAL REQUIREMENTS PLANNING: Materials management, Closed Loop MRP, Capacity Requirements Planning(CRP).			
3	DISTRIBUTION REQUIREMENTS PLANNING (DRP): DRP Structure, Distribution tree, Distribution requirement planning.			
4	SCHEDULING: Scheduling and Sequencing jobs on Single and multiple machine.			
5	SCHEDULING: Scheduling and Sequencing jobs on multiple machine, The bottleneck philosophy, Theory of constraints, Scheduling for Services.			
6	JUST IN TIME SYSTEMS (JIT): Just in time philosophy, Kanban, Suppliers and JIT, JIT layout, comparison of MRP and JIT, JIT in services.			
7	MIDTERM EXAM I.			
8	MANUFACTURING RESOURCES PLANNING SYSTEMS: Manufacturing resources planning (MRP II), Software packages, Properties, Benchmarking and Applications.			
9	ENTERPRISE RESOURCES PLANNING SYSTEMS: Enterprise resources planning (ERP), Software packages, Properties, Benchmarking and Applications.			
10	SUPPLY CHAIN MANAGEMENT (SCM): The strategic importance of the supply chain, Vendor Selection, managing the supply chain, Software packages, Properties, Benchmarking and Applications.			
11	MIDTERM EXAM II.			
12	PRODUCTION TECHNOLOGIES: Design technologies (CAD/CAM), Production technologies (NC/CNC, robots, AS/RS,AGV, FMS, CIM).			
13	NEW IMPROVEMENTS ON PRODUCTION SYSTEMS: Lean production, Agile manufacturing, ... etc.			
14	NEW IMPROVEMENTS ON PRODUCTION SYSTEMS: Homework and presentation on new improvements on production systems.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1: None 2: Partially 3: Completely				

Prepared by: Prof.Dr. Serpil EROL, Prof. Dr. Bilal TOKLU, Assoc.Prof. Dr. Ertan GÜNER,

ENM 404 MANAGEMENT INFORMATION SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>8</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Introduction to information systems. Data processing and management information systems. Database management systems. System development tools. System development methodologies. Information system security, ethic. Data communication. Internet and electronic commerce.</u>		
<u>Course Objectives</u>	<u>To give general information about information technologies and its trends. To teach information system development tools and methodologies (including Database design) and have an information system project about manufacturing and service systems prepared</u>		
<u>Course Outcomes</u>	<u>Understanding of information technologies. Gaining knowledge of how a new information system will be developed (including the database design), and understanding an information systems developed.</u>		
<u>Textbook and /or References</u>	1. H.Gökçen (2002) Yönetim Bilgi Sistemleri: Analiz ve Tasarım Perspektifi, EPI Yayıncılık, Ankara. (Textbook) 2. McLeod, R. , Schell, G. (2001), Management Information Systems, Eighth edition, Prentice Hall, New Jersey		
<u>Assessment Criteria</u>		<u>Quantity</u>	<u>Percentage</u>
	<u>Midterm Exams</u>	1	35
	<u>Quizzes</u>	-	-
	<u>Homeworks</u>	-	-
	<u>Projects</u>	1	15
	<u>Term Paper</u>	-	-
	<u>Laboratory Work</u>	-	-
	<u>Other</u>	-	-
	<u>Final Exam</u>	1	50
<u>Course Category by Content (%)</u>	<u>Mathematics and Basic Sciences</u>	20	
	<u>Engineering Science</u>	40	
	<u>Engineering Design</u>	15	
	<u>Social Sciences</u>	25	
<u>Instructors</u>	<u>Assoc.Prof.Dr. Hadi GÖKÇEN</u>		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION TO INFORMATION SYSTEMS: Information, System and system concepts, Managerial decision making, Information systems			
2	COMPUTER BASED INFORMATION SYSTEMS: Data processing systems, Management information systems and related topics.			
3	COMPUTER BASED INFORMATION SYSTEMS: Decision support systems, Office automated systems, Artificial intelligence and expert systems, Executive support systems.			
4	INFORMATION SYSTEM DEVELOPMENT TOOLS: Flowcharts, Data flow diagrams.			
5	INFORMATION SYSTEM DEVELOPMENT TOOLS: Structured chart, Structured English, Decision tables, Decision trees, HIPO			
6	DATABASE DESIGN AND MANAGEMENT: Data sources and data management, Database models, Database components.			
7	DATABASE DESIGN AND MANAGEMENT: Relational database design			
8	SYSTEM DEVELOPMENT APPROACHES : System development life cycle (SDLC)			
9	SYSTEM DEVELOPMENT APPROACHES: System development life cycle (SDLC),Prototyping, Application software packages, End user development, CASE (Computer Aided System/Software Engineering) tools, Object oriented methodology, Hybrid methodology.			
10	COMMUNICATION AND NETWORK SYSTEMS: Network topologies, Communication network types.			
11	MIDTERM EXAM I			
12	INTERNET AND ELECTRONIC COMMERCE; Internet, Intranet and extranet, Elektronik commerce and related concepts, Information system project discussion			
13	INFORMATION SYSTEM SECURITY AND ETHIC : Computer crimes, Ethical implications and legal regulations, Information system project discussion			
14	INFORMATION SYSTEM PROJECT DISCUSSION			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Assoc.Prof.Dr. Hadi GÖKÇEN Date : .../.../.....

ENM 406 SYSTEM ANALYSIS AND DESIGN		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
8	2	0	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	System approach. General system theory. System analysis and decision process. System analysis and design stages. Tools used for system analysis. System control and cybernetic. Case studies.		
Course Objectives	To teach and apply the methods to real life problems in a systematic fashion which are taught during the industrial engineering education.		
Course Outcomes	To get an ability for determininig the problems of production and service systems, for suggesting solution methods to these problems and for choosing the best alternative among those suggestions.		
Textbook and /or References	1. B.S. Blanchard and W.J. Fabrycky (1998), Systems Engineering and Analysis, Prentice Hall, N.J. (Textbook) 2. E. Aslaksen and R. Belcher (1992), Systems Engineering, Prentice Hall, N.Y. 3. J. Boardman (1990), Systems Engineering: An Introduction, Prentice Hall, U.K. 4. S. Şarman (1992), Sistem Analizi, D.E.Ü., İzmir.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	20
	Quizzes	-	-
	Homeworks	4	10
	Projects	-	-
	Term Paper	1	20
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	15	
	Engineering Science	40	
	Engineering Design	35	
	Social Sciences	10	
Instructors	Prof. Dr. Serpil EROL		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: System approach and other related concepts.
2	GENERAL SYSTEM THEORY AND ITS HISTORY: The general system theory, General system thought, System definition, Classification, Characteristics and their comparison.
3	DECISION MAKING PROCESS AND SYSTEM ANALYSIS: The relationship between system analysis and decision making process, The methods applied during decision process.
4	MODELLING FOR SYSTEM ANALYSIS AND REQUIRED TOOLS: The importance of the modelling for system analysis, Model definition and classification, Tools used for system analysis.
5	STAGES OF SYSTEM ANALYSIS: Stages of system analysis, Models built at these stages and their solution methods, Points to be focussed during system analysis studies.
6	SYSTEM FUNCTIONALITY AND CYBERNETIC: System control, The importance of the control for system functionality, Cybernetic.
7	SYSTEM DESIGN: New system design, Design types, Design stages, Application methods of new system design.
8	MIDTERM EXAM I
9	SYSTEM ANALYSIS CASE STUDIES: Case studies in system analysis.
10	SYSTEM ANALYSIS CASE STUDIES: Case studies in system analysis.
11	SYSTEM ANALYSIS CASE STUDIES: Case studies in system analysis.
12	SYSTEM DESIGN CASE STUDIES: Alternative design applications for an analysed system.
13	SYSTEM DESIGN CASE STUDIES: Choosing the best design for the system among alternative designs.
14	MIDTERM EXAM II

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Prof. Dr. Serpil EROL..... Date : 13 / 01 / 2003

<u>ENM 407 QUALITY PLANNING AND CONTROL</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>7</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Compulsory</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Quality. Quality control and total quality system. Online and offline quality control. Quality costs. Quality assurance system. Design of tolerance. Reliability. Statistical process control and process capability analysis. Acceptance sampling.</u>		
<u>Course Objectives</u>	<u>To introduce importance of quality in production and service systems. To teach the techniques related to quality design, planning and control in each step of a production and service system.</u>		
<u>Course Outcomes</u>	<u>To get an ability for using appropriate techniques to solve the problems related to planning, control and improvement of quality in real world.</u>		
Textbook and /or References	1. Mitra, A., (1998), Fundamentals of Quality Control and Improvement, Prentice Hall. (Textbook) 2. Montgomery, C. D., (1997), Introduction to Statistical Quality Control, John Wiley & Sons. 3. Devor, R.E., Chang, T.H., Sutherland, J.W., (1992), Statistical Quality Design and Control: Contemporary Concept and Methods, Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	<i>Midterm Exams</i>	2	40
	Quizzes	-	-
	Homeworks	3	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	40	
	Engineering Design	30	
	Social Sciences	-	
Instructors	Prof.Dr. Fevzi KUTAY, Assoc.Prof. Dr. Fulya ALTIPARMAK		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Quality, Quality characteristics, Quality control, Total quality system.
2	QUALITY MANAGEMENT: Quality costs, Quality assurance system, Continuous improvement.
3	STANDARDS AND SPECIFICATIONS: Description and importance of standards and specifications, National and International Standards, ISO 9000.
4	TOLERANCES: Description, necessary to use of tolerances, Simple and statistical tolerances.
5	RELIABILITY: System reliability and probability distributions in modelling reliability.
6	RELIABILITY: Systems with components in series and parallel, Reliability and life testing plans.
7	MIDTERM EXAM I
8	STATISTICAL PROCESS CONTROL: Statistical process control using control charts.
9	STATISTICAL PROCESS CONTROL: Control charts for mean and range (X and R), for mean and standard deviation (X and σ).
10	STATISTICAL PROCESS CONTROL: Process capability analysis, Control charts for attributes (p, np, c and u).
11	ACCEPTANCE SAMPLING: Introduction, advantage and disadvantages of sampling, Producer's risk and consumer's risk, Operating characteristics curve.
12	ACCEPTANCE SAMPLING: Types of sampling plans, Sampling plans for attributes.
13	MIDTERM EXAM II
14	ACCEPTANCE SAMPLING: Evaluating sampling plans, Sampling plans for variables.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 443 RESEARCH PROJECT		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7	2	2	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	Two of the following :ENM 202, ENM 208, ENM 312, ENM 316, ENM 317, ENM 322		
Catalog Description	Theoratical, experimental and/or computer aided researchs at a certain topic indeks Industrial Engineering		
Course Objectives	To make up theoretival, experimental and/or computer aided research at a certain topic under supervising.		
Course Outcomes	To get an ability of making up theoretival, experimental and/or computer aided research study at a certain.		
Textbook and /or References	(Under supervising of an advisor)		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	-	-
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	Presentation	100
Course Category by Content (%)	Mathematics and Basic Sciences		
	Engineering Science		
	Engineering Design		
	Social Sciences		
Instructors	All members of department		

COURSE PLAN	
Week	Topics
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RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			
2	An ability to design and conduct experiments, as well as to analyze and interpret data			
3	An ability to design a system, component, or process to meet desired needs			
4	An ability to function on multi-disciplinary teams			
5	An ability to identify, formulate, and solve engineering problems			
6	An understanding of professional and ethical responsibility			
7	An ability for effective written and oral communication in Turkish and English			
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			
9	A recognition of the need for, and ability to engage in life-long learning			
10	A knowledge of contemporary issues			
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Department Chairperson..... Date : .02/12/2003

ENM 444 GRADUATION PROJECT		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
8	1	3	0
Language	Turkish		
Compulsory / Elective	Compulsory		
Prerequisites	ENM 443		
Catalog Description	A term project based on synthesizing all the acquired information from Industrial Engineering Programme at a certain topic.		
Course Objectives	To prepare a term project based on synthesizing all the acquired information from Industrial Engineering Programme at a certain topic, on an application of research project (ENM 443).		
Course Outcomes	To get an ability of preparing a term project based on synthesizing all the acquired information from Industrial Engineering Programme at a certain topic, on an application of research project (ENM 443)		
Textbook and /or References	(Under supervising of an advisor)		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	-	-
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	Presentation	100
Course Category by Content (%)	Mathematics and Basic Sciences		
	Engineering Science		
	Engineering Design		
	Social Sciences		
Instructors	All members of department		

COURSE PLAN	
Week	Topics
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RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by: Department Chairperson..... Date : 02/12/2002

ENM 450 DECISION ANALYSIS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Introduction to decision analysis, Structuring decision, Making choices, Decision making under uncertainty, Decision making under risk, Value of information, Utility theory, Sensitivity analysis, Multiple criteria decision making, Game theory.		
Course Objectives	Teaching both modeling and solution methods used in decision problem, introducing the tools that makes the decision better, teaching the decision making techniques under conflicting objectives.		
Course Outcomes	Providing the manager with systematical thinking about hard decision, Serving analytical tools that makes complex decision easier to decision makers' use, Learning the related techniques to make a better decision.		
Textbook and /or References	10.Clemen, R.T., (1996), Making Hard Decisions, , 2 nd edition, PWS-Kent. (Textbook) 11.Holloway, C.A., (1979), Decision Making Under Uncertainty, Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	3	5
	Projects	-	-
	Term Paper	1	5
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	25	
	Engineering Science	45	
	Engineering Design	25	
	Social Sciences	5	
Instructors	Assoc.Prof. Dr. Ömer Faruk BAYKOÇ		

COURSE PLAN	
Week	Topics
1	INTRODUCTION TO DECISION ANALYSIS: Decision analysis process, Elements of decision problem.
2	STRUCTURING DECISION: Influence diagram, Decision tree.
3	MAKING CHOICES: Decision making under uncertainty, Decision making under risk.
4	MAKING CHOICES: Risk profiles, Dominant alternatives.
5	VALUE OF INFORMATION: Prior and posterior probabilities.
6	UTILITY THEORY: Expected utility, Certain equivalent, Risk premium.
7	MIDTERM EXAM I.
8	UTILITY THEORY: Assessment of utility function, Risk tolerance and exponential utility functions.
9	SENSITIVITY ANALYSIS: Two-way sensitivity analysis.
10	SENSITIVITY ANALYSIS: Sensitivity to probabilities, Strategy regions.
11	MULTIPLE CRITERIA DECISION MAKING: Goal programming.
12	MIDTERM EXAM II.
13	MULTIPLE CRITERIA DECISION MAKING: Analytic hierarchy process.
14	GAME THEORY: Two person-zero sum games

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1: None 2: Partially 3: Completely				

Prepared by: Assoc.Prof. Dr. Ömer Faruk BAYKOÇ

Date : 24/09/2002

ENM 451 MATHEMATICAL MODELS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
8	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>The place, significance and kinds of models in mathematical programming. Variable concept and their usage in problems. System concept and its kinds. Optimization concept and its applications. Decision models and their applicabilities. The concept, object and scope of mathematical programming. Linear programming concept, its applications and geometry. Specific linear programming models. Games theory and its applications. Non-linear programming models. Modelling of transportation problems. Dynamic programming models. Queueing models and its applications in industry. Markov Chains and their applications in industry.</u>		
<u>Course Objectives</u>	<u>Examination of concept, contents and properties of the models used in mathematical programming or operations research in the base of theory and application. Review of its applicability in terms of industrial productivity and rantability.</u>		
<u>Course Outcomes</u>	<u>To provide the application abilities of models used in mathematical programming in terms of industrial productivity and rantability.</u>		
<u>Textbook and /or References</u>	1.William, H.P., (1990), Model building in mathematical programming, John Wiley and Sons, Inc., N.Y. (Textbook). 2.Shapiro, J.F., (1979), Mathematical programming: Structures and algorithms, John Wiley and Sons, Inc., N.Y.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	1	5
	Projects	-	-
	Term Paper	1	5
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	25	
	Engineering Science	50	
	Engineering Design	25	
	Social Sciences	0	
Instructors	Prof. Dr. Orhan TÜRKBEY		

COURSE PLAN	
Week	Topics
1	INTRODUCTION TO MODELLING: The place, significance, concept and kinds of models in mathematical programming, Variable concept and their applications in problems.
2	BASIC DEFINITIONS: Variable concept and its use in problems, System concept and its kinds, Optimization concept and its applications.
3	DECISION THEORY: Decision making process and its stages, Decision models and their applicabilities.
4	INTRODUCTION TO MATHEMATICAL PROGRAMMING: The concept, object and scope of mathematical programming.
5	LINEAR PROGRAMMING: Linear programming concept and its application areas and geometry.
6	MIDTERM EXAM I, HOMEWORK I
7	MODELLING: Specific linear programming models.
8	GAMES THEORY: Games concept and game types, application areas and solution methods.
9	NON-LINEAR PROGRAMMING: The definition, concept and application areas of non-linear programming models and their geometry, Models and model related solution methods.
10	TRANSPORTATION PROBLEMS: The definition, concept and application areas of transportation problems and their solution methods.
11	DYNAMIC PROGRAMMING: The definition, concept and application areas of dynamic programming models and their solution methods.
12	MIDTERM EXAM II, HOMEWORK II
13	QUEUEING THEORY: The definition, concept and application areas of queueing theory and its models and solution methods.
14	MARKOV CHAINS: The definition, concept and applications of Markov Chains in industry, their modelling and solution methods.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 452 SERVICE SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Structure of service systems. Design and implementation of service systems. Capacity planning. Aggregate planning and scheduling. Quality in service systems		
Course Objectives	To give general information about the service systems and to teach the solution methods of the problems occurred in service systems in order to increase the service system productivity.		
Course Outcomes	To get an ability for focusing the service systems with perspective of Industrial Engineering and for solving the problems occurred in service systems		
Textbook and /or References	Fitzsimmons, J.A and Fitzsimmons, M.J., (1994), Service Management for Competitive Advantage, McGraw-Hill, Inc., International edition, Singapore. (Textbook)		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	40
	Quizzes	-	-
	Homeworks	4	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	25	
	Engineering Design	15	
	Social Sciences	30	
Instructors	Assoc.Prof.Dr. Hadi GÖKÇEN		

COURSE PLAN	
Week	Topics
1	SERVICES AND THE ECONOMY: The role of services in an economy, Nature of services.
2	SERVICE SYSTEMS: Definitions, Service systems versus manufacturing systems.
3	SERVICE CONCEPT AND COMPETITIVE STRATEGY: Service strategy and market position.
4	SERVICE CONCEPT AND COMPETITIVE STRATEGY: Strategic role of the information resource.
5	STRUCTURING THE SERVICE ENTERPRISE: Service delivery system.
6	STRUCTURING THE SERVICE ENTERPRISE: Service facility design and layout
7	STRUCTURING THE SERVICE ENTERPRISE: Service location
8	MANAGING THE OPERATIONS: Service encounter, Service quality
9	MANAGING THE OPERATIONS: Managing supply and demand, Managing queues.
10	MANAGING THE OPERATIONS: Productivity and quality improvement, Growth and expansion
11	MIDTERM EXAM I
12	QUANTITATIVE MODELS IN SERVICE APPLICATIONS: Forecasting demand for services, Queuing models and capacity planning.
13	QUANTITATIVE MODELS IN SERVICE APPLICATIONS: Queuing models and capacity planning., Linear programming models.
14	QUANTITATIVE MODELS IN SERVICE APPLICATIONS: ., Linear programming models.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Assoc.Prof.Dr. Hadi GÖKÇEN..... Date : 28/11/2002

ENM 453 SCHEDULING		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Scheduling theory. Model characteristics. General purpose scheduling procedures for one machine, parallel machine and multi machine problems (optimization and heuristic methods). Special scheduling problems (such as earliness and tardiness penalties).		
Course Objectives	To define the importance of scheduling function in manufacturing and service industries. To teach and apply basic methods and techniques employed for solving of the scheduling problems.		
Course Outcomes	To get an ability for determining of the scheduling problems occurred in manufacturing and service industries and implementing appropriate techniques to solve the problems.		
Textbook and /or References	1- Baker, K., (1974) , Introduction to Sequencing and Scheduling, John Wiley Sons. (Textbook) 2- Baker, K., (1995)., Elements of Sequencing and Scheduling, Tuck School of Business Administration College, Hanover, NH. 3- Pinedo., M., Chao, X., (1999), Operations Scheduling with Applications in Manufacturing and Services, Mc Graw-Hill. 4- Morton, T.E., Pentico, D.W., (1993) Heuristic Scheduling Systems, with Applications to Productions Systems and Project Management, John Wiley & Sons Inc., 5- French, S., (1982) Sequencing and Scheduling: An Introduction to the Mathematics of the Job-Shop, John Wiley Sons.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	4	5
	Projects	-	-
	Term Paper	1	5
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	40	
	Engineering Science	55	
	Engineering Design	5	
	Social Sciences	0	
Instructors	Associate Prof Dr. Ertan GÜNER, Dr. Ediz ATMACA		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Scheduling theory, its role and impact, the scheduling function in an enterprise.
2	MODEL CHARACTERISTICS: Overview of models, Notation, Machine configurations, Processing characteristics and constraints, Objectives and performance measures.
3	APPROACHES TO SCHEDULING: Overview , Past approaches (manual approaches, computer simulation approaches, mathematical approaches), Newer approaches (intensification/ diversification methods, simulated annealing, genetic algorithms, beam search(partial enumeration), Bottleneck methods, Expert systems, Neural networks, et,)
4	ONE MACHINE PROBLEMS : Single machine: foundations, fundamental propositions, problems without due dates, problems with due dates.
5	OPTIMIZATIONS METHODS FOR SINGLE MACHINE PROBLEM: Enumerations approaches such as dynamic programming, Branch and bound .
6	HEURISTIC METHODS FOR SINGLE MACHINE PROBLEM AND EXTANSIONS Of THE BASIC MODEL: Dispatching and construction procedures, Neighborhood search techniques, Tabu search, Simulated annealing, Sequence-dependent setup times.
7	EARLINESS AND TARDINESS PENALTIES: minimizing deviations from a common due date, The restricted version, Different earliness and tardiness penalties, Quadratic penalties, Job dependent penalties, Distinct due dates.
8	MIDTERM EXAM I.
9	PARALLEL MACHINES: General procedures and herustics for flow time, Makespan and other performance measures.
10	SCHEDULING FLOW SHOPS: Makespan on a two machine , Makespan with more than two machines, Heuristics, Branch and bound approaches.
11	SCHEDULING FLOW SHOPS: Other objectives and extensions.
12	SCHEDULING JOB SHOPS: Basic methods, Exact methods, Search heuristics, Dispatching methods .
13	MIDTERM EXAM II.
14	SCHEDULING JOB SHOPS: Disjunctive programming and branch and bound, The shifting bottleneck heuristic for the makespan and total tardiness.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1: None 2: Partially 3: Completely</i>				

Prepared by: Associate Prof Dr. Ertan GÜNER

Date : 20/09/2002

ENM 454 COMPUTER INTEGRATED MANUFACTURING SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
7-8	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>The concept of computer integrated manufacturing. Automation. Computer aided design and manufacturing (CAD-CAM). Computer aided process planning. Flexible manufacturing systems. PLC, robotics etc.</u>		
<u>Course Objectives</u>	<u>To give some applied information about the changes which is created by the technological improvements and the development of the automation in the manufacturing industry.</u>		
<u>Course Outcomes</u>	<u>To get the ability of designing the transition to automation, establishing the automatic control and operating the modern manufacturing systems with the knowledge of industrial robotic languages.</u>		
Textbook and /or References	1. J. Browne, J. Harhen and J. Shivnan (1996), Production management Systems: An Integrated Perspective, Prentice Hall, 2. T.C. Chang, R.A. Wysk and H.P. Wang (1998), Computer-Aided Manufacturing, prentice Hall, N.J. 3. R. Maleki (1991), FMS: The Technology and Management, Prentice Hall, Englewood Cliffs, N.J. 4. J.R. Powers and H. John (1990), Computer Automated Manufacturing, Glence/McGraw Hill Educational Divisions, Illinois.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	20
	Quizzes	2	5
	Homeworks	5	5
	Projects	-	-
	Term Paper	1	20
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	10	
	Engineering Science	40	
	Engineering Design	50	
	Social Sciences	-	
Instructors	Prof.Dr. Serpil EROL		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: The role of the computers in manufacturing, The concept of automation, Development of automation in manufacturing industry
2	AUTOMATION AND ADVANCED TECHNOLOGIES: Characteristics of NC / CNC / DNC and their comparison, Concepts of CAD / CAM / CAE, CAD and application methods.
3	COMPUTER AIDED MANUFACTURING AND PROCESS PLANNING: CAM, CAE, CAPP.
4	FLEXIBLE MANUFACTURING SYSTEM: Concept of flexibility, Flexibility types and relationship with competitiveness.
5	FLEXIBLE MANUFACTURING SYSTEMS: FMS technology, subsystems of FMS, FMS layout and their comparison with conventional systems.
6	MATERIAL HANDLING SYSTEMS: Material handling systems, Automatic storage / retrieval system types and their comparison.
7	MIDTERM EXAM I.
8	AUTOMATIC CONTROL: Computer control system in FMS, PLC.
9	ROBOTS: Introduction to robot systems, Robot types, Operation of industrial robot systems.
10	ROBOT PROGRAMMING: Teach Pendant Programming and Applications.
11	ROBOT PROGRAMMING: Teach Pendant Programming and Applications.
12	CIM APPLICATIONS: Robot, Material handling system, Machine interaction applications.
13	CIM APPLICATIONS: Robot, Material handling system, Machine interaction applications.
14	MIDTERM EXAM II.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Prof.Dr. Serpil EROL..... Date : 13./ 01./2003.....

ENM 456 INVESTMENT MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
7-8	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Type of investments, The financial markets, The risks of portfolio, Markowitz minimum variance model, The single and multi index models, The arbitrage pricing theory, Measuring portfolio performance.</u>		
<u>Course Objectives</u>	<u>This is a course about the theory of investment management. In addition to the theories, it covers also concepts and principles of investment management. This course provides to the students the tools to enable to manage investment risk, detect misprices securities, minimize taxes, and measure the the performance of investment managements as future managers.</u>		
<u>Course Outcomes</u>	<u>An understanding of investment theory will help to students to get job in financial area after graduation in future. This course also familiarizes the students with the knowledge, roles, responsibilities, and skills required of modern engineers and managers in financial world.</u>		
Textbook and /or References	1. Karan, M. B., (2001), Yatırım Analizi ve portföy Yönetimi, Gazi Kitabevi. (Textbook). 2. Sharpe, W. F., (1982), Investments, Prentice Hall, New Jersey. 3. Akmut, Ö., (1989), Sermaye Piyasası analizleri ve Portföy Yönetimi, Ankara. 4. Haugen, R., (1986), Modern Investment Theory, Prentice Hall, Englewood Cliffs.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	30
	Quizzes	-	-
	Homeworks	1	20
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	20	
	Engineering Design	-	
	Social Sciences	30	
Instructors	Prof. Dr. Zulal GÜNGÖR		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION: Introduction to modern investment theory, The financial market.			
2	BASIC CONCEPTS: Introduction to securities and bonds, Basic definitions of financial market, forward and future contracts.			
3	BASIC CONCEPTS: The simple and marjinal distribution theory, Population of variance, Covariance, the relationship between a stock and the market portfolio.			
4	RISK AND EXPECTED RATE OF RETURN: The risk and expected rate of return of portfolio, Portfolio variance, Combination lines.			
5	PORTFOLIO MANAGEMENT: The relationship between a stock and the market portfolio.			
6	MAXIMUM RETURN: Maximum return for a given risk, Finding the minumum variance set, the critical line.			
7	MIDTERM EXAM I.			
8	THE SINGLE INDEX MODEL: The assumption of the single index –model, Beta factor and resudial variance of a portfolio.			
9	THE CAPITAL ASSET PRICING MODEL (CAPM): Assumption of the capital asset pricing model, Descripton of CAPM, Security market line.			
10	THE ARBITRAGE PRICING MODEL (APT): Deriving the arbitrage pricing theory. The role of APT in financial market.			
11	MEASURING PORTFOLIO PERFORMANCE: The need for risk adjusted performance measures, Measuring performance with the Jensen,Treynor and Sharpe indices.			
12	PRESENTATION OF STUDENT PROJECT:			
13	PRESENTATION OF STUDENT PROJECT:			
14	MIDTERM EXAM II.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by :Prof. Dr. Zülal GÜNGÖR..... Date : 25./09../..2002.....

ENM 457 SIMULATION LANGUAGES		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	ENM 316		
Catalog Description	Modeling with simulation language (SIMAN, etc.), model and experiment frames in SIMAN. Modelling of complex queueing systems and manufacturing systems. Output analysis. Verification and validation of simulation models coded in simulation language. Modeling manufacturing systems with conveyors. Modeling some special industrial systems.		
Course Objectives	To teach the necessary blocks and elements for modelling of complex systems with SIMAN simulation language.		
Course Outcomes	To get an ability for modeling and analysis of a system using SIMAN simulation language and to get an experience with several applications.		
Textbook and References	4. Pegden, C.D., Shannon, R.E., and Sadowski, R.P., (1995), Introduction to Simulation Using SIMAN, 2nd ed., McGraw Hill Inc. (Textbook)		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	25
	Quizzes	2	10
	Homeworks	3	15
	Projects	1	15
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	35
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	40	
	Engineering Design	30	
	Social Sciences	0	
Instructors	Prof.Dr. Berna DENGİZ		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Basic modeling concepts.
2	OUTPUT ANALYSER IN SIMAN AND OUTPUT ANALYSIS: Using output analyser and controlling randomness (SEED Element)
3	STATION SUBMODELS AND ENTITY TRANSFERS: Station concept, Moving between stations (ROUTE Block and STATIONS Element), Control of entity transfers between station submodels (SEQUENCES element)
4	TRANSFERS BETWEEN STATIONS USING TRANSPORTERS: Transporter concept, Allocation and movement of empty transporters, Definition of transporter characteristics (REQUEST, TRANSPORT, FREE, etc. blocks and TRANSPORTERS, DISTANCES elements).
5	TRANSFERS BETWEEN STATIONS USING CONVEYORS: Conveyor concept, Blocks and elements related with conveyors (ACCESS, CONVEY, EXIT Blocks and CONVEYORS, SEGMENTS Elements)
6	ADDITIONAL DISCRETE MODELING CONCEPTS: Generic station submodels, Blocks and elements related with resource failures, Scheduled resource capacity changes (STATESETS, FAILURES, SCHEDULES, etc. Elements, ALTER, SEIZE, SELECT and PREEMPT Blocks)
7	MIDTERM EXAM I
8	ADDITIONAL DISCRETE MODELING CONCEPTS: Blocks related with queues (QUEUES, PICKQ, QPICK, etc. Blocks)
9	ADDITIONAL DISCRETE MODELING CONCEPTS: Blocks related with entity sets (GROUP, SPLIT, etc. Blocks)
10	ADDITIONAL DISCRETE MODELING CONCEPTS: Block and elements in inputting external data and outputting data (READ, WRITE Blocks and REPORTS ve REPORTLINES Elements), Conditional holds (WAIT, SIGNAL Blocks)
11	ADDITIONAL DISCRETE MODELING CONCEPTS: Logical modeling constructs (IF, ELSEIF, etc. Blocks), Some additional experimental controls (ARRIVALS, EXPRESSIONS and TABLES Elements)
12	ADVANCED MANUFACTURING FEATURES: Guided transporters (INTERSECTIONS, LINKS etc. elements)
13	MIDTERM EXAM II
14	ADVANCED MANUFACTURING FEATURES: Guided transporters (TRANSPORT Blok ve REDIRECTS Elements)

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning	X		
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Prof. Dr. Berna DENGİZ

..... Date : .09/10/2002

ENM 459 MAINTENANCE MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Maintenance Politics. Introduction to Repair Maintenance and Preventive Maintenance Sytems and relation of other sytems.		
Course Objectives	Determining the efficient maintenance plans in the firm.		
Course Outcomes	To give Information about maintainence management and to establish effective maintainence politics		
Textbook and /or References	1. Higgns, H., (1987), Maintenance Engineering Handbook, Mc-Graw Hill Book Company (Textbook). 2. Gaither, N. (1990), Production and Operation Management 4 th. Edition, TheDryden Press 3. Render, H.,(2000), Principles of Operations Management, Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	Adet	Yüzde
	Quizzes	2	40
	Homeworks	-	-
	Projects	-	-
	Term Paper	1	10
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	25	
	Engineering Science	50	
	Engineering Design	20	
	Social Sciences	05	
Instructors	Dr. Bahar ÖZYÖRÜK		

COURSE PLAN	
Week	Topics
1	INTRODUCTION TO MAINTENANCE MANAGEMENT: Basic definitions.
2	MAINTENANCE POLICIES: Repair maintenance.
3	MAINTENANCE POLICIES: Preventive maintenance (PM).
4	MAINTENANCE POLICIES: Determining the size of repair crews, Determining the number of standby machines.
5	MAINTENANCE POLICIES: Determining the number of spare parts to carry for PM, Determining the frequency of performing PM.
6	MAINTENANCE POLICIES: Predictive maintenance approach.
7	MIDTERM EXAM I.
8	MAINTENANCE POLICIES: Total productive maintenance (TPM) approach.
9	MAINTENANCE POLICIES : Relation of total quality management and TPM
10	ECONOMIC ANALYSIS IN MAINTENANCE MANAGEMENT: Decisions to renovate
11	RELIABILITY OF SYSTEMS: Reliability for series and parallel connection systems.
12	MIDTERM EXAM II.
13	OPERATIONS RESEARCH TECHNIQUES IN MAINTENANCE MANAGEMENT: Queuing theory
14	PRESENTATION OF PROJECT

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Dr Bahar ÖZYÖRÜK..... Date : .29../.11../.2002.....

ENM 460 PRODUCTION INFORMATION SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
7-8	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>The role of computers and elements of database in production Systems. Manufacturin resource planning (MRPII). Information sytems in Just in time Production (KANBAN). Enterprise resource planning (ERP) .Supply chain management (SCM)</u>		
<u>Course Objectives</u>	<u>Evaluating the planning and financial modules required for production systems and providing the use of production resources effectively.</u>		
<u>Course Outcomes</u>	<u>Setting up the material requirement planning systems and providing the use of bussiness resources effectively.</u>		
Textbook and /or References	1. Browne J., Harhen J., Shıvnen J., (1996), Production Management Systems, Prentice Hall. (Textbook) 2. Heizer J., Render B., (2000), Principles of Operations Management, Prentice Hall. 3. Russel R. S., Taylor M.B.W., (2000), Operations management, Prentice Hall. 4. Orlicky J., (1975), Material Requirement Planning , McGraw-Hill		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	1	10
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	10	
	Engineering Science	65	
	Engineering Design	20	
	Social Sciences	05	
Instructors	Dr. Bahar ÖZYÖRÜK		

COURSE PLAN	
Week	Topics
1	DESCRIPTION OF PRODUCTION SYSTEMS.
2	MATERIAL REQUIREMENT PLANNING (MRP) : Demand characteristics for products and Their Components
3	MATERIAL REQUIREMENT PLANNING: Master production scheduling and bill of materials Informations.
4	MATERIAL REQUIREMENT PLANNING : Process of MRP.
5	MATERIAL REQUIREMENT PLANNING : Lot sizing techniques in MRP systems.
6	MIDTERM EXAM I.
7	MANUFACTURING RESOURCE PLANNING (MRP II) : The evaluation of MRP and MRPII.
8	MANUFACTURING RESOURCE PLANNING: MRP II Database.
9	CAPACITY REQUIREMENT PLANNING (CRP): The calculation of load profile for machines.
10	JUST IN TIME PRODUCTION SYTEMS (JIT): Just in time production sytems and comparison of MRP.
11	MIDTERM EXAM II.
12	ENTERPRISE RESOURCE PLANNING (ERP): Introduction and database.
13	PRODUCTIN INFORMATIN SYSTEMS: Production information sytems and database.
14	THE PRESENTATION OF PROJECTS.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : ..Dr. Bahar ÖZYÖRÜK..... Date : ..29/11/2002.....

ENM 461 EXPERT SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Expert system definition. Development, basic components. Development phases. Expert systems development tools. Related softwares and applications.		
Course Objectives	To learn expert system definition. Learn to development, basic components and development phases. To teach expert systems development tools and related softwares and applications.		
Course Outcomes	Learning expert system definition, development, basic components and development phases. Teaching expert systems development tools and related softwares and applications.		
Textbook and /or References	1. Potter, D., Ali, M., Matthews, M., (1997), Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, Gordon and Breach Pub. (Textbook) 2. Wallace, W.A., Grabowski, M., (1993), Advances in Expert Systems for Management, Jai Press. 3. Sillince, J., (1997), Business Expert Systems, Financial Times/Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	20	
	Engineering Science	25	
	Engineering Design	55	
	Social Sciences	0	
Instructors	Dr. M. Ali AKCAYOL		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Introduction to expert systems. Expert system architecture. Expert system generations.
2	KNOWLEDGE REPRESENTATION METHODS: Knowledge representation by production rules. Frames, semantic networks.
3	KNOWLEDGE ORGANIZATION: Database preparation, Relationship of the objects preparation, Data acquire.
4	EXPERT SYSTEM STRUCTURE: Rule base, Inference engine, User interface.
5	EXPERT SYSTEM DESIGN: Design phases, Using heuristic, Based on rules expert systems design.
6	EXPERT SYSTEM DESIGN: Forward chaining algorithm. Backward chaining algorithm.
7	MIDTERM EXAM I
8	FUZZY LOGIC: Fuzzy logic terminology, Fuzzy logic and using on knowledge systems. Membership functions creation.
9	FUZZY LOGIC: Rule base creation. Inference engines, Obtain crisp values.
10	ARTIFICIAL NEURAL NETWORKS: Artificial neural network terminology, Artificial neural network and using on the knowledge systems.
11	ARTIFICIAL NEURAL NETWORKS: Using artificial neural network on the Expert systems, training methods.
12	MIDTERM EXAM II
13	EXAMPLES OF EXPERTS SYSTEM DESIGN: Obtain expert person knowledge for an application, Preparation user interface.
14	EXAMPLES OF EXPERTS SYSTEM DESIGN: Obtain expert person knowledge for an application, Preparation user interface.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data			X
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context	X		
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

ENM 462 FUZZY SETS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
7-8	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Introduction to fuzzy sets. Fuzzy sets and basic definitions. Extensions. Fuzzy measures and measures of fuzziness. The extension principle and applications. Fuzzy relations and fuzzy graphs. Fuzzy analysis. Possibility theory, probability theory, and fuzzy set theory. Fuzzy logic and approximate reasoning. Pattern recognition. Decision making in fuzzy environments. Fuzzy set models in operations research. Empirical examining in fuzzy set theory.		
<u>Course Objectives</u>	<u>Examination of concept, contents and properties of fuzzy set theory included in artificial intelligence algorithms in the base of theory and application. Review of its applicability in terms of industrial productivity and rantability and to provide abilities about artificial intelligence algorithms for the applicants.</u>		
<u>Course Outcomes</u>	<u>Investigation of the applicability of the fuzzy set theory, included in artificial intelligence algorithms, on mathematical programming scope in industry.</u>		
<u>Textbook and /or References</u>	1.Zimmermann, H.-J., (1996), Fuzzy Set Theory-and Its Applications 2 nd , revised ed., Kluwer Academic Pub., Boston (Textbook). 2.Klir, G.J., St.Clair, U. and Yuan, B., (1997), Fuzzy Set Theory: Foundations and applications, Prentice Hall, Inc., N.J. 3.Zimmermann, H.-J., (1987), Fuzzy Sets, Decision Making, and Expert Systems, Kluwer Academic Pub., Boston. 4.Chen, Shu-Jen, Hwang, Chin-Lai, (1992), Fuzzy Multiple Attribute Decision Making, Springer-Verlag, Berlin. 5.Terano, T., Asai, K. and Sugeno, M., (1992), Fuzzy Systems Theory and Its Applications, Academic Press, Inc., Boston.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	-	-
	Homeworks	1	5
	Projects	-	-
	Term Paper	1	5
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	20	
	Engineering Science	40	
	Engineering Design	40	
	Social Sciences	0	
Instructors	Prof. Dr. Orhan TÜRKBEY		

COURSE PLAN				
Week	Topics			
1	INTRODUCTION TO FUZZY SETS: Crispness, Vagueness, Fuzziness, Preciseness and Uncertainty, Fuzzy set theory.			
2	FUZZY SETS AND BASIC DEFINITIONS: Basic definitions, Basic set-theoretic operations for Fuzzy sets.			
3	EXTENSIONS: Types of Fuzzy sets, Further operations on fuzzy sets.			
4	FUZZY MEASURES AND MEASURES OF FUZZINESS: Fuzzy measures, Measures of fuzziness.			
5	THE EXTENSION PRINCIPLE AND APPLICATIONS: Extension principle, Operations for type 2 fuzzy sets, Algebraic operations with fuzzy numbers.			
6	MIDTERM EXAM I, HOMEWORK I			
7	FUZZY RELATIONS AND FUZZY GRAPHS: Fuzzy relations on sets and fuzzy sets, Fuzzy graphs, Special fuzzy relations.			
8	FUZZY ANALYSIS: Fuzzy functions on fuzzy sets, Extrema of fuzzy functions, Integration of fuzzy functions, Fuzzy differentiation.			
9	POSSIBILITY THEORY, PROBABILITY THEORY, AND FUZZY SET THEORY: Possibility theory, Probability of fuzzy events, Possibility vs. probability.			
10	FUZZY LOGIC AND APPROXIMATE REASONING: Linguistic variables, Fuzzy logic, Approximate reasoning, Fuzzy languages, Support logic programming.			
11	PATTERN RECOGNITION: Models for pattern recognition, Fuzzy clustering.			
12	MIDTERM EXAM II, HOMEWORK II			
13	DECISION MAKING IN FUZZY ENVIRONMENTS: Fuzzy decisions, Fuzzy linear programming, Fuzzy dynamic programming, Fuzzy multi criteria analysis.			
14	FUZZY SET MODELS IN OPERATIONS RESEARCH: Fuzzy set models in logistics, Fuzzy set models in production control and scheduling, Fuzzy set models in inventory control, A discrete location model.			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : Prof. Dr. Orhan TÜRKBEY..... Date : .11./12../2002

ENM 463 QUALITY MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Basic principles of Total Quality Management, Motivation, Satandardization and Quality-Enviromental Management Systems,Leadership, Teamwork, Quality circles, Time management, Cost quality, Benchmarking, System approach.		
Course Objectives	To provide the industrial engineering student with a conceptual understanding of total quality management and quality-enviromental management systems.		
Course Outcomes	To provide the industrial engineering student with leadership, teamwork, etc.		
Textbook and /or References	1. Ishikawa, K., (1997), Toplam Kalite Kontrol, Kalder Yayınları. 2. Yenersoy, G., (1997), Toplam Kalite Yönetimi, Rota Yayınları. 3. ISO 9001 For Engineers and Designers, McGraw-Hill, 1997...		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	30
	Quizzes	2	10
	Homeworks	-	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	50	
	Engineering Design	0	
	Social Sciences	20	
Instructors	Prof.Dr. Fevzi KUTAY, Dr. Mahmut ÖZDEMİR		

COURSE PLAN	
Week	Topics
1	BASIC TERMS AND DEFINITIONS OF TOTAL QUALITY MANAGEMENT
2	BASIC PRINCIPLES OF TOTAL QUALITY MANAGEMENT
3	MOTIVATION
4	QUALITY LEADERSHIP
5	TEAMWORK
6	QUALITY CIRCLES
7	TIME MANAGEMENT / MIDTERM EXAM I
8	METROLOGY AND MANAGEMENT
9	ACCREDITATION
10	COST OF QUALITY
11	BENCHMARKING
12	ISO 9000 SERIES STANDARDS AND QUALITY MANAGEMENT SYSTEMS
13	ISO 14000 SERIES STANDARDS AND ENVIROMENTAL MANAGEMENT SYSTEMS / MIDTERM EXAM II
14	SYSTEM APPROACH

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1: None 2: Partially 3: Completely				

Prepared by: Dr. Mahmut ÖZDEMİR

Date : 10.01.2003

ENM 464 DECISION SUPPORT SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	Information systems. The concept of decision support systems. Decision support system components. Data and model management. Group and organizational decision support systems. Artificial Intelligence and Expert systems. Data warehousing and Datamining. Case Studies.		
Course Objectives	To give general information about information technologies and its trends and decision support systems (DSS). To teach DSS development tools and methodologies and to prepare an DSS project about manufacturing and service systems.		
Course Outcomes	Understanding of information about DSS. Gaining knowledge of how a new DSS will be developed, and understanding a DSS developed.		
Textbook and /or References	1. Turban,E., Aronson, J.E., (2000), Decision Support Systems and Intelligent Systems (6th Edition), Prentice Hall.(Textbook) 2. Marakas, G.M., (1999), Decision Support Systems In The 21st Century, Prentice Hall, Upper Saddle River, New Jersey. 3. Olson, D.L., Courtney, J.F. (1992), Decision Support Models And Expert Systems, Macmillan Publishing Company, New York.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	35
	Quizzes	-	-
	Homeworks	-	-
	Projects	1	15
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	20	
	Engineering Science	40	
	Engineering Design	15	
	Social Sciences	25	
Instructors	Assoc.Prof.Dr. Hadi GÖKÇEN		

COURSE PLAN	
<u>Week</u>	Topics
1	INTRODUCTION TO DECISION SUPPORT SYSTEMS: Definition and history of decision support systems (DSS). Ingredients of DSS. Data and model management. DSS knowledge base. User interfaces. Categories and classes of DSS.
2	THE DECISION MAKER AND DECISIONS IN THE ORGANIZATION: Decision makers, Decision styles, Decision effectiveness, Decision effect of DSS, Understanding the organization, Organizational culture, Power and politics.
3	DECISION MAKING PROCESS: Difficulty of decision making, Typology of decisions, Decision theory, Rational decision making, Bounded ratioanality, The process of choice, Cognitive processes, Biases and heuristics in decision making, Effectiveness and efficiency.
4	MODELING THE DECISION PROCESSES: Defining the problem and its structure, Decision models, Types of probability, Techniques for forecasting probabilities, Calibration and sensitivity.
5	GROUP DECISION SUPPORT AND GROUPWARE TECHNOLOGIES: Group decision making, The problem with groups, Multiparticipant decision making(MDM) support technologies, Managing MDM activities.
6	EXECUTIVE INFORMATION SYSTEMS: What exactly is an executive information systems(EIS)? History of EIS, Why are top executives so different? EIS components, Making the EIS work, The future of executive decision making and the EIS.
7	EXPERT SYSTEMS AND ARTIFICIAL INTELLIGENCE: The concept of expertise, The intelligence of artificial intelligence, The concepts and structure of expert systems, Designing and building expert systems, Evaluating the benefits of expert systems.
8	THE DATA WAREHOUSE: Stores and warehouses, The data warehouse architecture, Metadata, Metadata extraction, Implementing the data warehouse, Data warehouse technologies, The future of data warehousing.
9	DATA MINING AND DATA VISUALIZATION: What is data mining? On-line analytical processing, Techniques used to mine the data, Current limitations and challenges to data mining, Data visualization, Software technologies.
10	DESIGNING AND BUILDING DECISION SUPPORT SYSTEMS: Strategies for DSS analysis and design, The DSS developer, Tools for DSS development.
11	MIDTERM EXAM I
12	IMPLEMENTING AND INTEGRATING DECISION SUPPORT SYSTEMS: DSS implementation, System evaulation, The importance of integration.
13	CREATIVE DECISION MAKING AND PROBLEM SOLVING: What is creativity? Creative problem-solving techniques. Intellegent agents in decision support.
14	DISCUSSION ON DECISION SUPPORT SYSTEM PROJECT:

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Assoc.Prof.Dr. Hadi GÖKÇEN Date : .../.../.....

<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>7-8</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Reliability concept. Reliability measures (Reliability function, Hazard function). Static reliability models. Dynamic reliability models. Reliability design examples. Reliability optimization.</u>		
<u>Course Objectives</u>	<u>To introduce importance of reliability in engineering applications. To teach methods used in calculation and optimization of system reliability.</u>		
<u>Course Outcomes</u>	<u>To get an ability for using appropriate methods to calculate and optimize of system reliability.</u>		
Textbook and /or References	1. Kuo, W., Prasad, V. J. R., Tillman, F., Hwang, C.L., 2001, Optimal Reliability Design: Fundamentals and Applications, Cambridge University Press. 2. Elsayed, E. A., 1996, Reliability Engineering, Prentice Hall. 3. Kapur, K.C., Lamberson, L.R., 1977, Reliability in Engineering Design, John Wiley & Sons.		
Assessment Criteria		Quantity	Percentage
	<i>Midterm Exams</i>	2	35
	Quizzes	-	-
	Homeworks	5	15
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	60	
	Engineering Science	25	
	Engineering Design	15	
	Social Sciences	0	
Instructors	Prof.Dr. Fevzi Kutay, Prof.Dr. Berna Dengiz, Assoc.Prof.Dr. Fulya Altıparmak		

COURSE PLAN	
<u>Week</u>	Topics
1	INTRODUCTION: Basic concepts, Reliability function, Failure rate and Hazard function.
2	HAZARD MODELS: Constant Hazard function, Linearly Increasing Hazard Function, Piecewise Linear Bathtub Hazard Function, Exponential model, Estimating the reliability, Failure Density Function and Hazard Function from empirical data.
3	STATIC RELIABILITY MODELS: Series system, Parallel system, Series and Parallel Combinations, Complex system analysis, Reliability considerations in design
4	PROBABILISTIC ENGINEERING DESIGN: Probabilistic design methodology, Safety factors and reliability, Reliability bounds in probabilistic design.
5	DYNAMIC RELIABILITY MODELS: Series system and related models, Parallel System Models, System effectiveness measures.
6	RELIABILITY ESTIMATION WITH EXPONENTIAL DISTRIBUTION: Data analysis, Estimation of mean life, Confidence interval for the mean time, Hypothesis testing concerning the minimum life and the mean life.
7	MIDTERM EXAM I
8	RELIABILITY ESTIMATION WITH WEIBULL DISTRIBUTION: Statistical properties of weibull distribution, Graphical estimation, Statistical estimation procedures.
9	SEQUENTIAL LIFE TESTING: The theory of sequential testing, The sequential testing procedure.
10	OPTIMIZATION TECHNIQUES FOR SYSTEM RELIABILITY: System models, Optimization techniques used to determine the optimal system reliability, Heuristic methods for optimal system reliability (Sharma and Venkateswaran's Approach, Aggarwal's Approach, etc.).
11	OPTIMIZATION TECHNIQUES FOR SYSTEM RELIABILITY: Optimization of system reliability using dynamic programming.
12	OPTIMIZATION TECHNIQUES FOR SYSTEM RELIABILITY: Optimization of system reliability using linear and integer programming.
13	MIDTERM EXAM II
14	DETERMINATION OF COMPONENT RELIABILITY: Statement of the problem, Optimization procedure.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning	X		
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1:None 2:Partially 3:Completely</i>				

Prepared by : Prof. Dr. Berna Dengiz, Assoc.Prof.Dr. Fulya Altıparmak

Date : 09/10/2002

ENM 466 INTERNATIONAL FINANCE		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8.	3	0	0
Language	Turkish		
Compulsory / Elective	Elective		
Prerequisites	None		
Catalog Description	International monetary system, international monetary fund (IMF) and international finance, balance of payment, behavior of foreign exchange market, international accounting measures of foreign exchange, parity conditions, theory on foreign exchange parity conditions, forward foreign exchange markets, foreign direct investments, Forward looking market instruments: Swaps.		
Course Objectives	This course covers concepts and principles of contemporary international finance. The objective is to familiarize the students with the concept of financial world and financial market and thereby prepare them for their roles in future organizations.		
Course Outcomes	The material covered in this class will be relevant to students which they will be occupied as managers, but regardless of their occupation, they can take benefit by studying international finance in any occupation they choose. They also better understand the financial world market and take benefit for their own financial lives.		
Textbook and /or References	1. Seyidoğlu, H., (2000), Uluslararası Finans, 3. baskı, Güzem yayınları. (Textbook). 2. Levi, M. D., (1990), International Finance, 2.nd. Ed., McGraw-Hill, 1990. 3. Rodrigez R. M., and Carter, E., (1996) International Finance Management, 3 rd ed. Prentice-Hall..		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	30
	Quizzes	-	-
	Homeworks	1	20
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	60	
	Engineering Science	10	
	Engineering Design	-	
	Social Sciences	30	
Instructors	Prof. Dr. Zülal GÜNGÖR		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Introduction to international monetary system, Introduction to financial markets and institutions, Gold standard, Fluctuating exchange rate system, Fixed exchange rate system: Bretton Woods, Mixed exchange rate system.
2	INTERNATIONAL MONETARY FUND (IMF): International liquidity, Regulating the quantity of money, International lending and crisis, International Monetary Fund (IMF), and the role of IMF.
3	BALANCE OF PAYMENT: Balance Payment accounting, Effects on exchange rates.
4	FOREIGN EXCHANGE: Foreign exchange risk, Exchange rate determination.
5	TYPE OF EXCHANGE RATE DETERMINATIONS: Absolute purchasing power parity, Relative purchasing power parity.
6	INFLATION RATES: International Fisher effect, Formulation of international Fisher effect.
7	MIDTERM EXAM I
8	FOREIGN EXCHANGE FUTURES AND OPTIONS: Organization and mechanics of futures trading, The pricing of futures contracts.
9	INTERNATIONAL PAYMENT METHODS: Banker's acceptance, forfaiting, counter trade.
10	PRESENTATION OF STUDENT PROJECT:
11	PRESENTATION OF STUDENT PROJECT:
12	PRESENTATION OF STUDENT PROJECT:
13	PRESENTATION OF STUDENT PROJECT:
14	MIDTERM EXAM II.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English			X
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by : .Prof. Dr. Zülal GÜNGÖR..... Date : 1.../10.../2002.....

ENM 467 INVENTORY MANAGEMENT		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
7-8	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>English</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	Basic inventory systems. Multi-item joint replenishment models. Inventory management under risk. Aggregate inventory management. Distribution inventory management.		
<u>Course Objectives</u>	To provide the industrial engineering student with a conceptual understanding of <u>inventory management in solving real-life problems,</u>		
<u>Course Outcomes</u>	To accomplish the organization's mission by using the manufacture resource of a <u>firm in the most efficient and effective ways possible.</u>		
Textbook and /or References	1. Narashimhan, S.L, McLeavey, D.W., Billington, P.J., (1995), Production Planning and Inventory Control, 2 nd . ed., Prentice Hall, (Textbook) 2. Johnson, L.A., Montgomery, D.C., (1974), Operations Research in production Planning, Scheduling, and Inventory Control, John Wiley and Sons, Inc.		
Assessment Criteria		Quantity	Percentage
	<i>Midterm Exams</i>	2	35
	Quizzes	4	16
	Homeworks	-	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	44
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	50	
	Engineering Design	20	
	Social Sciences	0	
Instructors	Prof. Dr. Bilal TOKLU		

COURSE PLAN				
Week	Topics			
1	BASIC INVENTORY SYSTEMS Definitions, Functions of inventory systems, Generalized inventory model, Types of inventory policies,			
2	BASIC INVENTORY SYSTEMS: Deterministic Single-Item Models: Economic order quantity model, Production rate model, EPQ and Just in time, All unit discount model			
3	BASIC INVENTORY SYSTEMS: Incremental Discount model, EPQ and shortages model, Periodic inventory systems			
4	BASIC INVENTORY SYSTEMS : Dynamic Models. Periodic review lot-size problems, Forward algorithm- backlogging permitted			
5	MULTI-ITEM JOINT REPLENISHMENT MODELS Deterministic Multi-Item Models: Economies of joint replenishment, Joint replenishment order quantity model, Joint replenishment order model with varying item cycle			
6	MULTI-ITEM JOINT REPLENISHMENT MODELS: Brown's algorithm, Silver's algorithm, Kaspi and Rosenblatt algorithm			
7	INVENTORY MANAGEMENT UNDER RISK: Joint replenishment production quantity model, Introduction to probabilistic inventory systems, Single period model			
8	MIDTERM EXAM I			
9	INVENTORY MANAGEMENT UNDER RISK: Service level and safety stock, Percent order service, Safety stock and multiperiod case			
10	INVENTORY MANAGEMENT UNDER RISK: Percent unit service, Safety stock, Backorder or Lost sale case			
11	INVENTORY MANAGEMENT UNDER RISK: Joint determination of Q and R, Lead time adjustments, Lead time variability, Time-varying demand, Anticipated price increases			
12	AGGREGATE INVENTORY MANAGEMENT: LIMIT, Lagrange multipliers			
13	MIDTERM EXAM II			
14	DISTRIBUTION INVENTORY MANAGEMENT: Definition of multilocation systems, Industrial dynamics, Centralization of inventories, Distribution inventory systems			
RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1: None 2: Partially 3: Completely				

<u>ENM 468 SPECIAL TOPICS IN INDUSTRIAL ENGINEERING</u>		<u>INDUSTRIAL ENGINEERING DEPARTMENT</u>	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
<u>7-8</u>	<u>3</u>	<u>0</u>	<u>0</u>
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	<u>Investigation of selected some specific industrial engineering topics.</u>		
<u>Course Objectives</u>	<u>To give detail informations about assembly lines and to teach some methods used in solving engineering problems occurred in these lines.</u>		
<u>Course Outcomes</u>	<u>To get an ability for solving the problems of assembly line designed in various types in industry.</u>		
Textbook and /or References	1. Askin, R.G. and Standridge, C.R., (1993), Modelling and Analysis of Manufacturing Systems, John Wiley and Sons, Inc. (Textbook) 2. Scholl, A., (1999), Balancing and Sequencing of assembly Lines, 2 nd ed., Physica Verlag		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	40
	Quizzes	-	-
	Homeworks	2	10
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	60	
	Engineering Science	30	
	Engineering Design	10	
	Social Sciences	0	
Instructors	Assoc.Prof.Dr. Hadi GÖKÇEN		

COURSE PLAN	
Week	Topics
1	PRODUCTION SYSTEMS: Job-shop, Batch production, Mass production, Transfer lines.
2	ASSEMBLY LINES: Terminology and definitions, Single model assembly lines, Multi model assembly lines, Mixed model assembly lines.
3	ASSEMBLY LINE BALANCING PROBLEM: Pre-Computations for assembly line balancing (ALB), Classification of ALB problems, Complexity in ALB problems.
4	SINGLE MODEL DETERMINISTIC ASSEMBLY LINE BALANCING PROBLEM, HEURISTIC METHODS: Kilbridge and Wester Method, COMSOAL Method.
5	SINGLE MODEL DETERMINISTIC ASSEMBLY LINE BALANCING PROBLEM, HEURISTIC METHODS: RPWT Method.
6	SINGLE MODEL DETERMINISTIC ASSEMBLY LINE BALANCING PROBLEM, OPTIMAL METHODS: Integer programming model, Shortest route model, Goal programming model.
7	SINGLE MODEL STOCHASTIC ASSEMBLY LINE BALANCING PROBLEM: General definitions related to stochastic ALB problem, Cost based balancing.
8	MULTI MODEL DETERMINISTIC ASSEMBLY LINE BALANCING PROBLEM: General definitions related to multi model ALB problem, Model sequencing methods.
9	MIDTERM EXAM I
10	MIXED MODEL DETERMINISTIC ASSEMBLY LINE BALANCING PROBLEM, HEURISTIC AND OPTIMAL METHODS: General definitions related to mixed model ALB problem, RPWT method for mixed model ALB problem, Integer programming model, Model sequencing methods.
11	U SHAPED (TYPE) ASSEMBLY LINES: Terminology and definitions, U shaped ALB problem.
12	U SHAPED ASSEMBLY LINES, HEURISTIC AND OPTIMAL METHODS:U-COMSOAL Method, U-RPWT method.
13	U SHAPED ASSEMBLY LINES, HEURISTIC AND OPTIMAL METHODS: Integer programming model, Dynamic programming model.
14	DISCUSSION

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English	X		
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course : 1:None 2:Partially 3:Completely				

Prepared by: Assoc. Prof.Dr. Hadi GÖKÇEN..... Date : ..30/12/2002

ENM 469 SPECIAL TOPICS IN OPERATIONS RESEARCH		INDUSTRIAL ENGINEERING DEPARTMENT	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7-8	3	0	0
Language	English		
Compulsory / Elective	Selective		
Prerequisites	None		
Catalog Description	Investigation of selected some specific operation research topics.		
Course Objectives	Investigation and development of analysis and modeling of medium-sized decision problems.		
Course Outcomes	Conception of the techniques and approaches of the operations research by means of various real life decision problems.		
Textbook and /or References	12.Taha, H., (2003), An Introduction to Operations Research, 7 th Ed., Prentice Hall. (Textbook) 13.Winston, W.L., (1993), An Introduction to Operations Research, 3 rd Ed., McGraw Hill. 14.Rardin, R., (1998), Optimization in Operations Research, Prentice Hall.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	35
	Quizzes	2	10
	Homeworks	2	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	90	
	Engineering Science	10	
	Engineering Design	0	
	Social Sciences	0	
Instructors	Assist. Prof. Dr. Mehmet ATAĞ		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Descriptionsdecision making and problem solving.
2	OPTIMIZATION: A fast review of the topics of Operations Research I .
3	OPTIMIZATION: A fast review of the topics of Operations Research II.
4	MODELING: Modeling of problems of various applications.
5	ANALYSIS: Analysis and interpretation of the results of run the problems being modelled.
6	MIDTERM EXAM I.
7	REVISED SIMPLEX METHOD: Matrix solution version of the linear programming problems.
8	REVISED SIMPLEX - SENSITIVITY: Carrying out all type of post-optimality analysis by means of the matrix computations of the Simplex Method.
9	REVISED-DUAL-SIMPLEX METHOD: Solution of the optimal but infeasible problems by means of the matrix computations.
10	PARAMETRIC OPTIMIZATION: Optimization when the funtions are parameterized.
11	PARAMETRIC OPTIMIZATION: Post-optimality analysis when the funtions and the RHS of constraints are parameterized.
12	MIDTERM EXAM II.
13	CONSTRAINED VARIABLES: Modeling and optimization when varaibles are restricted.
14	CONSTRAINED VARIABLES: Modeling and optimization when varaibles are restricted.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems		X	
6	An understanding of professional and ethical responsibility	X		
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	
Contribution of the course: 1: None 2: Partially 3: Completely				

Prepared by: Assist.Prof.Dr. Mehmet ATAĞ

Date: 16/09/2002

ENM 470 SPECIAL TOPICS IN MODERN MANUFACTURING SYSTEMS		INDUSTRIAL ENGINEERING DEPARTMENT	
<u>Semester</u>	<u>Credit Structure</u>		
	<u>Lecture</u>	<u>Recitation</u>	<u>Laboratory</u>
7-8	3	0	0
<u>Language</u>	<u>Turkish</u>		
<u>Compulsory / Elective</u>	<u>Elective</u>		
<u>Prerequisites</u>	<u>None</u>		
<u>Catalog Description</u>	This course is designed to promote interest in modern manufacturing systems. Various papers and references are presented and discussed related to these areas.		
<u>Course Objectives</u>	To promote interest in modern manufacturing systems. To present various papers and references related to Cellular Manufacturing Systems, Automated Material Handling-Storage Systems, Robotic Systems, FMS and CIM. To discuss state-of-the-art papers.		
<u>Course Outcomes</u>	Learning the latest topics and methods in manufacturing systems. To get an ability for implementing proper methods to solve the problems occurred in these areas.		
Textbook and /or References	1. Singh, N., (1996), System Approach to Computer- Integrated Design and Manufacturing, John Wiley Sons. (Textbook) 2. Groover, M., (2001), Automation, Production Systems and Computer- Integrated Manufacturing, Prentice Hall. 3. Rembold, U., Nnaji, B.O., Storr, A., (1993), Computer Integrated Manufacturing and Engineering, Addison-Wesley . 4. Jones, B., (1990), Elements of Industrial Robotics, Pitman Publishing		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	1	20
	Quizzes	-	-
	Homeworks	2	5
	Projects	1	25
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	35	
	Engineering Science	45	
	Engineering Design	20	
	Social Sciences	0	
Instructors	Assoc. Prof.Dr.. Ertan GÜNER		

COURSE PLAN	
Week	Topics
1	INTRODUCTION: Design and manufacturing: a historical perspective, Changing concepts of manufacturing management
2	CONCURRENT ENGINEERING: What is Concurrent engineering?, Sequential engineering versus concurrent engineering, Mathematical model for understanding interactions between design and manufacturing, Difficulties associated with performing concurrent engineering, concurrent engineering techniques.
3	COMPUTER CONTROL OF MANUFACTURING SYSTEMS: Automation, numerical control, Programming for numerical control, Adaptive kontrol, Sensor technology.
4	MATERIAL HANDLING SYSTEMS: Overview of material handling equipment; the 10 principles of material handling, Industrial trucks, Automated guided vehicle systems, Conveyor systems, Analysis of material transport systems.
5	WAREHOUSING: STORAGE AND RETRIEVAL SYSTEMS AND IDENTIFICATION TECHNOLOGIES: Storage system performance, Storage location strategies, Automated storage systems, Overview of automatic identification methods, Bar code technology, Other automatic data capture.
6	ROBOTIC SYSTEMS: Fundamentals of robotics and robotics technology, Rbotic joints, Robot classification robot motion analysis , Robot applications , Sequencing of robot moves in robotic cells.
7	JUST IN TIME MANUFACTURING: Toyoto production system, Pull versus push system, Types of kanbans, Kanban planning and control models, Signal kanban, JIT purchasing, Potential benefits of JIT implementation.
8	MIDTERM EXAM I,
9	GROUP TECHNOLOGY AND CELLULAR MANUFACTURING SYSTEMS: What is Group technology, design attributes and manufacturing features, GT implementation, Visual inspection method, Coding methods, the OPITZ sınıflandırma sistemi, Part family formation: Claddification and coding system, Selection of classification and coding systems, Benefits of group technology.
10	GROUP TECHNOLOGY AND CELLULAR MANUFACTURING SYSTEMS: What is cellular manufacturing?, Cell formation approaches: machine-compenent group analysis, Similarity coefficient-based approaches, Exceptional parts and bottleneck machines, Evaluation of cell designsn , Mathematical programming models, Production planning and control in cellular manufacturing systems, An integrated GT and MRP framework..
11	FLEXİBLE MANUFACTURİNG SYSTEMS, COMPUTER INTEGRATED MANUFACTURING: Basic features of physical and control components of an FMS, Operational problems in FMS, Introduction to CIM and enterprise-wide integration.
12	FUTURE DIRECTIONS ON MANUFACTURING SYSTEMS: Knowledge-based manufacturing management, Overview of basic principles and techniques of knowledge representation..
13	MIDTERM EXAM II
14	FUTURE DIRECTIONS ON MANUFACTURING SYSTEMS: A state of the art survey on current and future directions of manufacturing technology.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering		X	
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams			X
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			X
<i>Contribution of the course : 1: None 2: Partially 3: Completely</i>				

Prepared by: Associated Dr. Ertan GÜNER

Date : 20/09/2002