ABDULLAH GÜL UNIVERSITY
GRADUATE SCHOOL OF ENGINNERING & SCIENCE
INDUSTRIAL ENGINEERING DEPARTMENT
COURSE DESCRIPTION AND APPLICATION INFORMATION

Course Name	Code	Semester	T+P (Hour)	Credit	ECTS
Linear Programming	IE 513	Fall - Spring	3 + 0	3	10

Prerequisites	IE 511 Modelling and Optimization or equivalent

Course Type	Elective
Course Language	English
Course Coordinator	Assoc. Prof. İbrahim Akgün
Course Instructor	Assoc. Prof. İbrahim Akgün
Course Assistant	-
Course Objective	The aim of the course is to teach theory, algorithm and solving methods of linear programming.
Course Learning Outcomes	A student who successfully completes this course, 1. Models various problems encountered in real-world applications as linear programming and network flow problem, 2. Applies the (network) simplex algorithm and other conventional techniques to solve linear programming models 3. Analyze a linear programming model mathematically (polyhedral theory, duality, optimality conditions, level of complexity) 4. Apply decomposition techniques for large-scale problems with a specific structure, 5. Apply interior point methods developed for linear programming, 6. Having ability to code and solve Mathematical models on optimization package programs and/or general software.
Course Content	• Modeling linear programming problems • Mathematical analysis of linear programming (polyhedral theory, duality, optimality conditions, level of complexity) • Network flow models • Simplex algorithm and its variations • Decomposition techniques • Interior point methods

WEEKLY SUBJECTS AND RELATED PRELIMINARY PREPARATION PAGES

Week	Subjects	Preliminary
1	Linear Programming Models	
2	Linear Programming Models	
3	Simplex method	
4	Simplex method	
5	Duality and Sensitivity analysis	
6	Duality and Sensitivity analysis	
7	Decomposition methods	
8	Decomposition methods	
9	Network flow models	
10	Network flow models	
11	Network flow models	
12	Network flow models	
13	Interior point methods	
14	Interior point methods	
15	Project Presentation	
16	Final Exam	

SOURCES

Lecture Notes	Lecture notes and slides of the course will be shared with students during the semester via CANVAS system.
Other Sources	**Textbook:**

	Bazaraa, M.S., Jarvis, J.J., Sherali, H.D. Linear Programming and Network Flows, John Wiley and Sons, 2010. **Supplementary Textbooks:** 1. Bertsimas, D., Tsitsiklis, J.N. Introduction to Linear Optimization, Athena Scientific. 2. Rardin, R.L. Optimization in Operations Research, Prentice Hall.

MATERIAL SHARING	
Documents	will be shared with students during the semester via CANVAS system.
Homework	will be shared with students during the semester via CANVAS system.
Exams	1 (one) midterm exam and 1 (one) final exam. 2 exams in total

EVALUATION SYSTEM		
ACTIVITIES	**QUANTITY**	**WEIGHT**
Midterm Exam	1	%20
Quiz	5	%15
Homework	5	%15
Project	1	%20
Final Exam	1	%30
TOTAL		%100
Term Activities Percentage		%70
Final Exam Percentage		%30
TOTAL		%100

Course Category	
Natural Sciences and Mathematics	%40
Engineering Sciences	%60
Social Sciences	%0

LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS RELATIONSHIP							
No	Program Qualification	Contribution Level					
		1	2	3	4	5	
1	PQ1.					X	
2	PQ2.				X		
3	PQ3.		X				
4	PQ4.			X			
5	PQ5.				X		
6	PQ6.			X			

*Increasing from 1 to 5.

ECTS / WORK LOAD TABLE			
Activities	Activity	Duration (Hour)	Total Work Load
Course Duration (including exam week: 16x total course hours)		3	48
Out-of-class Study Time (Pre-study, practice)		4	64
Reading		1	16
Internet browsing, library work		1	10
Project		5	50
Report Preparation		15	30
Presentation Preparation		5	5
Presentation		2	4
Homework		5	25

Quiz		0,2	1
Midterm Exam		20	20
Final Exam		30	30
Total Work Load			303
Total Work Load / 30			10.1
Course ECTS CREDIT			10