

School of Engineering and Natural Sciences / Industrial Engineering (English)

2023 - 2024 Academic Year

ADVANCED OPERATION RESEARCH

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
ADVANCED OPERATION RESEARCH	IND3249150	Spring Semester	3+2	4	8
Prerequisites Courses	AĞ AKIŞLARI VE TAMSAYILI PROGRAMLAMA; OLASILIK VE RASSAL DEĞİŞKENLER				
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Elective				
Course Coordinator	Assoc.Prof. Yasin GÖÇGÜN				
Name of Lecturer(s)	Assoc.Prof. Yasin GÖÇGÜN				
Assistant(s)					
Aim	This course aims to provide necessary information for mathematical optimization and its applications. It also aims to teach students how to use AMPL, a mathematical modeling language, for solving mathematical programming problems.				
Course Content	This course contains; Introduction to Optimization,Linear Programming-1,Linear Programming-2,Simplex method-1,Simplex method-2,Introduction to AMPL,Production Models using AMPL,Diets, Blending, and Scheduling Models using AMPL,Transportation, Assignment, and Minimum-Cost Flow Models using AMPL ,Multicommodity and multiperiod models using AMPL,Simple Sets and Indexing in AMPL,Compound Sets and Indexing in AMPL; Parameters and Expressions in AMPL,Specifying Data in AMPL,Network Linear Programs using AMPL.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
Students will be able to model a problem using mathematical programming			10, 16, 6, 9	A, E	
Students will be able to solve small-sized problems using mathematical programming.			10, 16, 6, 9	A, E	
Students will be able to construct an AMPL model of a mathematical programming problem			10, 16, 6, 9	A, E	
Students will be able to solve a mathematical programming problem using AMPL.			10, 16, 6, 9	A, E	
Teaching Methods	10: Discussion Method, 16: Question - Answer Technique, 6: Experiential Learning, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam, E: Homework				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
0	Introduction to Optimization				
1	Linear Programming-1				
2	Linear Programming-2				
3	Simplex method-1				
4	Simplex method-2				
5	Introduction to AMPL				
6	Production Models using AMPL				
7	Diets, Blending, and Scheduling Models using AMPL				
8	Transportation, Assignment, and Minimum-Cost Flow Models using AMPL				
9	Multicommodity and multiperiod models using AMPL				
10	Simple Sets and Indexing in AMPL				
11	Compound Sets and Indexing in AMPL; Parameters and Expressions in AMPL				
12	Specifying Data in AMPL				
13	Network Linear Programs using AMPL				
Evaluation Methods		Weight(%)			
Midterm Exam		30			
General Exam		70			
Resources					
Frederik S. Hillier, Gerald J. Lieberman, Introduction to Operations Research, McGraw Hill					