

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

2023 - 2024 Academic Year

SPECIAL TOPICS in OPERATIONS RESEARCH

Syllabus

Course Description						
Name	Code	Semester	T+A Hour	Credit	ECTS	
SPECIAL TOPICS in OPERATIONS RESEARCH		IND4110793	Fall Semester	3+0	3	6
Prerequisites Courses	AĞ AKIŞLARI VE TAMSAYILI PROGRAMLAMA; STOKASTİK MODELLER					
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	The aim of the course is to enable students to learn dynamic programming and to formulate and solve related problems using dynamic programming.					
Course Content	This course contains; Introduction to Optimization, Motivating Examples for Dynamic Programming, Prototypical Example(s) for Dynamic Programming, Structure of Dynamic Programming Problems, Equipment replacement, distribution of effort, and production planning problems, Knapsack, multi-dimensional state, and traveling salesperson problems, Probability Basics, Probabilistic Dynamic Programming-1, Probabilistic Dynamic Programming-2, Dynamic Programming Applications-1, Dynamic Programming Applications-2, Solving Dynamic Programming Examples using Microsoft Excel-1, Solving Dynamic Programming Examples using Microsoft Excel-2, Review.					
Course Learning Outcomes			Teaching Methods	Assessment Methods		
Students model dynamic programming problems.			10, 16, 6, 9	A, E		
Students solve deterministic dynamic programming problems.			10, 16, 6, 9	A, E		
Students solve stochastic dynamic programming problems.			10, 16, 6, 9	A, E		
Students interpret dynamic programming problems.			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				
1	Introduction to Optimization					
2	Motivating Examples for Dynamic Programming					
3	Prototypical Example(s) for Dynamic Programming					
4	Structure of Dynamic Programming Problems					
5	Equipment replacement, distribution of effort, and production planning problems					
6	Knapsack, multi-dimensional state, and traveling salesperson problems					
7	Probability Basics					
8	Probabilistic Dynamic Programming-1					
9	Probabilistic Dynamic Programming-2					
10	Dynamic Programming Applications-1					
11	Dynamic Programming Applications-2					
12	Solving Dynamic Programming Examples using Microsoft Excel-1					
13	Solving Dynamic Programming Examples using Microsoft Excel-2					
14	Review					
Evaluation Methods		Weight(%)				
Midterm Exam		30				
General Exam		70				

Resources
Frederik S. Hillier, Gerald J. Lieberman, Introduction to Operations Research, McGraw Hill