

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
OPERATIONS RESEARCH	MIS2210877	Spring Semester	3+0	3	6
Prerequisites Courses					
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Required				
Course Coordinator	Assist.Prof. Esra BAYTÖREN				
Name of Lecturer(s)	Assist.Prof. Esra BAYTÖREN				
Assistant(s)					
Aim	Students are aimed to have the necessary qualifications and background to be able to formulate and solve simple business decision problems using operations research techniques.				
Course Content	This course contains; Operations Research – Introduction, Introduction to Optimization, Linear Programming – Building Models with Linear Programming, Linear Programming – Solution Concept, Linear Programming – Sensitivity Analysis, Linear Programming – The Simplex Method, Integer and Binary Integer Linear Programming, Linear Goal Programming, Network Models - Scope, Definition and Applications, Network Models – Minimal Spanning Tree Algorithms, Network Models - Shortest Path Algorithms, Network Models – Project Management (Pert and CPM), Deterministic Dynamic Programming, Simulation Models.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
1. Will be able to explain the purpose of operations research.			12, 13, 16, 6, 9	A, D, E	
1.1 Lists the usage areas of operations research					
1.2 Categorizes the operations research methods					
1.3 Defines the concept of modeling					
2. Will be able to explain the logic of optimization.			12, 13, 16, 6, 9	A, D, E	
2.1 Explains the difference between linear and nonlinear optimization models					
2.2 Explains the concepts of local optimum and global optimum					
2.3 Explains constrained and unconstrained optimization concepts					
3. Will be able to explain linear programming models.			12, 13, 16, 6, 9	A, D, E	
3.1 Composes linear programming models of simple business problems					
3.2 Develops integer and binary integer linear programming models					
3.3 Creates logical constraints using binary variables					
4. Will be able to solve linear programming models.			12, 13, 16, 6, 9	A, D, E	
4.1 Explains the logic of graphical solution					
4.2 Recognizes degenerate cases in linear programming models					
4.3 Applies the Simplex method					
4.4 Explains the solution logic of integer linear programming models					
5. Will be able to design goal programming models.			12, 13, 16, 6, 9	A, D, E	
5.1 Explains the difference between object and goal					
5.2 Explains the difference between weighted and priority goal programming					
5.3 Solves goal programming models using MS Excel Solver					
6. Will be able to explain the relations among network models and business applications.			12, 13, 16, 6, 9	A, D, E	
6.1 Designs the network in which the total distance is minimized with minimum spanning tree algorithms					
6.2 Calculates the shortest path on the network using Shortest Path algorithms					
6.3 Describes how projects are planned, monitored and controlled using PERT and CPM algorithms					
7. Will be able to explain the essentials of the simulation.			12, 13, 16, 6, 9	A, D, E	
7.1 Explains simulation types					
7.2 Explains Monte Carlo Simulation					
7.3 Applies simulation in spreadsheets (MS Excel)					
Teaching Methods	12: Problem Solving Method, 13: Case Study Method, 16: Question - Answer Technique, 6: Experiential Learning, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam, D: Oral Exam, E: Homework				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	Operations Research – Introduction				
2	Introduction to Optimization				
3	Linear Programming – Building Models with Linear Programming				
4	Linear Programming – Solution Concept				
5	Linear Programming – Sensitivity Analysis				
6	Linear Programming – The Simplex Method				
7	Integer and Binary Integer Linear Programming				
8	Linear Goal Programming				
9	Network Models - Scope, Definition and Applications				
10	Network Models – Minimal Spanning Tree Algorithms				
11	Network Models - Shortest Path Algorithms				
12	Network Models – Project Management (Pert and CPM)				
13	Deterministic Dynamic Programming				

Lecture Schedule		
Sequence	Topics	Preliminary Preparation
14	Simulation Models	
Evaluation Methods		Weight(%)
(Midterm Exam) 1st assignment as a part of midterm exam		8
(Midterm Exam) 2nd assignment as a part of midterm exam		12
(Midterm Exam) 3rd assignment as a part of midterm exam		12
(Midterm Exam) In-class activities as a part of midterm exam		8
Midterm Exam		40
General Exam		60

Resources
[1] Operations Research: An Introduction, Hamdy A. Taha, 11th edition, Pearson, 2023
[2] Introduction to Operations Research, Hillier, F.S. & Lieberman, G.J., 9th Edition, McGrawHill, 2010
[3] Yöneylem Araştırması, Taha, Hamdi A., 6.Basımdan çeviri, Çeviri: Ş.A.Baray ve Ş.Esnaf, Literatür Yayıncılık, 2016
[4] Yöneylem Araştırması: Nicel Karar Teknikleri, Özkan, Şule, 3. Baskı, Nobel Yayıncılık, 2012
[5] Lecture notes will be available at http://mebis.medipol.edu.tr