

Course Description						
Name	Code	Semester	T+A Hour	Credit	ECTS	
INTRODUCTION to MODELLING and OPTIMIZATION		IND2249050	Spring Semester	3+2	4	8
Prerequisites Courses	LİNEER CEBİR; LİNEER CEBİR VE DİFERANSİYEL DENKLEMLER					
Recommended Elective Courses						
Language of Instruction	English					
Course Level	First Cycle (Bachelor's Degree)					
Course Type	Required					
Course Coordinator	Assoc.Prof. Yasin GÖÇGÜN					
Name of Lecturer(s)	Assoc.Prof. Yasin GÖÇGÜN					
Assistant(s)						
Aim	The aim and objective of this course are to teach. how to formulate and analyze mathematical models (with selected real-world applications)and, mathematical tools to handle linear programming and network problems (the simplex method, duality, sensitivity analysis, and related topics, network models, and project scheduling).					
Course Content	This course contains; Introduction to Model Building,Basic Linear Algebra,Introduction to Linear Programming,Convex Sets and Functions, Extreme Points and Optimality, Graphical Solution,Graphical Sensitivity Analysis and Computer Based Solutions,Simplex Algorithm,Simplex Algorithm: Artificial Starting Solutions,Simplex Algorithm: Artificial Starting Solutions and Special Cases in Simplex,Revised Simplex ,Special Simplex Implementations: Karus-Kuhn-Tucker Optimality Conditions,Duality and Sensitivity,Duality and Sensitivity: Dual Simplex,Transportation and Assignment Problems-1,Transportation and Assignment Problems-2.					
Course Learning Outcomes			Teaching Methods	Assessment Methods		
Students define modeling concepts.			12, 13, 14, 16, 6, 8, 9	A, E, G, H		
Students analyze mathematical models.			12, 13, 14, 16, 6, 8, 9	A, E, H		
Students formulate problems using linear programming.			12, 14, 16, 21, 6, 8, 9	A, G		
Students implement the Simplex algorithm.			12, 14, 16, 8, 9	G		
Students define duality and sensitivity analysis.			12, 14, 16, 9	A		
Students solve transportation and assignment models.			12, 14, 16, 6, 9	A		
Teaching Methods	12: Problem Solving Method, 13: Case Study Method, 14: Self Study Method, 16: Question - Answer Technique, 21: Simulation Technique, 6: Experiential Learning, 8: Flipped Classroom Learning, 9: Lecture Method					
Assessment Methods	A: Traditional Written Exam, E: Homework, G: Quiz, H: Performance Task					
Lecture Schedule						
Sequence	Topics	Preliminary Preparation				
1	Introduction to Model Building	Examining the course textbook				
2	Basic Linear Algebra	Examining the course textbook				
3	Introduction to Linear Programming	Examining the course textbook				
4	Convex Sets and Functions, Extreme Points and Optimality, Graphical Solution	Examining the course textbook				
5	Graphical Sensitivity Analysis and Computer Based Solutions	Examining the course textbook				
6	Simplex Algorithm	Examining the course textbook				
7	Simplex Algorithm: Artificial Starting Solutions	Examining the course textbook				
8	Simplex Algorithm: Artificial Starting Solutions and Special Cases in Simplex	Examining the course textbook				
9	Revised Simplex	Examining the course textbook				
10	Special Simplex Implementations: Karus-Kuhn-Tucker Optimality Conditions	Examining the course textbook				
11	Duality and Sensitivity	Examining the course textbook				
12	Duality and Sensitivity: Dual Simplex	Examining the course textbook				
13	Transportation and Assignment Problems-1	Examining the course textbook				
14	Transportation and Assignment Problems-2	Examining the course textbook				
Evaluation Methods		Weight(%)				
Midterm Exam		30				
General Exam		70				

Resources
Taha, Hamdy A., Operations Research, 8th edition, 2007. ISBN: 0131360140Winston, Wayne L., Operations Research: Applications and Algorithms, 4th edition, 2003. ISBN-13: 978-0534380588 (Course notes and other material may be provided by the instructor)