İçerik

Ders Kodu	Dersin Adı	Yarıyıl	Teori	Uygulama	Lab	Kredisi	AKTS
EM 515	Mathematical Modeling and Optimization	1	4	0	0	3	8

Ön Koşul	
Derse Kabul Koşulları	

Dersin Dili	İngilizce
Türü	Zorunlu
Dersin Düzeyi	Yüksek Lisans
Dersin Amacı	The objective of the course is to familiarize the student with the basic tools of mathematical programming to the extent they can be applied in operational situations. The material is quite practical and will prove useful in personal decision making as well as in many types of engineering and management decisions.
İçerik	- Overview of modeling - Introduction to linear programming - Graphical solution - Linear programming model - Assumptions of linear programming - Additional modeling examples - The simplex method - Standard form of linear programming - Unrestricted variables - Algebra of the simplex method - Simplex method in tabular form - Special cases in simplex method application - Degeneracy - Unbounded solutions - Multiple optimal solutions - Infeasible solution - Post-optimality analysis - Artificial starting solution - The big M method - The two-phase method - Using Excel Solver to solve linear programming problems - Presentation of LINDO software - Duality - Definition of the dual problem - Primal-dual relationships - Dual simplex method - Sensitivity analysis - The transportation problem - The assignment problem - Goal programming - Formulation possibilities with binary variables - Deterministic dynamic programming - Characteristics of dynamic programming problems - Principle of optimality - Selected dynamic programming applications
Kaynaklar	Hillier, F.S., Lieberman, G.J., Introduction to Mathematical Programming, McGraw-Hill, 1995. Taha, H.A., Operations Research: An Introduction, Tenth edition, Pearson, 2017.

Teori Konu Başlıkları

Hafta	Konu Başlıkları
1	- Overview of modeling - Introduction to linear programming - Graphical solution
2	- Linear programming model - Assumptions of linear programming - Additional modeling examples
3	- Standard form of linear programming - Unrestricted variables - Algebra of the simplex method - Simplex method in tabular form

Hafta	Konu Başlıkları
4	- Special cases in simplex implementation (Degeneracy; Unbounded solutions; Multiple optimal solutions; Infeasible solution) - Post-optimality analysis
5	- Artificial starting solution - The big M method - The two-phase method
6	Midterm
7	- Using Excel Solver to solve linear programming problems - Presentation of LINDO software - Duality
8	- Dual simplex method - Sensitivity analysis
9	- The transportation problem - The assignment problem
10	- Goal programming - Formulation possibilities with binary variables
11	- Deterministic dynamic programming