BOĞAZİÇİ UNIVERSITY
DEPARTMENT OF INDUSTRIAL ENGINEERING
Fall 2020 – 2021
IE 501 OPTIMIZATION TECHNIQUES I

Day and Time	: M 09:00 – 11:00	W 09:00 – 11:00
Classroom	: Online	Online
Instructor	: İ. Kuban Altınel	
Office/Phone	: M4034 / Ext. 6407	
Office Hours	: M 11:00 – 13:00	W 11:00 – 13:00
Teaching Assistant	: Buğra Çınar	
Office	: M4040	
Office Hours	: TBA	

Grading

Quizzes	: 10% per quiz (2 midterm-like quizzes), Close book.
Homeworks	: 10% (Almost every other week. Assignment will be due one week after they are given out unless otherwise specified). NO LATE HOMEWORK!
Midterm	: 30%, Open book.
Eligibility	: Any registered student may take the midterm exam.
Makeup	: NO MAKEUP! ABSENCE WILL BE GIVEN 0 WHATEVER THE REASON IS.
Final	: 40%, Open book.
Eligibility	: Only registered students with a 70 overall weighted average or above, if they were given full grade at the final exam, e.g. 100, may enter.
Makeup	: Only registered students who are eligible to take the final will be given a makeup exam if he/she fails the course or he/she is absent at the final exam with an officially accepted excuse.

Textbook: Bertsimas, D. and Tsitliklis, J.N., Introduction to Linear Optimization, 1997

References:
1. Bazaraa, M. S., Jarvis, J. J., Sherali, H. D., Linear Programming and Network Flows, 4th edition
2. Bazaraa, M. S., Jarvis, J. J., Sherali, H. D., Linear Programming and Network Flows, 2nd edition
3. Padberg, M. Linear Optimization and Extensions
4. M. Sipser, Introduction to the theory of computing
5. Garey, M. and Johnson, D., Computers and Intractability
6. Lang, S., Linear Algebra

They are available **ON RESERVE** at the library

COURSE OUTLINE

1. Introduction: Mathematical models (Bertsimas, Tsitliklis Ch. 1, 12; Bazaraa, Jarvis, Sherali Ch. 1)
2. Introduction: Mathematical foundations (Bertsimas, Tsitliklis Ch. 1, 2; Lang Ch. 1 – 6, 12; Padberg Ch. 7; Bazaraa, Jarvis, Sherali Ch. 2)
3. The Simplex Algorithm (Bertsimas, Tsitliklis Ch. 3)
4. Modeling with GAMS (Brooke, Kendrick, Meeraus Part I – II)
5. Algorithmic Efficiency and the Computational Cost of the Simplex Algorithm (Bertsimas, Tsitliklis Ch. 3; Bazaraa, Jarvis, Sherali Ch. 8)
6. Various Implementations of the Simplex Method (Bazaraa, Jarvis, Sherali Ch. 5)
7. Duality (Bertsimas, Tsitliklis Ch. 4,)
8. Sensitivity Analysis (Bertsimas, Tsitliklis Ch. 5)
9. Computational Complexity (Garey, Johnson Ch. 1 – 3, Sipser Ch. 3.1, 3.3, 4.2, 7)
10. Complexity of Linear Programming Problem (Bertsimas, Tsitliklis Ch. 8)
11. Interior Point Methods (Bertsimas, Tsitliklis Ch. 9)
12. The Decomposition Principle (Bertsimas, Tsitliklis Ch. 6; Bazaraa, Jarvis, Sherali Ch. 7)
13. Karush – Kuhn –Tucker Optimality Conditions for Convex Programming

IE 501 TENTATIVE PROGRAM

WEEK	MONTH	DAY	TENTATIVE DAILY OUTLINE
1	October	26M	Introduction: Mathematical models
		28W	Introduction: Mathematical models
2	November	02M	Introduction: Mathematical foundations
		04W	Introduction: Mathematical foundations
3		09M	Introduction: Mathematical foundations
		11W	Introduction: Mathematical foundations
4		16M	Simplex Algorithm
		18W	Simplex Algorithm
5		23M (Q1)	Simplex Algorithm
		25W	Simplex Algorithm
6		30M	Modeling with GAMS
	December	02W	Algorithmic Efficiency, Comp. Cost of the Simplex Algorithm
7		07M	Algorithmic Efficiency, Comp. Cost of the Simplex Algorithm
		09W	Various Implementations of the Simplex Method
8		14M (MT)	Various Implementations of the Simplex Method
		16W	Duality
9		21M	Duality
		23W	Sensitivity Analysis
10		28M	Computational Complexity
		30W	Computational Complexity
11	January	04M	Computational Complexity
		06W	Complexity of Linear Programming Problem
12		11M	Interior Point Methods
		13W (Q2)	Interior Point Methods
13		18M	Decomposition Principle
		20W	Decomposition Principle