

BOĞAZIÇI UNIVERSITY
DEPARTMENT OF INDUSTRIAL ENGINEERING
Fall 2009 - 2010

IE 501 OPTIMIZATION TECHNIQUES I

Day and Time	:	M 11:00 – 13:00	T 9:00 – 11:00
Classroom	:	M 2180	M 2200
Instructor	:	İ. Kuban Altınel	
Office/Phone	:	Old Engineering Building, M 4060 / Ext. 6407	
Office Hours	:	T 11:00 – 13:00	Th 9:00 – 11:00
Teaching Assistant	:	Hande Küçükaydın	
Office	:	Old Engineering Building, M 4023	
Office Hours	:	TBA	
Grading	:		
Homeworks	:	15% (Almost every other week. Assignment will be due one week after they are given out, unless otherwise specified)	
Midterm	:	35% (NO MAKEUP. ABSENCE WILL BE GIVEN 0 WHATEVER THE REASON IS!)	
Final	:	40% (Only those whose name appears on the makeup examination list will be given a makeup exam.)	
Attendance	:	10%	

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, 2nd edition
2. Padberg, M. Linear Optimization and Extensions
3. M. Sipser, Introduction to the theory of computation
4. Garey, M. and Johnson, D., Computers and Intractability
5. Brooke, A., Kendrick, D. and Meeraus, A., GAMS: A User's Guide
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

<u>WEEK</u>	<u>MONTH</u>	<u>DAY</u>	<u>TENTATIVE DAILY OUTLINE</u>
1	September	28M	Introduction: Mathematical models
		29T	Introduction: Mathematical models
2	October	05M	Introduction: Mathematical foundations
		06T	Introduction: Mathematical foundations
3		12M	Introduction: Mathematical foundations
		13T	Introduction: Mathematical foundations
4		19M	Simplex Algorithm
		20T	Simplex Algorithm
5		26M	Simplex Algorithm
		27T	Simplex Algorithm
6	November	02M	Modeling with GAMS
		03T	Algorithmic Efficiency, Comp. Cost of the Simplex Algorithm
7		09M	Algorithmic Efficiency, Comp. Cost of the Simplex Algorithm
		10T	Algorithmic Efficiency, Comp. Cost of the Simplex Algorithm
8		16M	Various Implementations of the Simplex Method
		17T	Various Implementations of the Simplex Method
9		23M	Duality
		24T	Duality
10	December	30M	HOLIDAY
		01T	Sensitivity Analysis
11		07M	Computational Complexity
		08T	Computational Complexity
12		14M	Computational Complexity
		15T	Complexity of Linear Programming Problem
13		21M	Interior Point Methods
		22T	Interior Point Methods
14		28M	Decomposition Principle
		29T	Decomposition Principle
15	January	04M	<i>Convex programming, KKT conditions</i>
		05T	<i>Convex programming, KKT conditions</i>