

Department of Mathematics & Statistics

Concordia University

MAST 224

Introduction to Optimization

Winter 2015

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Office Hours: To be announced.

Textbook: *Operations Research: Applications and Algorithms*, by Wayne L. Winston, Brooks/Cole, 4th Edition.

Final Grade: (1) 10% Assignments + 20% Midterm Exam + 70% Final Exam or
(2) 10% Assignments + 90% Final Exam, whichever is higher.

Chapters, Sections, and Topics:

Chapter 3. Linear Programming: Tool for Solving Optimization Problems

Sections	Topics
3.1	What Is a Linear Programming Problem?
3.2	The Graphical Solution of Two-Variable LP Problems
3.3	Cases of LPs: Unique Solution, Many Solutions, No Solution

Chapter 4. The Simplex Algorithm: Method to Solve LPs

Sections	Topics
4.1	How to Convert LPs to Standard Form
4.2	Preview of the Simplex Algorithm, Basic Solutions, Basic Feasible Solutions
4.3	Direction of Unboundedness
4.4	Existence of an Optimal Basic Feasible Solution, Adjacent BF Solutions
4.5	The Simplex Algorithm, Standard Form, Optimal Canonical Form
4.6	Using Simplex Algorithm to Solve Minimization Problems
4.7	Alternative Optimal Solutions
4.8	Unbounded LPs, Direction of Unboundedness
4.11	Degenerate LPs and Convergence of the Simplex Algorithm
4.12	The Big M Method
4.13	The Two-Phase Simplex Method
4.14	LPs with Unrestricted in Sign Variables

Chapter 6. Sensitivity Analysis and Duality

Sections	Topics
6.1	Graphical Introduction to Sensitivity Analysis
6.2	Expressing LPs Optimal Tableau in Terms of the Initial LPs
6.3	Sensitivity Analysis
6.5	Finding the Dual LP Problem of an LP Problem
6.6	Economic Interpretation of the Dual Problem
6.7	The Dual Theorem and its Consequences
6.10	Complementary Slackness Theorem

Chapter 7. Transportation, Assignment, and Transshipment Problems

Sections	Topics
7.1	Formulating Transportation Problems
7.2	Finding Basic Feasible Solutions for Transportation Problems
7.3	The Transportation Simplex Method
7.5	Assignment Problems, Hungarian Method
7.6	Transshipment Problems