EBGN655 - Advanced Linear Programming

Spring 2013

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Monday, Wednesday</th>
<th>8:00am - 9:15am</th>
<th>211 Engineering Hall</th>
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</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>A. M. Newman</td>
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<tr>
<td>Office</td>
<td>319 Engineering Hall</td>
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<tr>
<td>Office Hours</td>
<td>Monday</td>
<td>10:45am-11:15am</td>
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<td>Tuesday</td>
<td>8:00am-9:00am; 5:00pm-8:00pm</td>
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<td>Wednesday</td>
<td>10:45am-11:15am</td>
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<tr>
<td>email</td>
<td><a href="mailto:newman@mines.edu">newman@mines.edu</a></td>
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<tr>
<td>Teaching Assistants</td>
<td>Ady Van-Dunem and Marvin King</td>
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<tr>
<td>Office</td>
<td>123 Engineering Hall</td>
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<tr>
<td>Office Hours</td>
<td>Monday</td>
<td>1:00pm-2:00pm</td>
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GENERAL INFORMATION

- **Textbooks:**

- **Assignments:** There will be a weekly assignment due on Wednesday in class the following week.

- **Project:** There will be a project involving formulating, solving and analyzing a challenging problem, writing code, and/or performing a literature review. The project group may consist of between one and four students. The project will be due during finals week.

- **Exams:** There will be a midterm and a final examination. Both are open book. You must wait 48 hours after the exam has been handed back to ask (me) any grading questions.
• Grading:
  ⋆ Class Participation: 5%
  ⋆ Homework Assignments: 20%
  ⋆ Project: 25%
  ⋆ Midterm: 20%
  ⋆ Final: 30%

Grading is done on a curve where 90% is sufficient but not necessarily necessary for an A-, 80% is sufficient but not necessarily necessary for a B-, etc.

COURSE OUTLINE

• I. Introduction and Linear Programming Formulations
  ⋆ Motivation
  ⋆ Mining applications
  ⋆ Energy applications

• II. Dual Simplex Method

• III. Interior Point Methods

• IV. Algorithmic Tuning for Linear Programs
  ⋆ Choice of algorithm and problem structure (primal versus dual)
  ⋆ Choice of pivoting rules (Simplex) and crossover time (interior point)
  ⋆ Numerical stability (including dense and sparse matrices, condition numbers, and degeneracy)

• V. Column Generation
  ⋆ Cutting stock problem
  ⋆ Theory
  ⋆ Scripting the procedure

• VI. Dantzig-Wolfe Decomposition

• VII. Dynamic Programming (Time permitting)
RULES

• Please do not send email regarding homework problems; come to office hours instead.

• Statute of limitations for questions about grading is one week from the student’s receipt of the graded work.

• I do not want to see or hear your cell phone. Ever. This includes during office hours.

• No rudeness of any kind towards anyone in the class will be tolerated.

• Do not talk to your neighbor during class.

• You may confer with others regarding the homework and project, but the work you hand in must be your own. Please ensure it is done neatly.

• Attendance in class is required. Be on time.

• Any alternate arrangements for exams must be submitted in writing at least one week in advance of the exam. Any additional arrangements regarding disabilities must be formally and legally documented and approved.

A minor infraction of the above rules will result in a warning. A major infraction will result in expulsion from the class.