Data, Models and Decisions

Master of International Business

Fall 2017 Syllabus

1. Objectives

- The first objective is to introduce modeling and optimization as they apply to support practical decisions relevant to business management, marketing, operations management, supply chain management and etc.

- The second objective is to expose students to a wide range of applications for these methods, and improve the students’ analytic thinking.

2. Delivery team

Instructor: Prof. Lai WEI, RM 1002
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Office hours: 3-5pm Fridays, or email for appointment

Teaching Assistant: Shan WANG
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Office hours: email for appointment

3. Material

Textbooks:
Data, Models, and Decisions: The Fundamentals of Management Science
By Dimitris Bertsimas and Robert Freund
Dynamic Ideas

Managerial Decision Modeling with Spreadsheets, Nagraj Balakrishnan, Barry Render & Jr. Ralph Stair, 3rd edition:
4. Software and Prerequisites

- The primary optimization software we will use for the course is Solver, which is included with, and relies on the interface of Microsoft Excel. That software is easy to use and appropriate for most if not all class assignments, but is typically not powerful enough for computationally challenging problems.

- The prerequisites includes Linear Algebra and Probability Theory.

5. Readings and Assignments

- **Readings**: The textbook readings are optional, but very strongly recommended to those who do not feel completely comfortable with the concepts covered in class. All other readings are mandatory.

- **In-class Exercise and Participation**: Regular attendance at all class meetings is expected. At the end of some topics, we will have team-based exercise competition, focusing on a real-world applications of the tools covered during the lecture. For each competition, each member of the first two teams who submitted the most accurate answer will be rewarded bonus points towards their final grade, although the most accurate solutions were not announced until after all teams submitted to avoid discouraging the teams who submitted their solutions after the first two teams. During the competition, teams were encouraged to engage with the instructor and each other in order to arrive at the best solution.
  - Attendance will be taken randomly in some class by signing the attendance sheet.
  - You are allowed to miss up to two lectures without deduction from your participation grade.
  - Please be on time! No disrupting classmates, no surfing the net, reading newspapers, ringing phones, talking, sleeping, or working on that assignment due in another course.

- **Homework**: Skill-building exercises will be assigned throughout the semester.
  - Each homework assignment must be submitted no later than 2:00PM on its due day. NO LATE HOMEWORK WILL BE ACCEPTED. A grade of zero will be assigned if you do not turn in the homework.
  - Handing in someone else’s work as your own. This constitutes plagiarism.
- Providing your work for someone else to hand in as their own. This includes e-mailing your file to someone just so they can “see what you did”.
- Explicitly telling another student how to do the assignment in a way that hinders their learning of the material.

- **Group Term Project:** Each group (the same case analysis team) should identify a potential or actual application of optimization within a clear decision-making context, based on their prior work experience or from some other personal experience. For your chosen application, prepare a 20 minute presentation and a report of up to 8 pages with text font no smaller than 12 (possibly with an additional technical appendix), both of professional quality, and describing:
  - The motivation and context of the application;
  - An optimization model formulation along with a statement and discussion of any assumptions made when formulating that model;
  - The results of relevant numerical experiments conducted with a computer implementation of this model, using as realistic a data set as possible (if your problem is large, you should attempt to scale it so as to create an interesting example with which to experiment);
  - A qualitative discussion of these results emphasizing any interesting insights gained and/or any related sensitivity analysis;
  - A discussion of any implementation issues associated with the application and how to overcome them.

- **Peer Evaluation:** As the course emphasizes the team-based learning, we will have a lot of team activities. To ensure every team member contribute the fair amount of time and effort to the group, we will conduct the peer evaluations near the end of the course. Peer evaluation is going to affect your assignment, class participation and team project score. If you don’t submit the peer evaluation before the due date, penalty will be enforced towards your grade. The peer evaluation result is confidential, which is only shared between the individual student and the instructor. Please write your truthful and objective comments to your peers.

**6. Grading**

Grading will be based on performance on assignments, class participation and final exam.
- **Class Participation & Preparedness (20%)**
7. Schedule

The following is a preliminary schedule and may be modified throughout the course. In addition, the schedule indicates whether each reading, case or document is to be found in the textbook or be distributed through our public email account.

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<th>Week</th>
<th>DATE</th>
<th>Lecture</th>
<th>Assignment Due</th>
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<td>Week 1</td>
<td>13 Sep</td>
<td>Introduction</td>
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<td>2</td>
<td>Week 2</td>
<td>20 Sep</td>
<td>Linear Programming</td>
<td>Bring your laptop with Excel installed</td>
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<td>Week 3</td>
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<td>Week 10</td>
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<td>Case analysis report (Group)</td>
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