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Office Hours: Thursdays: 5:15 – 6:15 PM (or by appointment)
Teaching Assistant: TBD

ISOM Area Administrative Assistant: Jalisa Norton, Room 423, 404-727-8698

Required Course Material


Course Objectives

This course provides the student with an array of management science modeling and solution tools, including linear and non-linear optimization, integer programming, simulation, and stochastic optimization. Note: The term “programming” is a misnomer; this topic has nothing to do with “programming” in the contemporary sense of the word. Math programming is a mathematical approach to business problem solving. We will not be doing any programming in this course, and prior experience in programming is not helpful or required.

Collectively, the tools that we learn in this class enjoy wide applicability in business practice in a variety of functions, including finance, marketing, operations and human resource planning. Topics include, but are not limited to: asset allocation, arbitrage, short term cash flow planning, revenue management, supply chain management, and pricing.

Excel Spreadsheet will be the platform on which we build, solve, and analyze the models. The focus of the course is in developing problem abstraction techniques, and in using data to generate quantitative and actionable managerial insights. The primary learning objectives are as follows:

- Translate a verbal or graphical description of a business problem into an optimization model
- Set up the optimization model in Excel and generate a solution
- Interpret the results and perform sensitivity analyses to examine the feasibility of the solution

Course Structure

The work in this course will largely consist of structuring managerial problems mathematically in Excel. Consequently, class time is expected to focus on utilizing spreadsheets. However, the course objective is NOT to make you “handier” at Excel. Although you will become more familiar with the capabilities of spreadsheet software packages and we will be performing virtually all classwork in Excel, the course is not designed to assist in becoming an Excel expert.
Homework

Assignments other than exams (problems from the text, handed out, or case studies) will be graded on a “mastery” model. That is, you keep revising them until you get them right. The purpose here is to keep anyone from falling behind in skill development.

There is a time limit on revision. If you get work in later, you will not have time to get feedback and revise.

Exams

There will be two in-class mid-term exams and a final. Class notes, homework solutions and model templates are permitted in the exams.

Class Leadership

Due to the nature of the material, students must help each other learn. At the end of the term I will ask you to help identify those who aided your learning.

Cases

There are two group cases. Both are graded on the mastery model, so you will have the ability to send in early versions and get feedback before a final version is graded.

Grading Policy and Class Design

The course grade will be determined as follows:

Exam 1 (group exam) 15%
Exam 2 (individual exam) 20%
Exam 3 (cumulative, individual final exam) 20%
Group Case Analyses 15%
Required Homework 15%
Class Leadership 15%

Other Issues

Students are bound by the honor code as set forth in the University’s policies. Any violations of the honor code will be seriously pursued. If you are unsure of this policy or need clarification, please take the time to talk to me.
### BUS 557 – Spring 2011 – Class Sessions

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<tr>
<th>Session</th>
<th>Date</th>
<th>Topics and Readings</th>
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| 1       | Tue, 12/13 | Course Introduction  
Reading: 1.5, p.10-16 “Using Solver”  
Reading: Ch 2, p.20-27 is on linearity and the assumptions | Problems 2.1 and 2.2, p. 56. |
| 2       | Tue, 12/13 | **Cost accounting**: production planning (*allocation*)  
Reading: Section 2.2, p.27-36  
**Operations**: the diet problem (*covering*)  
Reading: p.40, third paragraph |                           |
| 3       | Th, 12/15  | How does it work?  
Linear Programming in Pictures (graphical analysis; simplex algorithm)  
Reading: Appendix 2, p. 324-330, section 2.5, p.50-54 |                           |
| 4       | Th, 12/15  | **Operations/HR**: Workforce Scheduling (covering)  
Reading: section 2.3, p. 36-45  
**Finance**: Bond selection (blending)  
Reading: section 2.4, p. 45-50  
**Marketing**: Media selection (piece-wise linear approximation) | Homework: Problems 2.3 and 2.4, p. 56-57. |
| 5       | Sat, 12/17 | **Operations**: Aggregate planning, Finance: Short-term cash flow planning (Sequential Decision Making)  
Reading: section 3.6, p. 83-88 |                           |
| 6       | Sat, 12/17 | Sensitivity Analysis  
**Marketing/Cost Accounting**: pricing, marginal costs/revenues and transfer prices (sensitivity analysis)  
Reading: ch. 4, section 4.1 (104-112), 4.3 (119-122), 4.5 (124-127)  
Guide to the solver sensitivity report: p. 142  
| 7       | Sat, 12/17 | More on sensitivity  
Finishing school problem  
Goizueta Grass problem  
**Finance**: Asset allocation (overcoming LP limitations: multiple objective functions; solver sensitivity tool)  
*Text example*: 4.13, p.150  
Guide to the solver sensitivity tool: p. 143 |                           |
| 8       | Sat, 12/17 | **Exam 1 (group)** | ***** Holiday Break ***** |
| 9       | Tue, 01/03 | Network Models  
**Supply chain management**: shipping (transportation model)  
Reading: section 3.1, p. 66  
**Finance**: Lockbox |                           |
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| 10 | Tue, 01/03 | **Operations/Marketing**: Revenue Management  
**Finance**: maximizing ratios (Non-linear objective functions)  
Reading: section 3.3, p.74-78 | Homework: Problems 3.1 and 3.4, p. 93-94. |
| 11 | Th, 01/05 | Overcoming LP Limitations I  
LP with no objective function  
**Finance**: Arbitrage  
Non-profit pricing  
**Operations**: Finding feasible schedules  
Goal programming | **Turn in**: Final version of the Eastern Oil group case |
| 12 | Th, 01/05 | LP Under Uncertainty  
Reading: Appendix 4, p. 338-346  
**Finance**: Cash flows with inaccurate forecasts  
**Operations**: Production planning with inaccurate forecasts |   |
| 13 | Sat, 01/07 | Data Envelopment Analysis  
Lecture on DEA  
Case study: Nashville National Bank (p. 181-185)  
Reading: Ch. 5, section 5.1 (155-161), 5.3 (162-167), 5.5 (168-172)  
**Read prior to class.** | Homework: Problems 5.1 and 5.4, p. 175-176.  
**Turn in** first attempt before class on which we discuss the NNB case. |
| 14 | Sat, 01/07 | **Exam 2 (individual)** |   |
| 15 | Sat, 01/07 | Integer Programming  
**Operations**: Diet problem - again (branch and bound)  
Reading: section 6.5, 227-232  
**Finance**: Capital budgeting (logical operators)  
Reading: example 6.2, 192-197 |   |
| 16 | Sat, 01/07 | **Operations**: Facility location  
Reading: example 6.4, 201-203, section 6.4, 220-227  
**Marketing**: Media selection – again (big M method)  
Reading: 203-208 (portion of section 6.3) | Optional: Problems 6.1 and 6.3, p. 233-234. If you wish to turn this in, you will get feedback. Not required. |
| 17 | Tu, 01/10 | **Finance**: investment portfolio (linearizing non-linear functions)  
Reading: section 7.5, 269-277 |   |
| 18 | Tu, 01/10 | Guest Speaker: TBD |   |
| 19 | Th, 01/12 | Simulation I  
Corporate Valuation | Homework: TBD |
| 20 | Th, 01/12 | Simulation II  
Option Pricing |   |
| 21 | Sat, 01/14 | Stochastic Optimization I  
Portfolio Optimization |   |
| 22 | Sat, 01/14 | Stochastic Optimization II  
**Operations**: Capacity Planning |   |
| 23 | Sat, 01/14 | Guest Speaker: TBD |   |
| 24 | Sat, 01/14 | **Final Exam (individual)** |   |

*All class sessions meet in the regularly scheduled classroom (GBS 204) unless otherwise noted*