Syllabus for  
Spreadsheet Decision Modeling (MGT 70750)  
Mendoza College of Business  
University of Notre Dame  
Spring 2011 (Tentative)

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Office Hours:  By appointment.

Course Objectives:

1. To identify business problems that can be solved using advanced quantitative techniques.
   - Our problems come from operations, finance, marketing, and accounting. Examples include: process improvement, portfolio selection, financial planning, options and warranty pricing, logistics systems, and cash flow matching.
   - The techniques we study are simulation and optimization.

2. To model and solve these problems with spreadsheets. (We use Excel and Excel add-ins: Solver, SimQuick, and @Risk).

3. To improve your spreadsheet skills.

4. To improve your quantitative problem solving skills.

Only a basic familiarity with spreadsheets is assumed at the outset.

Materials:  
        SimQuick: Process Simulation with Excel, 2nd Edition by Hartvigsen

Software:  
Hands on: Excel spreadsheet; Solver, SimQuick, @Risk, Stats.xls, Ratings.xls.  
Demos or discussions: AnyLogic, IBM ILOG CPLEX, SAP, Expert Choice.

Grading:  
Two possibilities (whichever is better for you):  
Midterm exam 35%; Final exam 40%; Assignments 25%  
or  
Midterm exam 20%; Final exam 55%; Assignments 25%

Key Dates:  
Class meets 13 times.  
Final exam: usual class time and location.
Assignments: Due approximately every week. Can be done individually or in groups of two or three. Details of the assignments will be in the handouts and discussed in class. Due dates will be given in class. Please hand in one hard-copy solution set per group.

Honor Code: The standard Notre Dame Honor Code applies. For the midterm exam you can bring one piece of paper with notes on one side. For the final exam you can bring one piece of paper with notes on both sides. For both exams you may use a basic calculator with no communication capabilities.

Course Outline:

I. Introduction

II. Process Simulation (SimQuick)
   A. Bank, airline security, etc. (Chap. 2)
   B. Inventory in supply chains (Chap. 3)
   C. Production game (handout)
   D. Linear flow factory (Chap. 4.1)

III. Optimization (Solver; Winston/Albright text)
   A. Linear programming
      1. Product mix (handout; Chap. 3.7, 4.5)
      2. Financial models (Chap. 4.7)
      3. Advertising scheduling (Chap. 4.2)
      4. Foreign currency trading (Case 4.4)
   B. Network models
      1. Transportation model (Chap. 5.2)
      2. Dating service (handout)
   C. Integer programming
      1. Crew scheduling (handout; Chap. 4.3)
      2. Fixed cost models (Chap. 6.4)
   D. Nonlinear programming
      1. Portfolio optimization (Chap. 7.7)
      2. Rating sports teams (Chap. 7.6)

IV. Alternative Selection (handout; Ratings.xls)

V. Spreadsheet Simulation (@Risk; Winston/Albright text)
   A. Financial planning (handout)
   B. Inventory management (Chap. 11.5)
   C. Reservation management (handout)
   D. Warranties (Chap. 12.2)
   E. Simulating stock prices and options (Chap. 12.3)
   F. Games of chance
      1. Roulette (handout)
      2. Hitting a target (handout)