

B6015: Decision Models Summer 2011

Instructor

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Course Description

This course is about modeling with a purpose to aid in managerial decision-making. A model is a simplified representation of a real situation and modeling is the process of developing, analyzing and interpreting that simplified representation in order to help in making decisions. Models are invaluable tools in managing and understanding complexity and risk, which are inherently present in most business problems.

The emphasis is on models that are widely used in diverse industries and functional areas, including finance, operations and marketing. Applications will include advertising planning, revenue management, asset-liability management, environmental policy modeling, portfolio optimization, public health planning and corporate risk management, among others. We will use spreadsheets to implement, solve and analyze the models that we develop.

Questions ?

Please feel free stop by, e-mail (cwchan@columbia.edu) or call me (212-854-1609). I am happy to answer any questions you may have about the course, about your progress or any other issue of interest.

Course Materials

There is no required textbook for the course. Lecture notes and reading materials will be distributed in class.

The web page for the course can be found on Angel at <http://angel.gsb.columbia.edu/>. We will use Angel extensively, and the page will be updated frequently as the course progresses, so please check it often. Lecture notes, Excel files, homeworks, solutions, announcements and supplementary materials will be posted online.

For your reference, the following book is a good resource covering many of the modeling concepts and techniques we discuss in the course. Copies are available in the library.

Recommended

- Powell and Baker, *Management Science: The Art of Modeling with Spreadsheets*, Wiley, 2008 (3rd edition).

Computer Software

We will use spreadsheets fairly extensively throughout the course to solve the models that we develop. In particular, we will use Microsoft Excel. The add-ons we are going to use are:

- 1) *Solver*: Solver is an Excel add-in that allows you to solve different types of optimization problems and is part of the standard Excel installation.
- 2) *Crystal Ball*, an add-in for Excel created by Decisioneering, Inc. that makes it much easier to run simulations in a spreadsheet.

Computer services should have installed Solver and Crystal Ball on your notebooks when you arrived at CBS. **Do not install the software from the CD that comes with the Powell & Baker book.**

Review Sessions

The TA, Daniel Guetta, will hold review sessions every Tuesday, between 5:45 p.m. and 7:15 p.m. in Uris 142. These sessions will be used to answer questions and to go over practice problems.

During the last review session, he will go over a couple of sample final questions. This is currently scheduled for June 21 from 5:45pm to 7:15pm in Uris 142. The date and time may be moved closer to the exam date—we will give you at least 1 week notice of any change.

Course Work

There will be several homework assignments and one project assignment. Two short assignments (Shelby Shelving and Bond Return) are individual assignments. The remaining assignments (two homeworks and the project) are to be done in groups. In addition to these assignments, there will be a comprehensive final exam.

The due dates and weights of the assignments and the exam are as follows:

Assignment	Distributed	Due	Weight
Shelby Shelving Assignment (<i>Individual</i>)	Class 1	Class 2 (May 26)	5%
Group Homework 1 (<i>Group</i>)	Class 2	Class 5 (June 7)	11%
Project Proposal (<i>Group</i>)	Class 1	Class 7 (June 10)	N/A
Bond Return Assignment (<i>Individual</i>)	Class 6	Class 8 (June 14)	5%
Group Homework 2 (<i>Group</i>)	Class 7	Class 10 (June 21)	9%
Project (<i>Group</i>) (See the project handout for details)	Class 1	Class 12 (June 24)	20%
Final Exam		June 30	45%

In addition, 5% of the final grade will be assigned on the basis of class participation and individual professional conduct. I expect all class participants to arrive to class on-time and prepared, and to stay involved during class sessions. Every conceivable effort should be made to avoid absences, late arrivals or early departures. In cases when these are unavoidable, they need to be communicated to me in advance.

Notebook Computers

Notebook computers will be used in this course, and students are encouraged to bring them to class. During class, the computers may be used *only* while the Excel model is being developed to follow the steps of putting together the model.

Course Schedule

Class #	Topic
1	Introduction to Decision Models
2	Modeling Examples: Advertising Spending and Cash-Flow Management
3	Sensitivity Analysis
4	Non-Linear Models: Revenue Management in Retail
5	Integer Models: Capital Budgeting and Plant Location
6	Decentralized Optimization: Pollution Reduction
7	Introduction to Decision Making under Uncertainty
8	Asian option pricing via simulation
9	Managing FX Risk: Comparing Alternatives in Simulation
10	Evaluating the Value-at-Risk of a Portfolio of Stocks
11	Portfolio Optimization and Hedging
12	Project Presentations