DECISION MODELS AND MANAGEMENT

Course Description

This course provides an introduction to computer-based models for decision-making. The emphasis is on models that are widely used in diverse industries and functional areas, including finance, accounting, operations, and marketing. Applications will include advertising planning, revenue management, asset-liability management, environmental policy modeling, portfolio optimization, and corporate risk management, among others.

The aim of the course is to help students become intelligent consumers of these methods. To this end, the course will cover the basic elements of modeling -- how to formulate a model and how to use and interpret the information a model produces. The course will attempt to instill a critical viewpoint towards decision models, recognizing that they are powerful but limited tools.

The applicability and usage of computer-based models have increased dramatically in recent years, due to the extraordinary improvements in computer, information and communication technologies, including not just hardware but also model-solution techniques and user interfaces. Thirty years ago, working with a model meant using an expensive mainframe computer, learning a complex programming language, and struggling to compile data by hand; the entire process was clearly marked "experts only." The rise of personal computers, friendly interfaces (such as spreadsheets), and large databases has made modeling far more accessible to managers. Information has come to be recognized as a critical resource, and models play a key role in deploying this resource, in organizing and structuring information so that it can be used productively.

Texts

- There is no required textbook. But in the first class you will be provided with a list of recommended textbooks if you feel you need a reference book.

Course Web Page

The web page for the course can be found on CourseWorks. It contains the lecture notes, Excel files, and additional reading materials. The page will be updated as the course progresses.

Computer Software

We will use spreadsheets extensively throughout the course. In particular, we will utilize the Excel spreadsheet package for Windows. This package has optimization capabilities built in. In the beginning of the course, we will use Solver. Later in the semester we will use Crystal Ball. (Do not worry if you are not familiar with these software items. Their use will be explained in class. All you need is a basic understanding of Excel.):

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. To check whether you have this add-in, choose the Tools/Add-ins menu option in Excel. In the box that appears, you should have a line for the Solver add-in. Check the corresponding box hit OK. It should then appear on the right had side of the Data tab in Windows or under the Tools tab for Macs.

2) *YASAI*, a free add-in for Excel that makes it much easier to run simulations in a spreadsheet. It will be posted for download on our Courseworks site.

Course Work

There will be several computer homework assignments which must be completed to get a grade for the course. Depending on the timing of the course material, there may be a project assignment. In addition to these assignments, there will be a final exam.

Grading will be determined as follows (a project may or not be assigned depending on time):

Homework	Must be completed to get a grade
Final	100%

Regarding 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, you should communicate that to me in advance.

Practice Problems

A set of practice problems, solutions, and corresponding spreadsheets will be posted on Courseworks. Many of these practice problems are based on past midterm and final examination questions. None of these practice problems will be collected.

Exam

There will be one final exam covering all of the material. The exam will be open book and open notes. The *majority* of the points on the exam will be given for correct methods and analysis; correct numbers will count for a smaller portion of the points.

Notebook Computers

Notebook computers will be used in this course. Although students are not required to bring them to class, I recommend you do. Download any session materials before class. The network connections in the classroom may be turned off during the class hours.

Course Schedule

Lecture #	Topic
Lecture 1	Introduction to Decision Models, Optimization using Excel
Lecture 2	Modeling Examples: Staffing, Transportation/Supply Chain, Production
Lecture 3	Sensitivity Analysis
Lecture 4	Multi-period Models
Lecture 5	Integer Models
Lecture 6	Non-linear Models: Portfolio Optimization
Lecture 7	Portfolio Optimization: Options
Lecture 8	Product Pricing, Retail Revenue Management
Lecture 9	Introduction to Simulation, Asian Options
Lecture 10	Yield Management, Optimization using Simulation
Lecture 11	Foreign Exchange Hedging
Lecture 12	Simulating Value at Risk