SUMA PS5033 - Decision Models & Management – 2018

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SYLLABUS – 2018

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. Twenty 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.

Textbook - Recommended

Powell and Baker, The Art of Modeling with Spreadsheets, John Wiley & Sons, 2004.

Course Web Page

The web page for the course can be found on Canvas (previously known as 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 this course we will us the following pieces of software:

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 from Oracle which makes it much easier to run simulations in a spreadsheet.

You should have Solver on your computer. To check whether you have the Solver add-in, choose the Tools/Add-ins menu option in Excel. In the box that appears, you should have a line for it, and the corresponding boxes should be checked. If you do not have a line for an add-in, please let me know.

Course Work

There will be several computer homework assignments and one project assignment. In addition to these assignments, there will be a midterm and a final exam. There are specific instructions for how to format and submit homework on Canvas. Please refer to those notes.

Grading will be determined as follows:

Homework*	20%
Project	10%
Exams	70%

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.

*Weekly homework assignments are posted after each class and are due on Canvas the following Monday by 2pm.

Practice Problems

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

Exams

There will be a full class midterm and final exam. The exams will be open book and open notes. The majority of the points on the exams will be given for correct methods and analysis; correct numbers will only count for a small portion of the points.

Notebook Computers

Notebook computers will be used in this course, you should always bring your (fully charged) laptops to class. Download any session materials before class from Canvas as network connections in the classroom may be turned off during class hours.

Course Schedule

Session 1: Introduction to Decision Models, Optimization using Excel

Session 2: Modeling Examples: Staffing, Transportation/Supply Chain, Production

Session 3: Sensitivity Analysis

Session 4: Multi-period Models

Session 5: Integer Models

Session 6: Non-linear Models: Portfolio Optimization

Session 7: Portfolio Optimization: Options

Session 8: Product Pricing, Retail Revenue Management

Session 9: Introduction to Simulation, Asian Options

Session 10: Yield Management, Optimization using Simulation

Session 11: Foreign Exchange Hedging

Session 12: Simulating Value at Risk