Business Modeling for Competitive Advantage

BZAN 7320   **Spring 2019**

Instructor Information

Instructor	Email	Office Location & Hours
Wynne Chin, Ph.D.	Bzan7320@gmail.com	MH-270E /713-743-4728 Thu 9:00-10:00 PM and by appt

General Information

Description

Data have become a torrent flowing into every area of the global economy. Many companies are seeking to enhance their ability to transform data into valuable insights and actions. This course will provide students with necessary skills, including modeling, forecasting, optimization and simulation. We will build models, analyze them using various Excel-based tools and add-ins, and most importantly interpret the economic value of the solutions.

Prerequisite

Students are expected to be proficient in Excel prior to taking this course. This included being able to use common Excel tools such as range names, pivot tables, data tables, lookups, goal seek, conditional/logical IFs, conditional SUM/COUNT/AVERAGE, SUMPRODUCT, and statistical and financial functions. A good tutorial on all these tools (and more) can be found here: http://www.kelley.iu.edu/albrightbooks/Free_downloads.htm

Course Materials

- **Textbook:** *Practical Management Science 5th ed.,* ISBN 978-1-305-25090-1 (ISBN is hardcover version). This is not the most recent edition of the textbook, so it is available for a reasonable price. *Licensed version* of Palisade Decision Tools Suite and other Excel add-ins (included with *new* textbooks). Otherwise, you will need to purchase a student copy of Decision Tools Suite for $50 here: http://www.palisade.com/cart/products_en.asp?cat=51&panel=0.

Additional requirements:

- Laptop computer with Windows 7 OS or later. Because of issues with the Excel add-ins, Mac users must be able to run Windows either as the native OS or via Boot Camp, VMware Fusion, etc.

- Microsoft Excel 2013 or later.

Course Guidelines

The course involves lots of Excel Spreadsheets modeling. To be successful in this course you should be prepared to spend a fair amount of time outside of class practicing your modeling skills. This course is taught using and inverted pedagogy where you are responsible for reviewing the course lectures online BEFORE coming to class so that we can work more challenging problems during class and have more time for discussion.

While we will be using Excel as our primary modeling "language", this is not a course in Excel; rather, it is a course that will help you to integrate much of what you are learning in your MBA curriculum in a way that will allow you to add value to your organization.

Course Objectives

This course supports the MBA program learning goals in the following ways:

- **Cross disciplinary competence** – Practice translating descriptions of decision making problems in various business disciplines into formal models, and investigate those models in an organized fashion.
- **Critical thinking** – Skillfully build customized computer models for use in decision support, interpret model results, draw conclusions supported by the results and effectively present those conclusions.
- **Communication** – Strengthen students' ability to identify the key results of analysis and present them in useful ways to support decision making.

Classroom Conduct: All students are expected to behave in a professional and ethical manner at all times. This includes, but is not limited to, the following:

- Coming to class on time and staying until the end of the period. "Attending" class means not only being physically present but also engaged and actively participating in a positive way.
- Using legally licensed copies of the course software and textbook materials.
- Using your computer for class business ONLY; i.e., ***not for email, web surfing, messaging, etc.***
- Taking notes and paying attention during class so that you can ask meaningful questions.
- Working diligently outside of class time to solve the homework problems on your own.
- Strictly observing the university academic honesty policy at all times.

Academic Integrity Policy:

All students are expected to be familiar with the University of Houston Academic Honesty policy that is published in the graduate catalog. In particular, the following four principles apply to this class:

- All problem sets and quizzes should reflect your own effort only (except as noted above for the case studies where work with other students is documented). Discussion with others from another section about graded submissions is a violation of the Academic Honesty Policy.
- Passing case notes and class handouts to students who have yet to take the course, who attend a different section, or receiving material from those who took the class in the past, is strictly prohibited.
- Plagiarizing (the misrepresentation of work done by others as being one's own work) is a violation of the Academic Honesty Policy. Remember to cite all sources of information and ideas to prevent problems.
- You may not submit the same work (or substantially similar work) to meet the requirements of more than one course without the written consent of all instructors concerned.

Disability Accommodation: The C. T. Bauer College of Business would like to help students who have disabilities achieve their highest potential. To this end, in order to receive academic accommodations, students must register with the Center for Students with Disabilities (CSD) (telephone 713-743-5400), and present approved accommodation documentation to their instructors in a timely manner.

CAPS Counseling and Psychological Services: Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. Also, there is no appointment necessary for the "Let's Talk" program, which is a drop-in consultation service at convenient locations and hours around campus. http://www.uh.edu/caps/outreach/lets_talk.html.

Religious Holy Days: The University of Houston respects the religious observances of students even though they may conflict with university class meetings, assignments, or examinations as outlined in the University of Houston Student Handbook. Potential conflicts with assignment due dates and examinations must be discussed with the instructor **within the first week of class** to be eligible for scheduling changes.

Course Schedule (tentative)

Week	Date	Topic	Content	Sections
1	01/17	Introduction	Into to Business Analytics, Basic Excel, Filter & Pivot Table	Notes
2	01/24	Intro to modeling	Form Control, Breakeven, Data Table, NPV, Demand Estimate	Notes, Ch2
	01/31	Last day to drop		
3	01/31	Intro to modeling	Form Control, Breakeven, Data Table, NPV, Demand Estimate	Notes, Ch2
4	02/07	Regression Analysis	Estimating Relationships	Notes, Ch14
5	02/14	Regression Analysis	Statistical Inference, Interaction Analysis, Logistic Regression	Notes, Ch14
6	02/21	Forecasting	Time Series Analysis	Notes, Ch14
	02/22-02/24	**Exam 1**	Excel Modeling, Basic Regression	
7	02/28	Intro to Optimization	Intro to Linear Optimization; Product Mix, SolverTable	Ch3.1-3.9
8	03/07	Linear Programming	Aggregate Planning, Blending	Ch4.1-4.7
			Spring Break 03/11 – 03/15	
9	03/21	Adv. Optimization	Transportation & Assignment Models, Binary Models,	Ch5.1-5.3, Ch6
10	03/28	Adv. Optimization	Nonlinear Optimization, Genetic Algroithms	Ch7, Ch8
	03/29-03/31	**Exam 2**	Regression and Forecasting, Optimization	
	04/04	Last day to drop with W		
11	04/04	Data Mining	PCA & PLS regression, Cluster and Discriminant Analysis	Notes
12	04/11	Intro to Simulation	Excel vs @Risk	Ch10
13	04/18	Adv. Simulation	Operations, Financial and Marketing Models	Ch11
14	04/25	Inventory Control	EOQ, (R,Q) Policy, (s, S) Policy, Order Simulation,	Ch12
	04/26-04/28	**Exam 3**	Optimization and Simulation	

Assessments

Exam Protocol

The course includes three open-book, open-note exams during a weekend time window. The test will be available on BlackBoard and includes problems that does not allow backtracking. This provides all students with the opportunity to take the exam in a more relaxed and comfortable setting.

Each student will be required to affirm that they did not give or receive any unauthorized aid during the exam and adhered to the time limits given for the exam. Fail to submit your workbook and exam in a timely basis will result point deduction. Violations of this honesty pledge will be considered academic misconduct and may be subject to further disciplinary action.

Case study

The modeling projects are key deliverables of the course. These are unstructured problems that are intended to simulate problems you might encounter on the job. You should plan to work on the modeling projects in self-determined teams of **three to four**. HOWEVER both people are expected to contribute effort on ALL projects; DO NOT "take turns" working the projects as that will defeat the purpose of them.

Each project requires you to build a decision model from scratch. This means you must first identify the decision that is required by the project. Here you may find that using an influence diagram or other mapping tool will help you to understand the problem better, as well as helping to identify the information you will need to build the model. In many cases you will also need to draw upon your knowledge of the various business disciplines (finance, supply chain, etc.) to develop the model.

Next it is important for you to explore alternatives that may affect the decision. Keep in mind that any model is only as good as the assumptions that went into building it, so be sure to document your base assumptions and then determine how the results might change if those assumptions were different. This is known as "parametric analysis", and it is a key part of the decision modeling process.

Finally, make specific recommendations to address the issues you identified. Among the model alternatives you develop, one will usually stand out as being clearly better. Describe the next steps that should be taken to execute your recommendation(s) and provide some guidance how to evaluate whether or not it is successful. Think in terms of specific performance measures that will indicate that your recommendations are having an impact. Don't use imprecise measures such as "increase profit" or "decreased cost"; try to identify specific targets that can be monitored. While you may not be able to provide exact time/cost estimates, it is important to ensure that your recommendation is feasible.

Schedule

Case study	Start date	Subject	Due date
Case study 1		Regression and forecasting	2/28
Case study 2		Optimization	4/04
Case study 3		Simulation	4/25

Grading

The case studies, exams and in-class participation will be weighted as follows to determine each student's final grade:

Item	Value
3 Modeling Case studies (15% each)	45%
3 Exams	55%
Highest Grade 25%	
Middle Grade 20%	
Lowest Grade 10%	
Total	100%

The following scale will determine you final course grade:

≥ 92	A	80.00 – 83.32	B-
90.00 – 91.99	A-	75.00 – 79.99	C+
86.67 – 89.99	B+	70.00 – 74.99	C
83.33 – 86.66	B	< 70	C-

Figure 1 (below) summarizes how the course is organized. There are four main components: 1) learning advanced Excel tools and data mining, 2) resource allocation/optimization using Solver, 3) decision making under uncertainty, and 4) static simulation using Monte Carlo techniques.
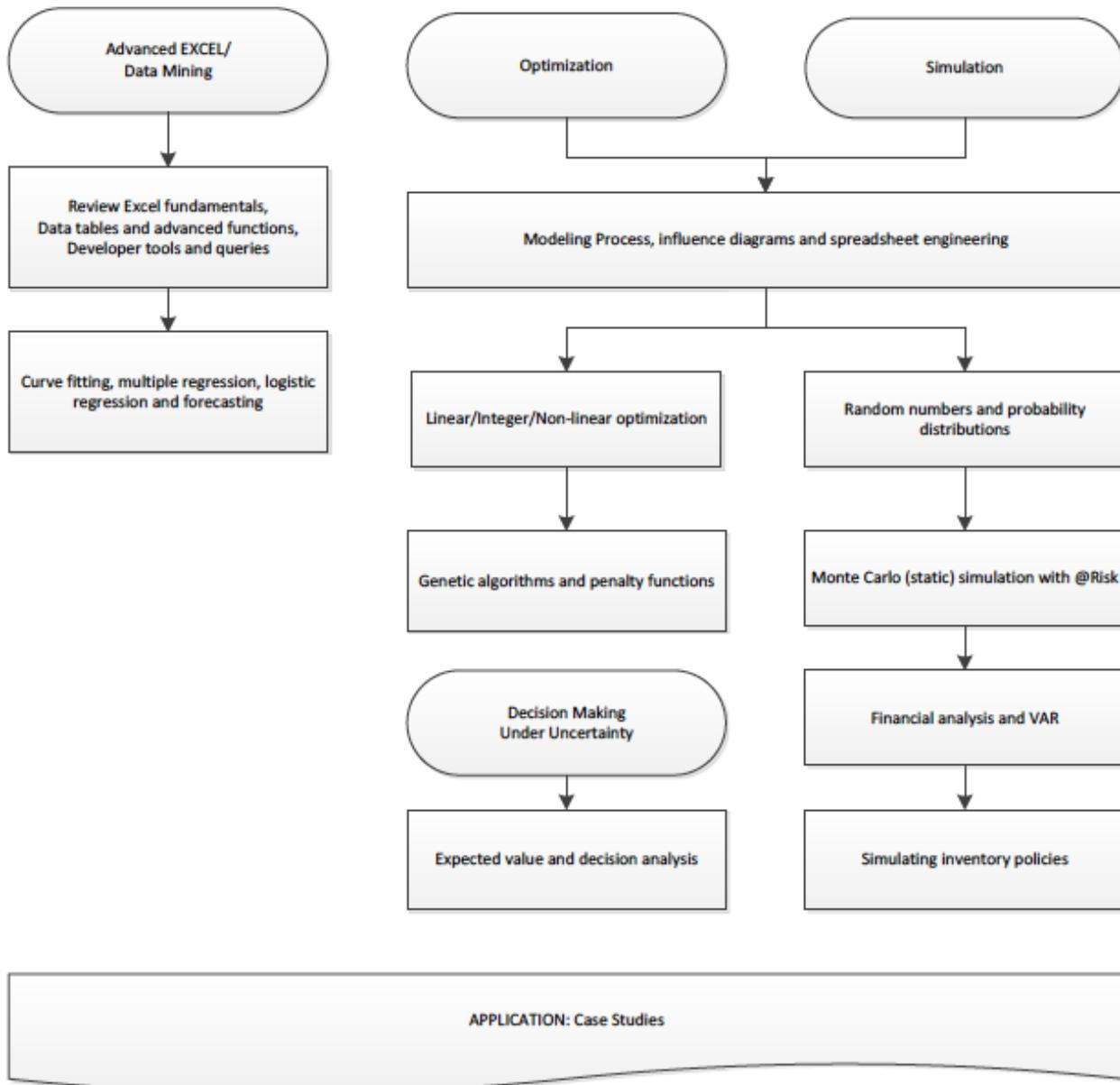
Figure 1: Business Modeling for Competitive Advantage Course Outline