

BZAN 7320: Business Modeling for Competitive Advantage
Section 18144 Thu 6 – 9 Spring 2018

**** PRELIMINARY COURSE SYLLABUS ****

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Student Hours: Online TBD; in-person Tue/Thu 4:00 – 5:00 p.m. and by appointment
Email: Please use BlackBoard email for all course correspondence

Course Description

This course is intended to help students develop the analytical skills needed to examine unstructured business problems, develop decision models, analyze alternatives, and make sound recommendations for action. Among the techniques we will study are: problems of optimization (e.g., resource allocation), risk analysis, data analytics, and forecasting. In each area we will consider specific operations, finance and marketing problems. We will build models, analyze them using various Excel-based tools and add-ins, and most importantly interpret the economic value of the solutions.

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.

In addition to the MBA learning goals, there are a number of specific objectives that are part of this course. These objectives are described in more detail on the course website.

Course textbook and requirements

Textbook: *Practical Management Science 5th ed.*, ISBN 978-1-305-25090-1 (hardcover version). This is not the most recent edition of the textbook, so it is available for a reasonable price. You will also 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.** Please note that the instructor is NOT an expert in operating systems or hardware!
- Microsoft Excel 2013 or later.
- *Licensed version* of Palisade Decision Tools Suite and other Excel add-ins (included with *new* textbooks)
- Optional: other software may be provided at no cost to you.

Course Outline and Organization

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.

Figure 1 (below) illustrates 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.

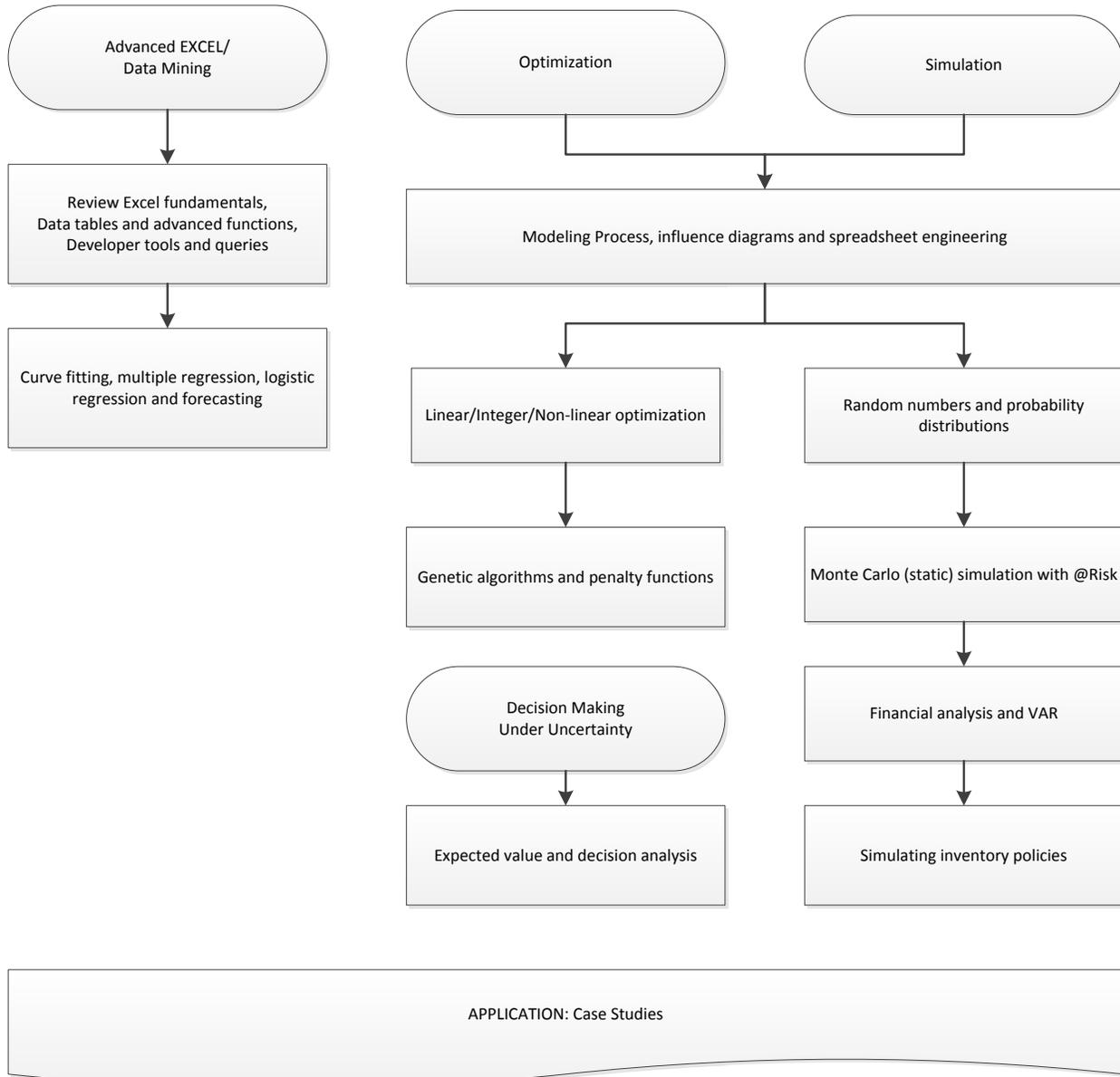


Figure 1: Business Modeling for Competitive Advantage Course Outline

While attending lectures and taking notes are necessary parts of this course, they are not sufficient to learn the material. Because this is a course emphasizing quantitative skills most students find that **the best way to learn and understand the principles of business modeling is by working problems**. To be successful in this course you should be prepared to spend a fair amount of time practicing your modeling skills, which for most students means a minimum of 4 – 6 hours per week *outside* of class. Thus, I have designed this course to provide you with multiple opportunities to learn and master the material so that you can be successful in developing business models as a professional. These include:

Guided Practice: these are structured activities outside of class that introduce modeling concepts through reading, watching video lectures, and other activities.

Problem Sets: these exercises focus on quantitative skills and conceptual understanding of the material introduced through Guided Practice. They are graded on a pass (full credit) /needs improvement (half credit) basis to encourage you to focus on learning the material rather than competing for points.

Class activities: we will focus on the advanced learning objectives for the course, and work problems that will promote a deeper understanding of optimization and simulation.

Concept Quizzes: at the conclusion of each course topic (Regression and Forecasting, Optimization Modeling, and Decision Making under Uncertainty) you will have an in class quiz during the final 45 minutes (i.e., 8 – 8:45 pm) of class that digs deeper into conceptual understanding and interpretation of that topic.

Modeling projects: In addition to the guided practice problem sets and concept quizzes, you will have an opportunity to complete three projects that apply modeling techniques to real world applications and that use or simulate real world data. These projects are also meant to challenge you to present your results in a way that is readily understood.

Grading

Let's talk frankly about grades for a minute. Your purpose in taking this course should be to learn interesting and valuable skills that can help you in your career, not to score points and get a particular letter grade. If you spend more time thinking about grades than about business modeling, then you will not be taking full advantage of the opportunity to learn new concepts and develop your skills.

The problem sets, concept quizzes and case studies will be weighted as follows to determine each student's final grade:

Item	Value
8 problem sets (pass/needs improvement)	25%
3 concept quizzes	30%
<u>3 modeling projects</u>	<u>45%</u>
Total	100%

The problem sets are graded on a Pass/Needs improvement basis where $\geq 70\%$ results in full credit. You will have two opportunities to earn full credit for the problem sets prior to the deadline for each.

The following scale will determine your final course grade¹:

≥ 90	A	76.67 – 79.99	B-
86.67 – 89.99	A-	73.33 – 76.66	C+
83.33 – 86.66	B+	70.00 – 73.32	C
80.00 – 83.32	B	< 70	C-

Modeling Projects

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 two. **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.

Two of the case studies are available from: <http://cb.hbsp.harvard.edu/cbmp/access/72595885>. The final case study will be posted on BlackBoard.

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.

Each project should consist of a report to management containing the following:

- Executive summary – brief description of the issues you identified and your recommendation(s)
- Model description – here you should document what the model does and the inputs necessary
- Parametric analysis – what changes you made to the model basis to determine how the results change, and a comparison of the various options to determine the best recommendation. *Be sure to include graphs, charts or tables that summarize your analyses where appropriate.*
- Conclusion – what are the next steps, and what performance metrics should be monitored?
- Appendix – the actual model you developed in Excel

¹ Grades are earned on the basis of performance in this course, not given on the basis of need or effort. This grading scale already includes a curve, so there will be no rounding up. NOTE: I do not reply to email requesting a grade change or opportunities for extra credit.

Academic Integrity

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.

Accommodations for Students with Disabilities

My objective is to help all students achieve their highest potential in the Bauer College of Business. If you need to receive accommodation in the classroom, on exams or with assignments, please make arrangements with me prior to the exam or assignment. You can also contact the Justin Dart Center for Students with (dis)Abilities (713-743-5400) to obtain assistance. Services provided by the Dart Center include assistance with course accommodations, adaptive equipment, individualized exam administration, taped textbooks, wheelchair repair, library needs, handicapped parking, as well as many other needs.

Teaching Philosophy

My teaching philosophy is based on the goal of leading you to develop skills that will help you achieve success in your professional careers and personal lives. I spent most of my career working in industry and I know first-hand how important it is to have intellectual curiosity matched with an ability to critically analyze the issues faced by organizations large and small. I believe that your education should be focused on more than just learning the contents of the textbooks we use. You must understand and be able to articulate the knowledge you gain before you can apply it successfully.

I will challenge you to think critically about the problems we discuss, and I will help you develop both an intuitive understanding of problems and a systematic approach to solving them. Realizing that all of you have diverse learning styles I will try to engage you in a number of ways to help you gain a better understanding of the subject at hand. For me teaching is an opportunity to provide you with some of the advantages I have received in my education and career, and I consider it a privilege to pass on what I have learned.

Class schedule

Given the quantitative nature of this course, it is important that students plan to complete all the guided practice exercises, problem sets and projects in order to gain the most value from the course. The following is a *preliminary* schedule for the semester; the instructor reserves the right to modify the schedule as events warrant:

BZAN 7320 Business Modeling for Competitive Advantage Tentative Class Schedule Spring 2018

Week		Date	Topic	Reference	Assignment due
1	Regr & Forecast	18-Jan	Course intro; Excel tools and PowerPivot	Notes	
2		25-Jan	Regression and forecasting	PMS 14	PS-02
3		1-Feb	Logistic regression	Notes	PS-01
4	Optimization	8-Feb	Intro to linear optimization; concept quiz #1	Notes, PMS 3	Project #1
5		15-Feb	Linear models: Product mix	PMS 4	PS-03
6		22-Feb	Linear models with integer variables: Transportation	PMS 5, 6	PS-04
7		1-Mar	Non-linear models: Blending	PMS 7	PS-05
8		8-Mar	Non-linear models: Genetic Algorithms	PMS 8	
9		15-Mar	<i>Spring Break - no class</i>		
10	Simulation & Queueing	22-Mar	Decision making under uncertainty; concept quiz #2	PMS 9	Project #2
11		29-Mar	Intro to simulation	Notes	
12		5-Apr	Simulation modeling	PMS 10	PS-06
13		12-Apr	Financial models and VAR	PMS 11	PS-07
14		19-Apr	Inventory and supply chain models	PMS 12	PS-08
15		26-Apr	Queueing models; concept quiz #3	PMS 13	Project #3

Revised: 1/18/2018

Note: The University of Houston academic calendars are published a year in advance, and show the date of finals week and the end of the semester. Travel plans prior to the end of the semester cannot be used as a reason to request a makeup exam.