

STA371G

Statistics and Modeling

MW 03.30p-5.00p (Unique 04455)

Course description

This course introduces some of the basic concepts in quantitative business analysis. We discuss methods that are used extensively in business organizations to solve large, structured problems. Such methods generate results that support decision-making at all levels of the organization over various time horizons.

The primary topics we will cover in this class are statistical regression, time series analysis & forecasting, decision analysis and simulation. We will repeatedly use real world datasets and examples to motivate our discussions and illustrate the relevance of what you learn. The concepts and methods you learn in this class should improve your own general problem solving skills. By the end of the semester you will have learned concepts and tools that will help you analyze, infer and make decisions using quantitative data.

Textbook

The textbook for the course is Albright, S. C., W. L. Winston, C. Zappe. "Data Analysis and Decision Making with Microsoft Excel". You can use the fourth or the extended third (3e) edition. Class lectures will not rely on the book very much. However, the book will serve well as a companion reading material and give you more sample problems and exercises.

Homework

Weekly assignments will be posted on Blackboard as a downloadable Excel file. The file will have one worksheet per question. The questions have to be answered on each of these sheets and submitted on Blackboard by midnight on their due dates. Please do not wait until the last minute to submit assignments. This will allow for any unexpected difficulties (with the material, Blackboard, etc.), which occur much more frequently than one would expect. Your lowest homework score will be dropped in calculating the aggregate homework grade. Homework assignments are to be completed individually and not in teams.

Exams

There will be two midterms and a final. Tests all be given in the MOD Lab and the midterms will be given in the evening. The final will be cumulative. All material presented in class will be included.

Instructor:

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Course material and web page:

Announcements, syllabus, lecture slides, videos and other course material will be posted on the class webpage: <http://bit.ly/371g-2013>.

Blackboard (courses.utexas.edu) will be used to administer assignments, tests and to report grades. There will be a link to the class webpage from Blackboard as well.

Group project

The group project is optional. Each group should have at least 2 and at most 3 members. The project can be done using any of the methods we cover in the class. If you take all three midterm exams you are not required to do a project. If you choose to do a project, your score for the project can substitute for your worse midterm exam (only midterms 1 or 2) or your aggregate homework score. If you miss either midterm 1 or 2 you can make up for it with the group project.

You can seek help from the TA or me in deciding your project, but it should be something you are interested in. You should choose your topic and email me a one paragraph description by March 6th. Your project report is due on May 1st. The report should be 8-12 pages long and should include a summary describing the goal of the project with a brief overview of the results, a section describing the data and their collection, a section describing the analysis and the results, a short concluding section. You should also submit your data and the code for your analysis. If you do a project, you will have to present your results in class as a 5-10 minute presentation at the end of the semester.

Tentative schedule

Grading:

Each test will account for 25% of your final grade. All homework assignments together will account for the other 25%. The optional group project will also weight 25% as it can replace the homework or the 1st or 2nd Midterms.

Quantitative Reasoning flag:

Note that this course also carries the Quantitative Reasoning flag (utexas.edu/ugs/teaching/flags). Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life.

Lecture	Date	Topic	Subtopic	Homework
1	14-Jan	Introduction	Syllabus and course overview	
2	16-Jan	"	Confidence intervals & hypothesis testing review	
3	23-Jan	Regression	Scatterplots, correlation and covariance	1 out
4	28-Jan	"	Simple linear regression	
5	30-Jan	"	Multiple regression	1 due 2 out
6	4-Feb	"	Conf. intervals and hyp. testing for regression parameters	
7	6-Feb	"	Multicollinearity	2 due 3 out
8	11-Feb	"	Assumptions, nonlinearity and outliers	
9	13-Feb	"	Model selection	3 due 4 out
10	18-Feb	Test 1 review	Test 1 on 19th Feb evening	
11	20-Feb	Time series & forecasting	Time series components, forecasting errors	4 due 5 out
12	25-Feb	"	Forecasts using one variable, moving averages, smoothing	
13	27-Feb	"	Forecasts using regression, trends and autocorrelations	5 due 6 out
14	4-Mar	"	Seasonality	
15	6-Mar	Decision Analysis	Review of probability and distributions	6 due
16	18-Mar	"	Introduction to decision trees	
17	20-Mar	"	Using Precision tree add-in	7 out
18	25-Mar	"	Bayes rule	
19	27-Mar	"	Multistage problems	7 due 8 out
20	1-Apr	Test 2 review	Test 2 on 2 nd Apr evening	
21	3-Apr	Simulation	Introduction to simulation and @Risk	8 due 9 out
22	8-Apr	"	Running multiple simulation runs	
23	10-Apr	"	Output distribution summaries	9 due 10 out
24	15-Apr	"	Multiple sources of randomness and correlation	
25	17-Apr	"	A simulation case study	10 due 11 out
26	22-Apr	"	Project presentations	
27	24-Apr	"	Project presentations	11 due 12 out
28	29-Apr	Course summary	Course summary and final review	
29	1-May	Test 3 review	Test 3 on 10 th May evening	12 due

Computing

This is a very quantitative course and there will be substantial numerical calculations. We will use Microsoft Excel and some software tools installed on it. For the sake of consistency we will stick to Excel 2010 on Windows for demonstrations. Also note that this is the setup that will be available to you at the MOD lab during your tests. There will be a number of excel demonstrations in class. It is not necessary to have your laptops during these times. While you are allowed to follow these demonstrations with your laptop, please be aware that I cannot stop to answer debugging questions (we will have to do this during office hours). Moreover, videos of many of these demonstrations will be posted.

Scholastic dishonesty

The McCombs School of Business has no tolerance for acts of scholastic dishonesty. The responsibilities of both students and faculty with regard to scholastic dishonesty are described in detail in the Policy Statement on Scholastic Dishonesty for the McCombs School of Business. By teaching this course, I have agreed to observe all the faculty responsibilities described in that document. By enrolling in this class, you have agreed to observe all the student responsibilities described in that document. If the application of that Policy Statement to this class and its assignments are unclear in any way, it is your responsibility to ask me for clarification. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. You should refer to the Student Judicial Services website at <http://deanofstudents.utexas.edu/sjs/> or the *General Information Catalog* to access the official University policies and procedures on scholastic dishonesty as well as further elaboration on what constitutes scholastic dishonesty.

Scholastic dishonesty in this course includes copying or collaborating during an exam, discussing or divulging the contents of an exam with another student who will take the test, and use of homework solutions from another student or semester.

Students with disabilities

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. This includes students with ADHD and learning disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities: <http://www.utexas.edu/diversity/ddce/ssd/> or at 471-6259, 471-4641 TTY.