STA 371G: Statistics and Modeling
Spring 2016

Session 1, 04520,   Tuesday & Thursday 12:30 - 2:00 PM, Room: UTC 1.144
Session 2, 04530,   Tuesday & Thursday 2:00 - 3:30 PM, Room: UTC 1.144
Session 3, 04540,   Tuesday & Thursday 3:30 - 5:00 PM, Room: UTC 1.144

Instructor: Mingyuan Zhou, Ph.D., Assistant Professor of Statistics
   Office: CBA 6.462 (east side of the building that faces the entrance of Gregory Gym)
   Phone: 512-232-6763
   Email: `mingyuan.zhou@mccombs.utexas.edu`
   Website: http://mingyuanzhou.github.io/
   Office Hours: Tuesday & Thursday 5:00-6:30 PM
   You are welcome to come by my office at other times. To make sure that I will be there
then, you may first call my office or send me an email.

Teaching Assistants:
   Quan Zhang, `zhangquan@utexas.edu` , McCombs PhD Student
   Office Hours: Wednesday, 3:00 PM to 4:30 PM, CBA 4.304A (TA Space D)
   Yutong Duan, `yduan@utexas.edu`, Statistics and Data Sciences Master Student
   Office Hours: Wednesday, 10:30 AM - 12:00 PM, CBA 4.304A (TA Space C)

Course Website: http://mingyuanzhou.github.io/STA371G/

Course Description: This course introduces statistical methods and data analysis tools
to model uncertainty in business decisions. After a brief review of basic probability and
statistics, we will discuss regression models, time series analysis, and decision making. Sim-
ulation with statistical software will be incorporated into these topics and used throughout
the semester. The introduced statistical models will be illustrated with a large number of
real examples, such as those in finance, marketing, economics, politics, and sports. Analyz-
ing real datasets with R and Excel will be demonstrated in class. The techniques taught in
the course will also be useful in performing data analysis in other BBA courses.

   By the end of the course, you will be equipped with the necessary statistical knowledge
and skills to solve real-world business problems. Specifically, you will learn how to choose an
appropriate statistical model to analyze business data, perform computation with statistical
software, validate the output of the model, and draw appropriate conclusions.

Materials:

- Text:

   (a) Data Analysis and Decision Making with Microsoft Excel by Albright, Winston and
   Zappe, 3rd/4th edition. It covers most of the topics of this course. A UT customized
   version is available at a lower price. It is recommended but not required.

(b) OpenIntro Statistics by Diez, Barr and Çetinkaya-Rundel, 3rd Edition, available for free at http://www.openintro.org/stat/textbook.php. This book provides a review of basic probability and statistics. It is recommended but not required.

(c) Course packet available at University Coop. It contains the cases to be studied in this course. One course packet for each group would usually be sufficient.

- Software:

(a) R and RStudio (free software). Learning basic operations with R is recommended, though not required. I will use R for class demonstrations and post the R code on the course website. Running these R code by yourself will help you better understand randomness and uncertainty, and practice your data analysis skills. You are free to use any other software, such as Excel, Matlab, Python, SAS and Minitab.

(b) Excel, Analysis ToolPak for Windows, StatPlus:mac LE for Mac.

Grading:
Homework (15%)
In Class Quizzes (7%)
Midterm Exam 1 (22.5%)
Midterm Exam 2 (22.5%)
Final Exam (33%)

Homework: You will receive a total of around eight homework assignments throughout the semester. You may form groups to complete homework assignments. Each group may consist of no more than three members. Each group only need to turn in one report.

For class discussions and homework assignments, we will study the following eight business cases:

1. Amore Frozen Food, UVA-QA-0317

2. Waite First Securities, UVA-QA-0453

3. Milk and Money, KEL343

4. Orion Bus Industries: Contract bidding strategy, IVEY 9B03E005

5. Oakland A's A, UVA-QA-0282

6. Oakland A's B, UVA-QA-0283

7. Northern Napa Valley Winery, Inc, IVEY 9A98E046

8. Freemark Abbey, Harvard 9-181-027

You may either purchase these cases individually online or purchase the course packet that contains all the eight cases.

Exams:

- Midterm Exam 1 will be on Tuesday, March 1 (Location TBD, 7:00-10:00 pm).
- Midterm Exam 2 will be on Tuesday, April 12 (Location TBD, 7:00-10:00 pm).
- Both midterm exams will be held in the evening to reduce exam stress.
- The final exam is cumulative and covers basic probability and statistics, linear regression, time series, decision making, and simulation. It will be given during the University's final exam period. The specific date is determined by the University.
- Your first midterm exam score could be replaced by the second midterm exam score or the final exam score, whichever is higher. Your second midterm exam score could be replaced by the final exam score if it is lower than the final exam score.
- Clerical errors will be corrected without hassle. Other regrading requests must be submitted in writing within one week (7 days) of the exam's return.
- You may bring one, two, and three pages (8.5×11 inch, letter size) of notes and formulas to the first midterm, second midterm, and final exams, respectively.
- You may bring a calculator to the midterm and final exams.
- There is no predetermined grade distribution for this class.

Tentative Course Schedule:

This schedule represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

A more detailed Course Outline in the course website will be updated on a regular basis.

Week 1
Jan 19, Introduction, random variables and probability distributions
Jan 21, Random variables and probability distributions

Week 2
Jan 26, Normal and binomial distributions
Jan 28, Estimation and sampling distributions

Week 3
Feb 02, Simple linear regression: least squares estimation
Feb 04, Simple linear regression: covariance and correlation, goodness of fit

Week 4
Feb 09, Simple linear regression: model assumptions
Feb 11, Sampling distributions for regression parameters

Week 5
Feb 16, Confidence intervals for regression parameters
Feb 18, Hypothesis testing for regression models

Week 6
Feb 23, Multiple regression
Feb 25, Review for Midterm Exam 1, Discuss Practice Exam 1

Week 7
March 03, Multiple regression

Week 8
Mar 08, Dummy variables and interactions
Mar 10, Diagnostics and transformations

Week 9
Mar 15, Spring break, no classes
Mar 17, Spring break, no classes

Week 10
Mar 22, Diagnostics and transformations, logistic regression
Mar 24, Time series

Week 11
Mar 29, Time series
Mar 31, Model selection

Week 12
Apr 05, Decision making
Apr 07, Review for Midterm Exam 2

Week 13
Apr 14, Decision making

Week 14
Apr 19, Decision making
Apr 21, Decision making

Week 15
Apr 26, Introduction to Monte Carlo simulation
Apr 28, Simulation, Case Study

Week 16
May 03, Simulation, Case Study
May 05, Review and Discuss Practice Questions for the Final Exam

Office Hours: Don't hesitate to come to my office at CBA 6.462 during office hours (Tuesday & Thursday 5:00-6:30 PM) to discuss homework problems or any other aspects of the course. Please feel free to come by my office at other times, but to make sure that I will be there then, you may first call my office, send me an email, or talk to me before or after class to make an appointment.

Quantitative Reasoning Flag: This course carries the Quantitative Reasoning flag. 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. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

University of Texas Honor Code: The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

Academic Integrity: Each student in this course is expected to abide by the University of Texas Honor Code. Any work submitted by a student in this course for academic credit will be the student's own work.

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Students with Disabilities: Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, http://www.utexas.edu/diversity/ddce/ssd/.

Religious Holy Days: By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Policy on 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 BBA Program?s Statement on Scholastic Dishonesty at http://www.mccombs.utexas.edu/BBA/Code-of-Ethics.aspx. By teaching this course, I have agreed to observe all faculty responsibilities described in that document. By enrolling in this class, you have agreed to observe all student responsibilities described in that document. If the application of the Statement on Scholastic Dishonesty to this class or its assignments is 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, the integrity of the University, and the value of our academic brand, policies on scholastic dishonesty will be strictly enforced. You should refer to the Student Judicial Services website at http://deanofstudents.utexas.edu/sjs/ to access the official University policies and procedures on scholastic dishonesty as well as further elaboration on what constitutes scholastic dishonesty.

Campus Safety: Please note the following recommendations regarding emergency evacuation, provided by the Office of Campus Safety and Security, 512-471-5767, http://www.utexas.edu/safety:

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.

- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.

- Students requiring assistance in evacuation should inform the instructor in writing during the first week of class.

- In the event of an evacuation, follow the instruction of faculty or class instructors.

- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

- Behavior Concerns Advice Line (BCAL): 512-232-5050

- Further information regarding emergency evacuation routes and emergency procedures can be found at: http://www.utexas.edu/emergency.