STAT:5200 APPLIED STATISTICS-I

Fall 2019

TIME AND LOCATION:
Lectures: Monday, Wednesday and Friday from 12:30 – 1:20 PM in 51 SH
Lab: Friday from 1:30 – 2:20 PM in 41 SH

PREREQUISITES:
STAT:3101 (22S:131) or equivalent, and knowledge of matrix algebra

COREQUISITES:
STAT:4100 (22S:153) or STAT:5100 (22S:193)

INSTRUCTOR:
Joyee Ghosh, Dept. of Statistics and Actuarial Science
Office: 372 SH; Phone: 335-0816; E-mail: joyee-ghosh@uiowa.edu

OFFICE HOURS:
Monday 11:00–11:30 AM and 4:00–5:30 PM, Wednesday 11:00–11:30 AM, Friday 11:00-11:30 AM, and by appointment.

DEO:
Professor Kung-Sik Chang; Office: 241 Schaeffer Hall; Phone: 335-0712;
Email: kung-sik-chan@uiowa.edu

TEXTBOOK:
Required: Introduction to Regression Modeling, Abraham and Ledolter. (available at University Book Store)

ICON:
ICON will be used for posting grades, assignments, labs etc. All students registered for the course should have access.
COURSE INFORMATION:

Goals

The main topic of this course is regression analysis, which involves modeling data, as well as accompanying diagnostic methods (to see if the model fits well) and statistical inference (to see how much we can infer from the fitted model about the population from which the data have been collected). This is an applied statistics course, and some of your work will involve data analysis, computing and communicating statistical results. On the other hand, this is a graduate-level statistics course, and hence we will cover the material in some technical depth.

Description

We will cover chapters 1 through 7 of the textbook in the first eleven weeks or so. We will then cover chapters 9, 11 and/or other topics as time permits.

LAB:

We will use the statistical language R for this course, which can be downloaded from http://cran.us.r-project.org/ and is installed in the lab. Attendance in the labs is important for your success in the course. This is where you will learn how to use R under Linux, and use it for your assignments and project.

GRADING:

A plus-minus grading system will be used. As a rough guide A,A-: 90%–100%, B+,B,B-: 75%–90%, C+,C,C-: 50-75%, D: 40-50%, F:<40%. I may lower the cut-offs depending on the difficulty of the exam.

- Homework assignments (10%)
- Project (15%)
- Midterm exam (25%)
- Final exam (35%)
- Quizzes (15%)

Homework assignments

I expect to give weekly homework assignments covering both theory and applied problems. I will usually assign the homework on Wednesday and it will be due in class the following Wednesday. You can discuss homework assignments with me or other students, but the final write-up should be from your own understanding. While assignments do not have to be type-written, please provide figures or R code, when applicable. I may suggest additional practice problems some of which may be discussed in class, but you do not need to turn these in.
Project

For the project you can either identify an appropriate dataset for which multiple linear regression is applicable, or create an interesting simulation study (for example severe multicollinearity, small sample size relative to the number of predictors, nonnormal errors etc.) and generate fake data under it. The goal would be to analyze the real dataset using some of the statistical methods taught in class or compare the performance of different methods using simulation studies. You may include methods that have not been taught in class, but then you would be expected to have a good understanding of those methods. Some good resources for datasets are the DASL Library (The Data and Story Library) at http://lib.stat.cmu.edu/DASL/, the UCI Machine Learning Repository at http://archive.ics.uci.edu/ml/, and the MASS library in R. Please do not analyze data that have already been used in lectures, labs or homework assignments. You will work in groups for the project and submit i) a project proposal and ii) slides for an oral presentation to the class (per group). The final presentation should address the following:

- Objective
- Brief description of the data (source, variable key etc. or simulation set up)
- Statistical methods used for data analysis/simulation study
- Summary of results (presented as figures or tables when applicable)
- Discussion of findings and your interpretation, any shortcomings, and/or future work

Once you have identified the dataset or simulation topic, please submit a brief (maximum one-page description but can have extra pages of plots) project proposal by Monday, November 4, 2019. I am happy to talk to you about any questions regarding the project. The slides will be due on Tuesday, December 3, 2019, and the presentations (approximately 15 minutes per group) will be on December 4 and 6, 2019.

Exams

There will be a closed book 50 minutes midterm exam in class on Wednesday, October 16, 2019 (tentatively). You may bring a 8.5” × 11” hand-written formula sheet (both sides). There will be a closed book two hours final exam (date to be announced later). You may bring two 8.5” × 11” hand-written formula sheets (both sides). If an exam is missed, a make-up exam will be permitted only if the circumstances of missing the exam satisfy university policy (documentation will be required in such a case).

Quizzes

There will be a few brief quizzes to help you keep up with the material covered in class. The quizzes will be closed book and closed notes, no crib sheets will be allowed. I will announce the date and syllabus about one week before each quiz. The policy for make-up quizzes is same as that of exams.
**LATE WORK AND ABSENCES:**

Barring illness and family emergencies, credit will not be given for late work. If you have to miss a class, please read the material covered on that day before coming to the next class. This will help you get the most out of lectures.

**CLASSROOM ENVIRONMENT:**

Activities which are unacceptable are (1) prolonged conversation with a fellow student, (2) the use of cell phones, and (3) the use of laptops/tablets etc. in class. Please remember to switch your phones to silent mode before class starts and put away laptops/tablets/phones etc. when in class.

College of Liberal Arts and Sciences: Policies and Procedures

**Absences and Attendance**

Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, including Holy Day obligations, unavoidable circumstances, or University authorized activities (https://clas.uiowa.edu/students/handbook/attendance-absences). Students may use this absence form to aid communication; the instructor will decide if the absence is excused or unexcused:


**Academic Integrity**

All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College’s Code of Academic Honesty. Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through the UI email address (https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code).

**Accommodations for Disabilities**

UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussing specific accommodations with the instructor. More information is at https://sds.studentlife.uiowa.edu/.

**Administrative Home of the Course**

The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and related policies. Other colleges may have different policies. CLAS policies may be found here: https://clas.uiowa.edu/students/handbook.
Communication and the Required Use of UI Email

Students are responsible for official correspondences sent to the UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2).

Complaints

Students with a complaint about an academic issue should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to the College of Liberal Arts and Sciences.
For more information, see https://clas.uiowa.edu/students/handbook/student-rights-responsibilities.

Final Examination Policies

The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this information. No exams of any kind are allowed the week before finals. Visit https://registrar.uiowa.edu/final-examination-scheduling-policies.

Nondiscrimination in the Classroom

UI is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (diversity.uiowa.edu).

Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see https://osmrc.uiowa.edu/.