STAT:5200 APPLIED STATISTICS-I

Fall 2021

TIME AND LOCATION:
Lectures: Monday, Wednesday, and Friday from 12:30–1:20 PM in 30 SH
Lab: Friday from 8:30–9:20 AM in 346 SH

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

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

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

ZOOM OFFICE HOURS:
Monday 2:00–4:00 PM, Wednesday 1:35–2:00 PM, Friday 1:35–2:10 PM, or by appointment. You are welcome to “walk in” that is drop by in Zoom during office hours without prior appointment.

DEO:
Professor Kung-Sik Chan; 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 https://cran.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 (including 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+,D,D-: 40-50%, F:<40%. I may lower the cut-offs depending on the difficulty of the exam. The A+ grade is rarely awarded.

- 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 on ICON the following Wednesday. The lowest HW score will be dropped to accommodate missed HW due to illness and other unavoidable circumstances.

HW should show name and HW number written at the top of the first page. Please upload HW as Word or PDF documents. You may take a picture of your handwritten HW and embed in Word. If you have an iPhone, you can use the “Notes” app to create a new note. Choose the camera icon and then select “Scan Documents”. This automatically saves all the scanned handwritten pages in
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.

**Project**

For the project you can either identify an appropriate dataset for which multiple linear regression/logistic regression is applicable, or create an interesting simulation study (for example severe multicollinearity, small sample size relative to the number of predictors, nonnormal errors for linear regression 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/](http://lib.stat.cmu.edu/DASL/) the UCI Machine Learning Repository at [http://archive.ics.uci.edu/ml/](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 submit i) a project proposal and ii) slides for an oral presentation to the class. 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 1, 2021. I am happy to talk with you about any questions regarding the project. The slides will be due on Tuesday, November 30, 2021, and the presentations (approximately 15 minutes each) will be on December 1 and 3, 2021.

**Exams**

There will be a closed book 50 minutes midterm exam in class on Wednesday, October 20, 2021 (tentatively). You may bring a 8.5" × 11" hand-written formula sheet (write on one side only).

There will be a closed book two hours final exam (date to be announced later). You may bring a 8.5" × 11" hand-written formula sheet (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 some (2-3) short quizzes to help you keep up with the material covered in class. The quizzes will be closed book and I will announce the date and syllabus around 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.
ATTENDANCE AND CLASSROOM EXPECTATIONS

Students are responsible for attending class and for knowing an instructor’s attendance policies, which vary by course and content area. All students are expected to attend class and to contribute to its learning environment in part by complying with University policies and directives regarding appropriate classroom behavior or other matters.

ABSENCES

Students are responsible for communicating with instructors as soon they know that an absence might occur or as soon as possible in the case of an illness. Delays in communication could result in a forfeit of what otherwise might be an excused absence.

ABSENCES: ILLNESS, UNAVOIDABLE CIRCUMSTANCES, AND UNIVERSITY SPONSORED ACTIVITIES

Students who are ill, in an unavoidable circumstance affecting academic work, or who miss class because of a University sponsored activity are allowed by UI policy to make up a missed exam. Documentation is required by the instructor except in the case of a brief illness. Students are responsible for communicating with instructors as soon as the absence is known (https://opsmanual.uiowa.edu/students/absences-class#8.1).

ABSENCES: HOLY DAYS

Reasonable accommodations are allowed for students whose religious holy days coincide with their classroom assignments, tests, and attendance if the student notifies the instructor in writing of any such religious Holy Day conflicts within the first days of the semester and no later than the third week. (See the University Operations Manual: https://opsmanual.uiowa.edu/students/absences-class#8.2).

ABSENCES: MILITARY SERVICE OBLIGATIONS

Students absent from class due to U.S. veteran or U.S. military service obligations (including military service-related medical appointments, military orders, and National Guard Service obligations) must be excused without penalty. Instructors must make reasonable accommodations to allow students to make-up exams or other work. Students must communicate with their instructors about the expected possibility of missing class as soon as possible. (For more information, see https://opsmanual.uiowa.edu/iv-8-absences-class%C2%A0-0).

ACADEMIC MISCONDUCT

Plagiarism and the process for addressing academic misconduct of graduate students are defined in Section IV, Article F “Plagiarism by Graduate Students” of the UI Graduate College Manual of Rules and Regulations. Please contact the CLAS Associate Dean for Graduate Education for any necessary assistance in navigating the process mandated by the Graduate College.
ACADEMIC ACCOMMODATIONS

UI is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as a mental health, attention, learning, vision, and a physical or health-related condition) through the Student Disability Services (SDS) office. The student is responsible for discussing specific accommodations with the instructor. Note that accommodations are not granted retroactively but from the time of the student’s request to the instructor onward; additionally, accommodations must be requested at least two weeks in advance of the related assignment or exam ([https://sds.studentlife.uiowa.edu/](https://sds.studentlife.uiowa.edu/)). Graduate students serving as Teaching Assistants, Research Assistants, or Fellows must contact Faculty and Staff Disability Services ([https://hr.uiowa.edu/support/faculty-and-staff-disability-services](https://hr.uiowa.edu/support/faculty-and-staff-disability-services)) for assistance with accommodations.

CLASS RECORDINGS: PRIVACY AND SHARING

Course lectures and discussions are sometimes recorded or live-streamed. These are only available to students registered for the course and the intellectual property of the faculty member. These materials may not be shared or reproduced without the explicit written consent of the instructors. Students may not share these recordings with those who are not enrolled in the course; likewise, students may not upload recordings to any other online environment. Doing so is a breach of the Code of Student Conduct and could be a violation of the Federal Education Rights and Privacy Act (FERPA); also see [https://dos.uiowa.edu/policies/code-of-student-life/](https://dos.uiowa.edu/policies/code-of-student-life/).

COMMUNICATION: UI EMAIL

Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community ([Operations Manual, III.15.2](https://www.uiowa.edu/faculty-staff-handbook)). Emails should be respectful and brief, with complex matters addressed during the instructor’s drop-in hours, for example. Faculty are not expected to answer email after business hours or during the weekends.

FREE SPEECH AND EXPRESSION

The University of Iowa supports and upholds the First Amendment protection of freedom of speech and the principles of academic and artistic freedom. We are committed to open inquiry, vigorous debate, and creative expression inside and outside of the classroom. Visit Free Speech at Iowa for more information on the University’s policies on free speech and academic freedom: [https://freespeech.uiowa.edu/](https://freespeech.uiowa.edu/).

COMPLAINTS ABOUT ACADEMIC MATTERS

Students with a complaint about a grade or a related academic matter should first visit with the instructor and then with the course supervisor (if applicable), and finally with the director of the school, department, or program offering the course. If a graduate student has not been able to resolve the issue through the director of the school, department, or program, they should contact the associate dean for graduate education in the College of Liberal Arts and Sciences.
FINAL EXAMINATION POLICIES
The final exam schedule is published during the fifth week of the fall and spring semesters or on the first day of summer classes; students are responsible for knowing the date, time, and place of their final exams. Students should not make travel plans until knowing this information. A student with exams scheduled on the same day and time or who have more than two final exams on the same day should visit this page for how to resolve these problems by the given deadline (https://registrar.uiowa.edu/makeup-final-examination-policies). No exams are allowed the week before finals, but with some exceptions made for labs, language courses, and off-cycle courses (https://registrar.uiowa.edu.final-examination-scheduling-policies).

HOME OF THE COURSE
The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the policies and procedures for its courses. Graduate students, however, must adhere to the academic deadlines set by the Graduate College. See https://grad.uiowa.edu/academics/deadlines.

MENTAL HEALTH
Students are encouraged to seek help as a preventive measure or if feeling stressed or overwhelmed. Students should talk to their instructors for guidance with specific class-related concerns and are encouraged to contact University Counseling Service (UCS) at 319-335-7294 during regular business hours to schedule an appointment. UCS offers group and individual therapy as well as counseling for couples about relationships while making referrals to other resources (https://counseling.uiowa.edu/). Student Health can also address related concerns (https://studenthealth.uiowa.edu/). These visits are free to students. After hours, students are encouraged to call the Johnson County Community Crisis Line at (319) 351-0140 or dial 911 in an emergency.

NONDISCRIMINATION IN THE CLASSROOM
The University of Iowa is committed to making the classroom a respectful and inclusive space for people of all gender, sexual, racial, religious, and other identities. Toward this goal, students are invited in MyUI to optionally share the names and pronouns they would like their instructors and advisors to use to address them. The University of Iowa prohibits discrimination and harassment against individuals based on race, class, gender, sexual orientation, national origin, and other identity categories indicated by the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity at https://diversity.uiowa.edu/division/oie.

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 are expected to conduct themselves in a manner that maintains an environment free from sexual harassment and sexual misconduct. Those experiencing Incidents of sexual harassment are strongly encouraged to report incidents and to seek help (https://osmrc.uiowa.edu/).