STAT:3200 APPLIED LINEAR REGRESSION

Spring 2022

TIME AND LOCATION:
Lectures: Monday, Wednesday, and Friday from 2:30–3:20 PM in 40 SH

PREREQUISITES:
STAT:2020 or STAT:2010 or STAT:3120

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

INSTRUCTOR ZOOM OFFICE HOURS:
M/W/F 1:00–1:30 PM, M 3:40–5:10 PM, or by appointment. You are welcome to “walk in” that
is drop by in Zoom during office hours without prior appointment.

TEACHING ASSISTANT:
Mr. Chunlei Wang
E-mail: chunlei-wang@uiowa.edu

TEACHING ASSISTANT ZOOM OFFICE HOUR:
M 1:30–2:30 PM. You are welcome to “walk in” that is drop by in Zoom during the office hour
without prior appointment.

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

OPTIONAL TEXTBOOK:
Applied Regression Analysis & Generalized Linear Models, second edition, by John Fox.
ICON:
ICON will be used for posting notes, 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 most of your work will involve data analysis, computing and communicating statistical results.

Description
Coverage includes examining and transforming data; modeling strategies; simple, multiple and dummy variable regression models; ANOVA; diagnostics of influential data; model checking; model selection; logistic regression; and other topics as time permits.

LAB:
We will use the statistical software \( \text{R} \) for this course. Attendance in the labs is important for your success in the course. This is where you will learn how to use \( \text{R} \) and use it for your assignments and project. \( \text{R} \) is an open-source statistical software and is freely available at http://www.r-project.org. Please use RStudio, an integrated development environment for \( \text{R} \), to interact with \( \text{R} \).

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 (20%)
- Project (20%)
- Midterm exam (25%)
- Final exam (35%)

Homework assignments
I expect to give homework assignments every two or three weeks. 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 a single PDF file.
Please be considerate to the grader and double check that your uploaded scanned documents are readable (not too small or large fonts etc.).

You can discuss homework assignments with me, your TA, 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 identify an appropriate dataset for which multiple linear regression/logistic regression is applicable. The goal would be to analyze the dataset using some of the statistical methods taught in class. 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/](http://lib.stat.cmu.edu/), 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 work in groups for the project and 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.)
- Statistical methods used for data analysis
- Summary of results (presented as figures or tables when applicable)
- Discussion of findings and your interpretation, any shortcomings, and/or future work
- Appendix for R code

Once you have identified the dataset, please submit a brief (maximum one-page description but can have extra pages of plots) project proposal by Friday, April 1, 2022 (tentatively). I am happy to talk with you about any questions regarding the project. The slides will be due on Friday, April 22, 2022 (tentatively), and the presentations (approximately 15 minutes per group) will be in the week of April 25 (tentatively).

Exams

There will be a closed book in-class midterm exam on Wednesday, March 2, 2022 (tentatively) during lecture time. You may bring one 8.5'' × 11'' hand-written formula sheet (both sides written). It will be collected with the exam and returned with the graded exam.

There will be a closed book in-class two hours final exam (date to be announced later). You may bring two 8.5'' × 11'' hand-written formula sheets (both sides written).

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). Collaboration is not permitted for exams.
GRADING ERRORS:
If you find grading errors in HW, please report to your TA via email and cc me, within a week after scores are released. If you find grading errors in the exam, please report to me, within a week after scores are released.

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. For lab sessions you are welcome and encouraged to bring laptops to get the most out of them.

COURSE MATERIALS:
Please remember that you should not make the course material publicly available via web, print etc. This includes lecture notes, lab handouts, assignments, exams, and solutions, as well as any other materials that I post on ICON.
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 or an unavoidable circumstance. Students can use the CLAS absence form to help communicate with instructors who will decide if the absence is excused or unexcused; the form is located on ICON within the top banner under "Student Tools.” Delays by students in communication with an instructor could result in a forfeit of what otherwise might be an excused absence (https://clas.uiowa.edu/students/handbook/attendance-absences).

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
The University is prepared to make reasonable accommodations for students whose religious holy days coincide with their classroom assignments, test schedules, and classroom attendance expectations. Students must notify their instructors in writing of any such Religious Holy Day conflicts or absences within the first few days of the semester or session, and no later than the third week of the semester. If the conflict or absence will occur within the first three weeks of the semester, the student should notify the instructor as soon as possible. See Operations Manual 8.2 Absences for Religious Holy Days for additional information.

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
All undergraduates enrolled in courses offered by CLAS have in essence agreed to the College's Code of Academic Honesty. Academic misconduct affects a student's grade and is reported to the College which applies an additional sanction, such as suspension. Outcomes about misconduct are communicated through UI email (https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code).

ACADEMIC ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES
The University is committed to providing an educational experience that is accessible to all students. If a student has a diagnosed disability or other disabling condition that may impact the student’s ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through Student Disability Services (SDS). SDS is responsible for making Letters of Accommodation (LOA) available to the student. The student must provide a LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated. The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Note that accommodations are not granted retroactively but from the time of the student’s request to the instructor onward. Additional information can be found on the SDS website.

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/.

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). 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.

COMPLAINTS ABOUT ACADEMIC MATTERS
Students with a complaint about a grade or a related academic issue should first visit with the instructor and then with the course supervisor (if one is assigned), and next with the Chair of the department or program offering the course. If not resolved, students may bring their concerns to the College of Liberal Arts and Sciences: https://clas.uiowa.edu/students/handbook/student-rights-responsibilities.

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 may be scheduled the week before finals; some exception, however, have been made for labs, language courses, and off-cycle courses (https://registrar.uiowa.edu/final-examination-scheduling-policies).

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/).

HOME OF THE COURSE
The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the course’s add and drop deadlines, the “second-grade only” option (SGO), and other undergraduate policies and procedures. Different UI colleges may have other policies or deadlines. See https://clas.uiowa.edu/students/handbook. Questions? Contact CLAS at clasps@uiowa.edu or 319-335-2633.

MENTAL HEALTH
Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students are encouraged to talk to their instructor for assistance with specific class-related concerns. For additional support and counseling, students are encouraged to contact University Counseling Service (UCS). Information about UCS, including resources and how to schedule an appointment, can be found at counseling.uiowa.edu. Find out more about UI mental health services at: mentalhealth.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.

NON-DISCRIMINATION STATEMENT
The University of Iowa prohibits discrimination in employment, educational programs, and activities on the basis of race, creed, color, religion, national origin, age, sex, pregnancy, disability, genetic information, status as a U.S. veteran, service in the U.S. military, sexual orientation, gender identity, associational preferences, or any other classification that deprives the person of consideration as an individual. The university also affirms its commitment to providing equal opportunities and equal access to university facilities. For additional information on nondiscrimination policies, contact the Director, Office of Institutional Equity, the University of Iowa, 202 Jessup Hall, Iowa City, IA 52242-1316, 319-335-0705, oie-ui@uiowa.edu. Students may share their pronouns and chosen/preferred names in MyUI, which is accessible to instructors and advisors.
SEXUAL HARASSMENT
The University of Iowa prohibits all forms of sexual harassment, sexual misconduct, and related retaliation. The Policy on Sexual Harassment and Sexual Misconduct governs actions by students, faculty, staff and visitors. Incidents of sexual harassment or sexual misconduct can be reported to the Title IX and Gender Equity Office or to the Department of Public Safety. Students impacted by sexual harassment or sexual misconduct may be eligible for academic supportive measures and can learn more by contacting the Title IX and Gender Equity Office. Information about confidential resources can be found here. Watch the video for an explanation of these resources.