

STAT:5200 (22S:164): APPLIED STATISTICS-I

Fall 2016

TIME AND LOCATION:

Lectures: Monday, Wednesday and Friday from 12:30 – 1:20 PM in 75 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 2:00–4:00 PM, Tuesday 2:15–3:15 PM, and by appointment.

DEO:

Professor Joseph Lang; Office: 241 Schaeffer Hall; Phone: 335-0712;
Email: joseph-lang@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 may 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%. 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 one-page (maximum) project proposal by Friday, October 28, 2016. I am happy to talk to you about any questions regarding the project. The slides will be due on Tuesday, November 29, 2016, and the presentations (approximately 15 minutes per group) will be on November 30 and December 2, 2016.

Exams

There will be a **closed** book 50 minutes midterm exam in class on Wednesday, October 12, 2016. You may bring a $8.5'' \times 11''$ 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 $8.5'' \times 11''$ 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 emphasizing the key concepts mentioned in class and homework problems to help you keep up with the material covered in class. The quizzes will be **closed** book and you may bring a $8.5'' \times 11''$ hand-written formula sheet (one side written only) to each quiz. 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

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at <http://clas.uiowa.edu/students/handbook>.

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (Operations Manual, III.15.2. Scroll down to k.11.)

Accommodations for Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which includes but is not limited to mental health, attention, learning, vision, and physical or health-related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS. See <http://sds.studentlife.uiowa.edu/> for information.

Academic Honesty

All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (see CLAS Academic Policies Handbook).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor (and the course supervisor), and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

Understanding 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 have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Office of the Sexual Misconduct Response Coordinator for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety website.