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

Fall 2012

TIME AND LOCATION:
Monday, Wednesday and Friday from 1:30 – 2:20 PM in 30 SH and Thursday from 12:30 – 1:20 PM in 346 SH (UNIX Lab)

PREREQUISITES:
STAT:3120 (22S:120) or equivalent, and knowledge of matrix algebra

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

OFFICE HOURS:
Monday, Wednesday and Friday 11:20 AM – 12:10 PM, and by appointment.

DEO:
Professor Luke Tierney; Office: 241 Schaeffer Hall; Phone: 335-0712;
Email: luke-tierney@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 and 11 and some methods for variable selection like ridge regression and LASSO.

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 in 346 SH. 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−:85%–100%, B+, B, B−:70%–85%, C+, C, C−:50–70%. I may lower the cut-offs depending on the difficulty of the exam.

- Homework assignments (10%)
- Project (20%)
- Midterm exam (30%)
- Final exam (40%)

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 will 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) and generate fake data under it. The goal would be to analyze the data using the statistical methods taught in class or compare the performance of different methods using simulation studies. 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 26, 2012. I am happy to talk to you about any questions regarding the project. The slides will be due on Tuesday, November 27, 2012, and the presentations (15 minutes per group) will be on November 28 and 30, 2012.

Exams

There will be a closed book 50 minutes midterm exam in class on Friday, October 19, 2012. 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).

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 the lectures.
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 Student Academic 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
A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Fraud
Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Academic Fraud section of the Student Academic Handbook.

CLAS Final Examination Policies
Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

Making a Suggestion or a Complaint
Students with a suggestion or complaint should first visit the instructor, then 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 Comprehensive Guide on Sexual Harassment 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 web site.