

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

Fall 2010

## **TIME AND LOCATION:**

Monday, Wednesday and Friday from 1:30P-2:20P in 75 SH and Thursday from 1:30P-2:20P in 346 SH (UNIX Lab)

## **PREREQUISITES:**

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:**

Wednesday 3:00P-4:00P and Friday 3:00P-5:00P, and by appointment.

## **DEO:**

Professor Dale Zimmerman; Office: 241 Schaeffer Hall; Phone: 335-0712;  
Email: dale-zimmerman@uiowa.edu

## **TEXTBOOK:**

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

Optional: Data Analysis Using Regression and Multilevel/Hierarchical Models, Gelman and Hill. (available at University Book Store)

## **ICON:**

ICON will be used for posting grades. All students registered for the course should have access.

## **CLASS WEBPAGE:**

A password-protected class webpage for students enrolled in the class will be maintained at [www.stat.uiowa.edu/~jghsh/22S:164/coursecal.html](http://www.stat.uiowa.edu/~jghsh/22S:164/coursecal.html) for posting assignments, labs and other handouts.

## **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 text, and spend around 3 weeks on Bayesian variable selection (A brief introduction to Bayesian statistics: 1 week, Bayesian linear regression: 1 week, Bayesian variable selection and an R package to implement it: 1 week). If time permits we may also cover some additional topics from the book.

### **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:**

Grading will be on a curve, with  $+/-$  grades used. The A+ grade represents exceptional work and is rarely awarded.

- 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 Monday and it will be due in class the following Monday. 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 from time to time, that you do not need to turn in.

## **Project**

For the project you can either identify an appropriate dataset for which multiple linear regression is applicable, or create an interesting simulation scenario (for example severe multicollinearity) and generate data under it. The goal would be to analyze the data using the statistical methods taught in class. Some good resources for datasets are the DASL Library (The Data and Story Library) at <http://lib.stat.cmu.edu/DASL/> and the MASS library in R. You will work in groups for the project and submit i) a project proposal, and ii) a final report per group. The project report should consist of a type-written report of no more than 15 pages (including tables and figures), and should include 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

The code should be included in the Appendix unless it is necessary for the main text. Once you have identified the dataset, please submit a one-page (maximum) project proposal by September 29, 2010. Please feel free to talk to me about any other questions regarding the project. The final project report will be due on November 17, 2010, in order for you to have plenty of time to prepare for the final exam.

## **Midterm exam**

The midterm will be a closed book 50 minutes in-class examination on October 20, 2010.

## **Final exam**

The final exam will be a closed book examination on Monday, December 13, 2010 from 12:00P-2:00P.

## **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 lecture notes (from the web or other students) before coming to the next class. This will help you to keep up with the pace of the class and be able to participate in the 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 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/](http://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.