Statistics 6950
Applied Statistics II
4-semester-hour course

Spring 2018 Syllabus

Instructor:	Dr. Christopher Hans	When:	TR 9:05-10:55
Email:	hans@stat.osu.edu	**Where:**	CH 228
Office:	CH 327 (Cockins Hall)	**Office Hours:**	Wed. 2:00-3:00
Website:	Carmen		Wed. 5:00-6:00

Grader:	Kumar Somnath	Office	By appt.
Email:	somnath.1@osu.edu	**hours:**	CH 238

Prerequisite: Stat 6801 and 6910.

Class format: Two 110-minute lectures per week

Course Description and Requirements

Simple and multiple linear regression, diagnostics, model selection, the mixed model, and generalized linear models. Intended primarily for students in the PhD program in Statistics or Biostatistics.

You are responsible for all material covered in class; this includes derivation, proofs, computational techniques, etc. This is an applied course and the emphasis will be on applying concepts learned in class to real-world data sets. However, there will be a strong theoretical flavor to the ideas presented which will help you better understand the methodologies which you will employ on data sets. You are expected to be comfortable with multivariable calculus and basic matrix operations from linear algebra. I will primarily use R to demonstrate ideas and examples, however much of the responsibility to program solutions will be left to you.

Topics

- Simple linear regression
- Fitting the simple linear regression model
- Statistics inference for regression
- Diagnostics
- Multiple linear regression
- Model building and model selection

- Iteratively reweighted least squares
- Robust regression
- Mixed effects regression
- The generalized linear model

Textbook and Other Course Materials

We will use the textbook *Applied Linear Regression, Fourth Edition* (2014) by Sanford Weisberg. An electronic version of the book can be accessed for free through The Ohio State University Libraries at http://bit.ly/1Q4xbLB (although there may only be limited copies available at any given time). Reading and homework will be assigned from the book. Be sure to use the fourth edition (red/orange cover) and not the third edition (green cover). More information about the textbook can be found at http://users.stat.umn.edu/~sandy/alr4ed/.

We will use the R software environment for statistical computing and graphics. R can be downloaded for free at http://www.r-project.org. Many students prefer to use RStudio, an IDE designed for use with R. RStudio is available for free at http://www.rstudio.com. Once R has been downloaded and installed, students will also need to install the (free) R package **alr4,** which contains the data sets discussed in the textbook.

Assignments

Homework will be assigned regularly throughout the semester, will be due on Thursdays *at the start of class*, and will be graded. You are encouraged to discuss problems with each other in general terms, but you must write your own homework solutions and project reports. Homework reports must be submitted in hardcopy.

Homework will be due on the following dates: HW1 Jan. 25; HW2 Feb 1; HW3 Feb. 8; HW4 Feb. 15; HW5 Feb. 22; HW6 Mar. 1; HW7 Mar. 29; HW8 Apr. 5; HW9* Apr. 19 (*depending on time and progression of topics)

Data Analysis Project: There will be a group data analysis project in the second half of the semester that will tie together the concepts learned throughout the course. Both written and oral reports describing the analysis will be required. Details will be provided at the end of February.

Exams

There will be one in-class midterm exam that covers material from lecture, the assigned readings and homework. The midterm will be held on Tuesday, March 6th.

A cumulative final examination will be given during the university's examination period on Monday, April 30, 2018 **from 8:00AM-9:45AM** in our usual classroom. No early or-makeup exams will be given except in cases of documented emergencies (serious illness, etc.).

Course Grade Information

The final course grade will be based on homework assignments, the midterm exam, the course project and a comprehensive final examination. The weights for each component of the grade are:

Homework	Midterm	Project	Final Exam
10%	30%	25%	35%

Statement on Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Special Accommodations

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.

Syllabus Version

1/15/18:   Updated office hours

1/8/18:   Original version