

STAT 462: Applied Regression Analysis

Syllabus

Instructor: Lingzhou Xue

Office: 318 Thomas

Office Hours: Mon. & Wed. 9:00am – 10:00am, and by appointment

TA: Chen Xue

Office: 301 Thomas

Office Hours: Tue. 1:30pm – 2:30pm & Fri. 9:00am – 10:00am, and by appointment

Time and Location

Lecture: Mon. Wed. 8:00am – 8:50am 216 Thomas

Lab: Fri. 8:00am – 8:50am 112 Boucke

(Lecture and lab attendances are required.)

Course Information and Requirement

Overview

This is an applied linear regression course that involves hands-on data analysis. The focus of STAT 462 is on the fundamentals of linear regression, multiple regression and logistic regression as well as the use of standard statistical software. Students enrolling for this course should have taken at least once other statistics course and be familiar with the basic fundamentals of statistical testing and estimation. Any student that is not comfortable with the introductory statistics may struggle with this course. Such students should consider taking STAT 460, which also covers regression and uses less mathematics.



Announcements and materials will be posted on CANVAS. Please check CANVAS frequently. Homework assignments, solutions, data sets, etc. will be posted.

Prerequisites

Students enrolling for this course should have taken **STAT 200, STAT 220, STAT 240, STAT 250, STAT 301, or STAT 401** which deals with simple and multiple regression, correlation, polynomial models, step-wise and piece-wise regression and rudimentary logistic regression. Students are also expected to know basics of probability and conditional distributions and expectations. A knowledge of linear algebra and multivariate calculus is beneficial in understanding some of the concepts underlying the methods.

Textbook

Linear Models with R, by Faraway.

Applied Linear Statistical Models, by Kutner, Nachtsheim, Neter, and Li

Software

R: <http://cran.r-project.org/> to download R for free. We strongly recommend downloading and working in R-Studio. You can use other programs such as Minitab or SAS, but the class notes and assignments will focus on R. The weekly homework assignments will be submitted in R Markdown (<http://rmarkdown.rstudio.com/>).

If you are using R for the first time, please take some time to follow through the following introduction: <https://onlinecourses.science.psu.edu/statprogram/node/50>. There are a number of tutorials available on the YouTube, e.g., <https://www.youtube.com/playlist?list=PLqzoL9-eJTNBDdKgJgJzaQcY6OXmsXAHU>. Another helpful resource is R Programming for Data Science by Roger Peng. This book is freely available on the web.

Grading Policy and Requirements

Your assignment and due dates will be posted on Canvas. Note that there is NO exam!

Quiz (20%) There are weekly in-class quizzes based on the course material. The quiz is timed but time allotted is sufficient. The quiz will be submitted when the time limit is up. **Make-up quizzes will not be accepted without a prior notice and a legitimate excuse.** The lowest grade will be dropped prior to calculating the final grade.

Homework Assignments (20%) There are weekly homework assignments. For each of them, you will apply the course material and R codes. The objective is to apply the concepts to data and write your own codes. They should be submitted in the drop box on CANVAS before due dates. **Late submissions will not be accepted without a legitimate excuse.** The lowest grade will be dropped prior to calculating the final grade.

- *You have one week to appeal a homework or quiz grade. No grade changes will be made one week after a graded homework or quiz is returned*

Projects (60%) There will be 2 Individual Projects worth **15%** each and 1 Team Project worth **30%**. The instructions for each project will be posted on Canvas. Final project report will worth **20%** of the final grade, and final project presentation worth **10%** of the final grade.

- Teams of 3 to 5 students will be assigned after the first project. I will take requests for teammates and all others will be randomly assigned. Students are encouraged to pick your own data set and topics, but I can suggest back-up datasets if you cannot find one.
- Each team will present their projects to the rest of the class during the last week of class. After presentation, students can receive feedback and revise their final analysis and report, which is due the last day of final exams week (Sunday, May 6).
- Final project report should explicitly include logs of group meetings/efforts and report individual contributions in the appendix.
- More information on the project will be given in class and posted on CANVAS.

Participation (Extra Credit) Students are encouraged to communicate and participate in class and in the discussion board on Canvas. Please post class questions and answer others' questions if you can, rather than emailing the instructor or TA. In this way, everyone can benefit from it. Top four active participants receive the extra credit **1%, 0.75%, 0.5% and 0.25%** respectively.

| GRADING SCALE | |
|---------------|--------------|
| A = 100-93 | C = 76-73 |
| A- = 92-90 | C- = 72-70 |
| B+ = 89-87 | D+ = 69-67 |
| B = 86-83 | D = 66-63 |
| B - = 82-80 | D- = 62-60 |
| C+ = 79-77 | F = BELOW 60 |

A course percentage above 90% will earn A or A-, and above 80% will earn B+, B- or B.

Academic Integrity:

It is encouraged for you to work with your colleagues regarding homework assignments, but the solutions you submit **MUST** be your own. Furthermore, it is to be understood that no collaboration is to occur regarding the examinations. For any material or ideas obtained from other sources, such as the text or things you see on the web, in the library, etc., a source reference must be given. Direct quotes from any source must be identified as such. This course will abide by the Penn State Academic Integrity Policy.

Accommodations for Students with Disabilities:

Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services website. In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

Code of Mutual Respect and Cooperation:

The Eberly College of Science Code of Mutual Respect and Cooperation embodies the values that we hope our faculty, staff, and students possess and will endorse to make The Eberly College of Science a place where every individual feels respected and valued, as well as challenged and rewarded.

Campus Emergency:

In case of weather-related delays at the University, this online course will proceed as planned. Your instructor will inform you if there are any extenuating circumstances regarding content or activity due dates in the course due to weather delays. If you are affected by a weather-related emergency, then please contact your instructor at the earliest possible time to make special arrangements.