Stat 423 Applied Regression  
Winter 2022

This class meets for lecture on Mondays 2:30 - 3:20 and Wednesdays 2:30 - 4:20. Quiz section is on Fridays from 2:30 - 3:20. All class meetings starting the second week of the quarter are in THO 325 (unless it is determined that we will be meeting over Zoom beyond the first week).

Instructor
Tamre Cardoso: tamre@uw.edu  
Wednesdays 12 - 1 PM at this Zoom link or by appointment.

TA
Jie Gao–jiegao@uw.edu  
Mondays 12:30 to 2:30 PM at this Zoom link. There are two Monday holidays. She will post an announcement to Ed Discussion for alternative office hours those two weeks.

Course Description
This course introduces the most frequently used statistical model, namely, linear regression. Topics include simple and multiple linear regression, least squares and weighted least squares estimation, hypothesis testing and statistical inference, detecting violations of assumptions and ways to deal with them, statistical model-building strategies, and introduction to logistic regression. Students work on projects in small groups where they use regression for answering a research question of interest. Project groups deliver oral presentations in class on their ongoing work and present results in final paper.

Outline of course topics
1. Simple linear regression: interpretation, tests and confidence intervals, predictions, fitted values, residuals  
2. Multiple linear regression: estimation, testing, sequential ANOVA,  
3. Multiple testing: Bonferroni, Holm correction, FDR  
4. Categorical predictors, interactions, and polynomials  
5. Model diagnostics: residual analysis, transformations  
6. Leverage points, outliers, and influential cases  
7. Model selection: AIC, BIC, Mallows’ Cp, cross-validation  
8. Logistic regression  
9. Other GLM methods as time permits

Primary Textbook/Lectures
Our main textbook will be Weisberg, S. (2014). *Applied Linear Regression*, 4th edition, Wiley (available online through UW library). It is not required that you obtain this book. The lecture slides and notes should be sufficient.

Lecture slides will be posted ahead of time under each weekly module. An after class version with any writing on the slides will be posted after the lecture.
Quiz Section

The TA will go over homework and answer questions that you may have concerning the homework that is due the following week. You will also use this time to work on group projects.

Software

- We will use the statistical software environment R, which is freely available from https://www.r-project.org/.
- I recommend using R in combination with Rstudio: https://www.rstudio.com/products/rstudio/download/

See the R and RStudio Module for installation information.

Grading policy and exams

All assignments will be graded through Gradescope. Please upload your solutions there.

- Homework (40%). See the homework guidelines.
- Midterm (20%): Wednesday, February 16th
- Project (40%): Split across presentation and final paper. See project guidelines.

Other useful resources

- Bryan Martin's R lecture notes
- alr4: Data to accompany Applied Linear Regression, 4th edition
- "Applied Linear Regression Models" textbook, by Kutner et. al.
- DataCamp's free R tutorial: https://www.datacamp.com/courses/free-introduction-to-r
- Julian Faraway's book on Linear Models with R: Practical Regression and ANOVA using R
- Statistical Inference via Data Science: A ModernDive into R and the Tidyverse. You can link to the online version here.
- R for Data Science, which can be found here.
- Kaggle datasets

Final Group Project

There will be a final group project that will allow you to demonstrate your ability to carry out a regression analysis. Students will split into groups of 2-4. See project guidelines for details.

Course Announcements/Discussion Forum
Use the Ed Discussion board to post questions or comments about the course, including but not limited to questions from readings in the textbook, course materials, learning objectives, or other course content. We have populated the Ed Discussion board with categories—please try to use the most appropriate category based on the content of your post. For guidelines about effective posting on discussion forums, please see the NetiquetteLinks information.

The TAs or I may post some class announcements under the “Announcements” thread on Ed Discussion. It is important for you to read all postings—you are responsible for all information posted via announcements. If you think you might have missed some information, you can check the “Announcements” section on Ed Discussion at any time to see what has been posted throughout the quarter. Please do not reply to announcements as we do not monitor the announcements for comments. If you have a question/comment based on an announcement, please post under the proper thread on the Ed Discussion, email me or your TA, or attend office hours.

**Religious Accommodations**

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW’s policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/).

Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/).

**Mental Health Resources**

Any member of the UW community can call SafeCampus anytime to anonymously discuss safety and well-being concerns for yourself or others. Caring, trained professionals will talk you through options and connect you with additional resources if you want them. Available 24/7 by phone at 206-685-7233, or M-F, 8am-5pm at safecampus@uw.edu. Crisis Connections provides immediate help to individuals, families, and friends of people in emotional crisis, dealing with addiction, or struggling to meet basic needs. Anyone in Washington State can receive support and resource referrals 24/7 through their crisis line at 866-4CRISIS (866-427-4747 or TTY 206-461-3219).

**Disability Services for Students** (http://hr.uw.edu/dso/)

To request disability accommodation, contact the Disability Services Office at: 206.543.6450 (voice), 206.543.6452 (TTY), 206.685.7264 (fax), or email at dso@u.washington.edu. The University of Washington makes every effort to honor disability accommodation requests. Requests can be responded to most effectively if received as far in advance of the event as possible, preferably at least 10 days.

**UW Diversity Statement**

Diverse backgrounds, embodiments, and experiences are essential to the critical thinking endeavor at the heart of university education. Therefore, I expect you to follow the UW Student Conduct Code in your interactions with your colleagues and me in this course by respecting the many social and cultural differences among us, which may include, but are not
limited to age, cultural background, disability, ethnicity, family status, gender identity and presentation, citizenship and immigration status, national origin, race, religious and political beliefs, sex, sexual orientation, socioeconomic status, and veteran status.

**Academic Integrity**

The University takes academic integrity very seriously. Behaving with integrity is part of our responsibility to our shared learning community. If you are uncertain about if something is academic misconduct, ask me. I am willing to discuss questions you might have.

Acts of academic misconduct may include but are not limited to:

- Cheating (working collaboratively on quizzes/exams and discussion submissions, sharing answers and previewing quizzes/exams)
- Plagiarism (representing the work of others as your own without giving appropriate credit to the original author(s))
- Unauthorized collaboration (working with each other on assignments)

Concerns about these or other behaviors prohibited by the Student Conduct Code will be referred for investigation and adjudication by (include information for specific campus office).

Students found to have engaged in academic misconduct may receive a zero on the assignment (or another possible outcome).

The University of Washington Student Conduct Code (WAC 478-121) defines prohibited academic and behavioral conduct and describes how the University holds students accountable as they pursue their academic goals. Allegations of misconduct by students may be referred to the appropriate campus office for investigation and resolution. More information can be found online [here](#).