The Team:

Instructor: Emilija Perković
TAs: Jie Gao and Ronak Mehta

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<td>Lecture</td>
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<td>Jie's LAB sections</td>
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Office Hours

All office hours will be held on Zoom. Please register for office hours.

If you have questions for a particular office hour, please submit them on Piazza under that person's tag.

Emilija Perkovic: Mon 03:30 PM- 04:30 PM
Jie Gao: Thu 3:00 PM-4:00 PM
Ronak Mehta: Thu 1:30PM-02:30PM

Course Description:

This course provides an introduction to the most frequently used statistical model, namely, linear regression. Topics include hypothesis testing and statistical inference, simple and multiple linear regression, logistic regression, lasso, and ridge regressions, detecting violations of assumptions and ways to deal with them, model and evaluation strategies. 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 final results in a report format.
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 17th
- Project (40%): 15% short video presentation, 10% based on feedback from 2 peer projects, 15% final project report, +2.5% bonus if your project proposal is selected. See the project guidelines for more details.

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. Ridge, LASSO regression, Elastic net

Lab sessions information:

The TA will go over homework and answer questions that you may have concerning the homework that is due the following week.

Textbooks/Lecture notes:

- 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 notes/slides/labs and a tentative course schedule will be posted here. This page will be updated as the course progresses.

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/

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
● Seber and Lee, Linear Regression Analysis
● Kaggle datasets

**Students with disabilities:**

If you would like to request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz (206) 543-8924 (V/TTY). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present this letter to me to discuss the accommodations you might need for the class.

**Academic Integrity:**

Collaboration and discussions are allowed and encouraged in this class, but copying or letting others copy your work amounts to plagiarism. This includes copying model solutions, e.g., from prior years. Although cheating seldom occurs in graduate classes, if it does, I will take the following action: assign a grade of 0.0 for the exam/homework where the cheating occurred, and report the incident to the Graduate School Committee on Academic Conduct, which will decide upon an appropriate University course of action.

**Religious Accommodations:**

Washington state law requires that UW develop a policy for the 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 requesting 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/).

**Student conduct:**

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.