Syllabus for SDS 439/5130 – Linear Statistical Models, Spring 2025

3.0 Units, Letter Graded

Instructor: Joe Guinness (joeguinness@wustl.edu)

Lecture: MWF, 1:00 - 1:50 PM, Wrighton 250

Office Hour: MWF, 2:00 - 3:00 PM, Jolley 538

Course Github Page:
Course materials posted here: https://github.com/averagejoestats/linear_models_sp25

Prerequisite Courses: programming, linear algebra, probability

Course Description: The course focuses on the theory and application of linear statistical models expressed in matrix form. A list of topics is given on the next page.

Suggested Textbooks:
Linear Models with R (2nd Edition) by Faraway
Reading Material by Guinness on github

Exercises: A set of exercises is due roughly every two weeks. The lowest exercise score is dropped. You may discuss exercises with classmates, but copying work is not allowed and will be penalized at the discretion of the instructor.

Quizzes: A quiz is given roughly every two weeks in class. The lowest quiz score is dropped.

Final Exam: There is no final exam

Final Project: There will be a final project roughly equivalent to two sets of exercises, due at the end of the semester on a date to be determined.

439 / 5130 Differentiation: Students in 5130 may have additional exercises.

Final Grade: Final score is the weighted average of quizzes (45%), exercises (45%), and final project (10%). Letter grade cutoffs are: 100-93 = A, 93-90 = A-, 90-87 = B+, 87-83 = B, 83-80 = B-, 80-77 = C+, etc. There is no rounding. A+ grades may be awarded for exceptional performance.

AI Policy: You are welcome to try out artificial intelligence (AI) tools like ChatGPT as a search engine or to assist in getting started on assignments. However, you must indicate clearly on your assignment that you used an AI tool, and you must include the prompts that you found most helpful.

Tentative List of Topics:

statistical framework review
simple linear models
multiple linear models
matrix representations
multivariate normal distribution
sampling distributions of estimators
factors (a.k.a. categorical covariates)
interactions
models for dependent data
generalized linear models

Tentative Quiz Dates:

Jan 22 (wednesday)
Feb 3
Feb 17
Mar 3
Mar 24
Apr 7
Apr 21

Tentative Exercise Due Dates:

Jan 27
Feb 10
Feb 24
Mar 17
Mar 31
Apr 14