Syllabus for Biometry 6020 - Statistical Methods II, Spring 2021

Instructor: Joe Guinness (guinness@cornell.edu)
Live Discussion: Wednesday 9:40-10:55am (all times local Ithaca time, all meetings on Zoom)
Instructor Office Hour: Wednesday 2:00-3:00pm

Teaching Assistants: Will Bekerman (wjb239), Skylar Fang (wf226), Eric Rosenthal (emr262)
TA Office Hours: Thursday 9:00-10:00 am, Thursday 2:30-3:30 pm, Friday 2:00-3:00 pm

Webpages: Canvas and `https://github.coecis.cornell.edu/jsg342/btry6020_2021`

Prerequisite Course: Biometry 6010 or similar

Overview: The course covers multiple linear regression and some related topics. A list of topics is given below. An emphasis is placed on understanding and communicating the specified statistical model and justified interpretation of results. The R programming language is used for statistical computing. The course is organized around modules, each module spanning a week.

Textbook: *Applied Linear Regression, 4th Edition* by Sanford Weisberg. Digital version available for free from the Cornell Library website.

Lectures: Lectures are delivered as asynchronous videos, posted each week.

Exercises: Each module includes a set of exercises to be completed by the students. Solutions are posted at the end of each week.
Grading: Exercises are not turned in and do not count for the grade.

Quizzes: Each module concludes with a closed-everything quiz on Canvas. Students have 30 minutes to complete each quiz sometime on Monday. Students may not work together on the quizzes or discuss any quiz problems until after the 24-hour quiz period is over.
Grading: At the beginning of the semester, students decide whether their overall quiz grade is the mean or median of their individual quiz grades. This decision cannot be changed.

Labs: Labs consist of a video and an assignment each week. They are intended to give students an in-depth and hands-on exposure to R programming.
Grading: Lab assignments are graded for completion but do not count for the final grade. Exemplary lab performance will be rewarded with a *mystery lab performance prize* at the end of the semester.

Final Exam: There will be a comprehensive online final exam. Date is determined by the university.

Final Grade: Final grade is the weighted average of quizzes (70%) and final exam (30%). Letter grade cutoffs have 5% increments: 95-100 = A+, 90-95 = A, 85-90 = A-, 80-85 = B+, etc.

Cheating: Please do not cheat.

Disabilities: Student Disability Services (SDS) helps provide and arrange reasonable accommodations for students with disabilities. Please give the instructor your SDS accommodation letter early in the semester so that we have adequate time to arrange your approved academic accommodations. If your accommodation needs change, please contact SDS and your instructor. SDS is located on level 5 of Cornell Health, 110 Ho Plaza, 607-254-4545, sds.cornell.edu.

Lecture Topics:

statistical modeling and inference
mathematical notation
simple linear model
multiple linear model
factor (categorical) covariates
F-tests
interaction effects
experimental design principles
basic experimental designs
random effects
models for correlated errors
generalized linear models

Lab Topics

introductory R session and basic commands
data structures
reading in data and manipulating data frames
graphics
git and github
running R scripts from the terminal
loops and conditional statements
functions and function scope
vector subsetting and matrix operations
recycling rules
working with factors
R markdown
the tidyverse
ggplot
developing an R package.