

STAT 408

Applied Regression Analysis

Miles Xi

Department of Mathematics and Statistics

Loyola University Chicago

Fall 2022

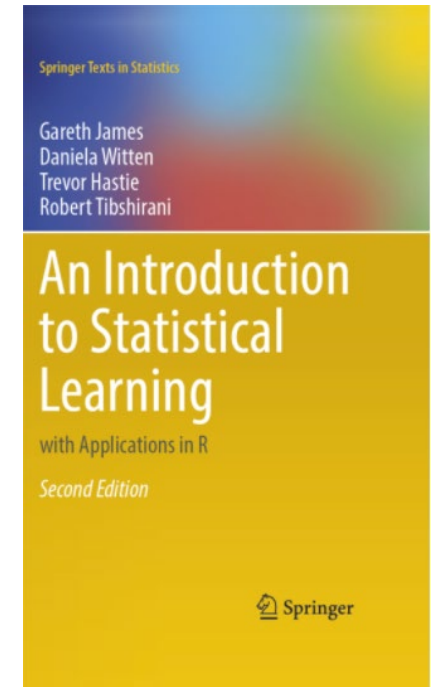
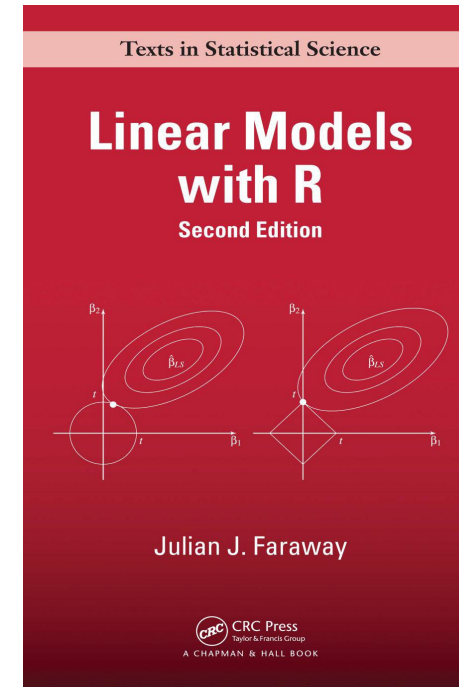
Syllabus

Instructor

- Miles Xi, PhD in Statistics, UCLA
- Assistant Professor in Statistics, Department of Mathematics and Statistics
- Office: 117 Loyola Hall
- Office hour: Thursday, 3:45 AM - 5:45 PM
- Or the same time by zoom <https://luc.zoom.us/j/8955486944>
- Email: mxi1@luc.edu
- Research
 - Statistical learning
 - Computational genomics
 - Biopharmaceutic statistics

Textbook and Prerequisite

- Faraway, J. (2014) Linear Models with R. 2nd Edition. Elsevier Academic Press.
- Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani. (2021) An Introduction to Statistical Learning with Applications in R. Second Edition. Springer.
- Prerequisite
 - STAT 203 or STAT 335 or equivalent
 - Introductory statistics
 - Basic calculus
 - Basic linear algebra
 - Coding experience is preferred



Topics

- Review of introductory statistics
- Introduction to R
- Estimation of simple and multivariate linear regression
- Inference in regression
- Prediction and explanation
- Model diagnostics
- Transformation
- Model selection
- Shrinkage method
- Missing data
- Categorical predictors

Coding Tools

- R programming language <https://www.r-project.org/>
- RStudio (IDE) <https://www.rstudio.com/>
- Please bring your laptop to the class

Homework

- Approximately one homework every two weeks, depending on the class progress.
- Discussion between classmates is allowed. However, the writing and submission should be independent.
- Two types of homework: problem solving + coding
- The coding should be written in R programming language
- Homework must be submitted in pdf format through Sakai and contain all code and output used to obtain solutions as well as well written descriptions of your output.
- Homework must be submitted on time to receive full credit. There will be a 20% penalty for each day late

Exams

- One midterm on October 20th, Thursday
- One final (time TBD)
- Exams are open notes and open books

Course Project

- There will be a group project due at the end of the semester.
- Students will form groups of no more than two students.
- Each group will formulate a question based on a real dataset. The question can be from any fields.
- Each group should use the methods discussed in the class to solve the question.
- Each group will present the project in class and write a final report.

Grading

- Homework assignments 20%
- Midterm exam 20%
- Class project 30% = presentation 15% + project report 15%
- Final exam 30%
- Final grades will be first normalized to 100 and then assigned based on the following scale:
 - A [95,100], A- [90,95)
 - B+ [86,90), B [83,86), B- [80,83)
 - C+ [76,80), C [73,76), C- [70,73)
 - D+ [65,70), D [60,65)
 - F [0-60)

Tips for Success

- Attend the lecture if you are healthy
- Ask questions in the class
- Do the homework by yourself, start early
- Use Google for things you don't know
- Focus on methods
- Prepare the final project early
- Read papers

Questions

- Any questions about the class?

Introduce Yourself

- Now, please introduce yourself
 - Name
 - Major
 - Year
 - Why you choose this class
 - What is your expectation for this class
 - Anything else you want us to know