STAT 207: Advanced Statistical Computing

Zhe Fei

Logistics

- Lecture: Tu/Th 2:00 - 3:20 PM
- Discussion: Th 1:00 - 1:50 PM
- Instructor: Zhe Fei (Olmsted 1344), zhef@ucr.edu
- Location: Olmsted 1431
- Office Hours: Tu 1:00 - 2:00 PM, Th 12:00 - 1:00 PM or by appointment

Description

4 Units, Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 201A and STAT 206 or equivalents; or consent of instructor. Computational algorithms for research in statistics. Topics include Numerical linear algebra, Numerical optimization, Monte Carlo methods, Bootstrap and resampling methods.

Textbook

- Kenneth Lange, Numerical Analysis for Statisticians, 2nd Edition, Springer (2010), available online, UCR library link
- James Gentle, Computational Statistics, Springer (2009), available online, UCR library link

Discussion

- Coding and implementation
- Reading of recent papers

Assignments

Expected 4 - 5 homework assignments (50%).

You are welcomed, and encouraged, to work with each other on the problems, but you must turn in your own work. If you copy someone else's work, both parties will receive a 0 for the homework grade as well as being reported to the Student Conduct & Academic Integrity Programs (SCAIP).

Submission instructions: You will turn in your homework **on Canvas**, with both source codes and output files.

Exam

There are no exams.

Attendance

Attendance to both lectures and discussions is mandatory. If you are not able to attend a lecture or lab due to medical or technical reasons, please proactively communicate with the instructor and TA and notify us your circumstances at earliest chance.

Grading

- Homework, 75%
- Attendance, 25%

Grades may be curved at the end. Cumulative numerical averages of 90-100 are guaranteed at least an A-, 80-89 at least a B-, and 70 - 79 at least a C-. However the exact ranges for letter grades will be determined after the final exam.

Work Load and Teamwork

You are expected to put in about 3 - 4 hours of work outside of class for each hour of lecture. Some of you will do well with less time, and some might need more. You are encouraged to study with your classmates. But remember that anything that is not explicitly a team assignment must be your own work.

Policies

- You are responsible for checking announcements and accessing course materials on Canvas.
- Late work policy for the homework and labs reports:
  - next day: **lose 50%** of total possible points
  - later than next day: lose all points
- There will be no make-ups for homework, labs, quizzes, or exams. If the midterm exam must be missed, absence must be officially excused **in advance**, in which case the missing exam score will be imputed using the final exam score. This policy only applies to the midterm. All other missed assessments will receive a grade of 0. The final exam must be taken at the stated time. You must take the final exam to pass this course.
- Please be considerate of your classmates by arriving on time. If you arrive after at least one student has finished the exam and left the room, you will NOT be allowed to sit for the exam, and will receive a "0". Turn off cell phones before entering the exam room. If your cell phone rings during the exam, you will lose points on the exam.
- Use of disallowed materials (textbook, class notes, web references, any form of communication with classmates or other persons, etc.) during exams will not be tolerated. This will result in a 0 on the exam for all students involved, possible failure of the course, and will be reported to the Student Conduct & Academic Integrity Programs (SCAIP). If you have any questions about whether something is or is not allowed, ask me beforehand.

Tentative Topics

- Numerical linear algebra: vectors and matrices; eigenvalues; SVD; ...
- Numerical optimization: MM; EM; Newton's method; ...
- Resampling methods: Monte Carlo; bootstrap; cross validation; ...
- Advanced optimization topics