

UNM Stat 427/527: Advanced Data Analysis I (ADA1) Syllabus (F19 subset)

Lecture: Stat 427.001, CRN 59508; Stat 527.001, CRN 59509; TR 1530-1645; Location: CTLB 300 (building 55)

Website: <http://statacumen.com/teaching/ada1/>

email: "Erik B. Erhardt" <erike@stat.unm.edu>, please include "ADA1" in subject line

Laptops running R: I encourage you to bring a laptop to class each day so you can try the R programming exercises in class. Classroom laptops (3 per 9-person table) have the software you need.

Saving data: If you're using classroom computers, use **Flashdrives** or UNM's **OneDrive** (available in LoboMail) for saving files. The CTLB computers do not connect to your standard UNM drive space. Sorry.

Teaching Assistants and Peer Mentors

Stat grad students TAs

Kelli Kasper <kkasper@unm.edu>, SMLC 306; Leah Puglisi <lhuglisi@unm.edu>, SMLC 319

Peer Mentors: TBA

Office hours

Mon: 11:00-14:00 Kelli; Tue: 13:00-15:00 Erik; Wed: 11:00-13:00 Leah; Thu: 13:00-15:00 Erik; Fri: 11:00-12:00 Erik

Weekly structure

- Pre-class (Tuesday): Reading, Video, Quiz (due before class — solutions become available Tue 3:30, after the quiz is due)
- In-class: Activities in class Tuesday and Thursday due by 5pm the following day, submitted to UNM Learn (evaluated by TA within 1 week).
- Post-class (Thursday): Homework (UNM Learn, due following Thursday before class)

Assessment

- **Quizzes** will be due each Tuesday before class. *Purpose: to assess reading and video comprehension and assure you're prepared to actively participate in class activities with minimal lecture.* (About 12, **20% of final grade**, the lowest few are dropped.) Most weeks plan for 1-2 hours reading and video, 20 minute quiz. Quizzes are not timed, they can be taken twice, and the higher of the two scores is used for grade calculation.
 - Viewing quiz solutions after the due date in UNM Learn is not intuitive. Click on the "Begin" button (this is the non-intuitive part, since you are not actually beginning the quiz), then click "View All Attempts" to see the scores. Finally, click "Calculated Grade" to see the feedback for each question of the quiz.
- **In-class assignments** are due by 5pm the next day, submitted to UNM Learn. *Purpose: to struggle and find success in class with the concepts and skills.* (About 24, includes class participation, **30% of final grade**, the lowest several are dropped.) Most weeks plan to finish in class.
- **Homework (HW)** assignments are assigned each Thursday and due the following Thursday, submitted to UNM Learn. *Purpose: to apply concepts and skills to your class poster project.* (About 12, **30% of final grade**, the lowest few are dropped.) Most weeks plan on 1-4 hours per assignment.
- **Poster** will be developed through semester (most HW assignment contribute to poster), the last couple weeks we'll complete them, and the last week we'll have poster presentations. *Purpose: to have an overarching set of questions to answer using methods learned in the course, with a deliverable you can be proud of!* (1 poster and presentation, **12% poster, 2% presentation, and 2% evaluations of others of final grade.**) In the last couple weeks, assembling this poster may take 5-10 hours, using a template provided to you.
- **Course surveys** are due at the beginning and end of the course. *Purpose: to participate in national project-based learning projects and improve course.* (About 2, **4% of final grade.**)

All assignments in this class are electronic, submitted to a website for grading, except for the final poster.

Late assignments will not be accepted.

Rubrics guide assessment (and self-assessment) of homework, code, projects, exams, and presentations. Each assignment will have its own specific rubric.

Collaboration and citation

For homework, I encourage you to work together. Please discuss the data, code, and problems with one another, but do your own exploration and write up. We expect everyone to submit substantially different homework, and we will enforce this under the honor code. The small benefit you might get from plagiarism is not worth the severe penalty (of lost trust, being reported to the dean, no points for the assignment, etc.).

As in life, please use any resources available to you. I encourage you to use the ideas of others, but make them your own, giving credit.

Statements

Accommodation Statement

In accordance with University Policy 2310 and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she are not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Contact Accessibility Resource Center at 277-3506 for additional information.

Title IX statement

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered "responsible employees" by the Department of Education (see pg 15). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity. For more information on the campus policy regarding sexual misconduct.

Student learning outcomes

At the end of the course, you will be able to:

General outcomes:

1. Organize knowledge in graphs, tables, and code to support concise, comprehensible, and scientifically defensible written interpretations to produce knowledge.
2. Distinguish a testable scientific hypothesis or data-supported interpretation from an opinion.
3. Understand from a data story the goals of the study and apply the correct statistical procedure.
4. Explain the scientific aspects of a problem to nonscientists in a fashion that enhances understanding and decision making.

Topical outcomes:

5. Define parameters of interest and hypotheses in words and notation.
6. Summarize data visually, numerically, and descriptively and interpret the observed characteristics. Calculate and interpret numerical summaries such as mean, variance, five-number summary, confidence intervals, and p-values, and create visual summaries such as bar plots, scatter plots, and histograms. (Never pie charts!)
7. Distinguish between statistical significance and scientific relevance.
8. Use statistical software, such as R, to read and manage data, create informative plots, report numerical summaries, apply statistical models, by recommended programming practice including abstraction and documentation.
9. Understand the differences and limitations of controlled experiments and observational studies. Design experiments to infer causal treatment effects. Analyze observational data to infer associations between measured variables.
10. Identify and explain the statistical methods, assumptions, and limitations used in reported studies in scientific literature or popular media.
11. Evaluate and criticize published studies, the work of peers, and your own work and assess what was done well, what could be done better, and examine whether their conclusions are supported using statistical principles.
12. Make evidence-based decisions by constructing and deciding between testable hypotheses using appropriate data and methods.
13. Discover relationships and make predictions through model development and selection.