Fall 2025 Syllabus
Stat 427/527: Advanced Data Analysis I

Instructor: Dr. Yan Lu

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Prerequisites: Math 1350 (Stat 145) or equivalent introductory statistics course
Class Time and Location: Online MAX Arranged

- This course follows a Tuesday/Thursday schedule. Each week:
  - On **Tuesdays and Thursdays**:
    - Read the assigned chapter.
    - Watch the corresponding video lectures to reinforce your understanding.
    - Practice R coding with data.
    - Work on homework assignments, which consist of exercises and worksheets.
- **Assignment Deadlines:**
  - Tuesday assignments are due by **Friday, 11:50 PM**.
  - Thursday assignments are due by **Monday, 11:50 PM**.

Teaching Assistant: Mingyue Liu (mingyueliu@unm.edu) and to be announced.
Office Hours:

- Approximately 20 hours/week hosted by TAs and instructor via Zoom (see office hours table from my website).
  `https://unm.zoom.us/j/6727234389`
  passcode:123
- **Policy:**
  - Notify instructor/TA via email before attending office hours
  - Email template: "ADA1 Office Hours [Day] [Time]: I'll be there to ask about [Topics]"
  - Hours guaranteed if notified in advance
  - Hours may be canceled without notice if no attendance confirmation
  - Additional appointments available by request

Textbook:

- *Introduction to Modern Statistics* (2nd Ed) by Mine Çetinkaya-Rundel and Johanna Hardin
  `https://openintro-ims.netlify.app/`
  Solutions to odd-numbered exercises:
  `https://statacumen.com/teach/ADA1/IMS2_book/28-exercise-solutions.html`

- Lecture Notes for *Advanced Data Analysis I* by Erik B. Erhardt, Edward J. Bedrick, and Ronald M. Schrader
  `https://statacumen.com/teach/ADA1/notes/ADA1_notes_F19.pdf`

Note: These materials will serve as references for the course, with some lectures and exercises drawn from each source.

Course Description

This course introduces advanced methods of data analysis with an emphasis on practical application using R. Topics include study design, exploratory data analysis, and regression modeling (linear and logistic). The course also covers the foundations of statistical inference through randomization, bootstrapping, and mathematical models, as well as methods for inference on means (one-sample, two-sample, and paired t-tests), categorical data, and analysis of variance (ANOVA).
Note: This course does not count toward graduate degrees in Mathematics and Statistics.
Course Learning Objectives: Upon successful completion of this course, students will be able to:

- Apply R for data management, visualization, and statistical analysis
- Identify and justify appropriate statistical methods for addressing research questions
- Develop and evaluate statistical models for examining group differences (e.g., ANOVA) and for describing relationships and making predictions (e.g., regression)
- Communicate statistical concepts and findings clearly to both technical and non-technical audiences

Computing Requirements

- **R:** windows: `https://cran.r-project.org/bin/windows/base/`
  mac: `https://cran.r-project.org/bin/macosx/`
- **RStudio:** Integrated development environment for R, available at `https://posit.co/download/rstudio-desktop/`.
  Installation guides:
  – Windows: `https://www.youtube.com/watch?v=eD07NznguA4`
  – Mac: `https://www.youtube.com/watch?v=AEebOXiMyyI`
- **Quarto:** An open-source scientific and technical publishing system. With Quarto, you can combine text, R code, and mathematical notation (via LaTeX) into a single source file, then render it into multiple formats including Word, HTML, and PDF.
  Documentation and installation instructions:
  `https://quarto.org/docs/get-started/`
- **TinyTeX:** A lightweight and easy-to-install LaTeX distribution. TinyTeX is required if you wish to render PDF files directly from Quarto. It provides all necessary LaTeX tools without the bulk of full distributions. Installation in R:

  ```
  install.packages("tinytex")
  tinytex::install_tinytex()
  ```

  To confirm installation:

  ```
  tinytex::tinytex_root()
  ```

  More information: `https://yihui.name/tinytex/`

Assessment

- **Late Work Policy:**
  - **No late assignments accepted** except for documented serious, unavoidable circumstances extending beyond two weeks
  - The drop policy (below) accommodates routine scheduling conflicts
  - Plan ahead and seek help early to ensure timely submission
- **Drop Policy:**
  - Lowest 2 weeks of assignments automatically dropped
  - Excludes approximately 1-2 exercises and 2-3 worksheets
- All assignments in this course are **submitted electronically via UNM Canvas**. Please follow these steps for each submission:
  - In Quarto, render your `.qmd` file to an HTML document.
  - Open the resulting HTML file in a web browser.
  - Print the HTML file to a PDF.
  - Upload the PDF file to UNM Canvas.

  After submitting, always double-check your submission in Canvas to ensure that it is properly viewable—this is how your grader will see it as well.
- **Exercises (28% of grade):**
  - Approximately 18 assignments
  - Assess reading/video comprehension
  - Two attempts allowed, highest score recorded
  - Estimated time: 1-2 hours reading, 1 hour exercises weekly
- **Worksheet Assignments (70% of grade):**
  - Approximately 21 assignments
  - Focus on conceptual understanding and application
- **Course Surveys (2% of grade):**
  - End-of-course evaluation (EvalKit)
- **Grading Scale:**

Grade	Stat 527	Stat 427
A	90%–100%	85%–100%
B	80%–89%	75%–84%
C	70%–79%	60%–74%
D	Below 70%	Below 60%