

STATS 500, Fall 2026

Regression Analysis

Last updated September 1, 2026

Lectures: Mon Wed 2:30-4:00 pm

Location: 1202 SEB

Instructor: Richard Guo, Assistant Professor of Statistics (he/him)

E-mail: ricguo@umich.edu

Office: 269 West Hall

Office Hours:

Wed 4:00-5:00 pm (in person)

Fri 3:00-4:00 pm (in person and via zoom)

GSIs: Dongsun Yoon dsyoon@umich.edu, Kevin Zeng kevinzen@umich.edu

Office Hours: TBD

Course Objectives Much of the class will focus on linear models, and will include topics such as building linear regression models and conducting inference and model checking, variable selection, shrinkage estimators (e.g. ridge regression, LASSO), as well as extension to generalized linear models for modeling binary and count data. This course aims to introduce the basic concepts and statistical methods that have been commonly used in practice. After finishing this course, students should have the basic skills to analyze data sets collected under simple and standard designs.

Prerequisites Matrix algebra, introductory probability and statistics. If in doubt, talk to the instructor. Some familiarity with R is helpful, but not required.

Course Resources

- **Canvas:** Course management system. Updates will be posted to Canvas. Please make sure that your Canvas settings for an ‘**announcement will alert you ASAP**’.

- **Textbook:** We will closely follow the textbook

Peng Ding. *Linear model and extensions*. Chapman & Hall, 2025. Available [online](#), which also comes with [data and R code](#).

For other optional references, consult the two books written by Julian J. Faraway:

[Linear models with R](#) (2nd ed). Chapman & Hall, 2015.

[Extending the linear model with R](#) (2nd ed). Chapman & Hall, 2016.

Both books are available online through the UM library.

- **R:** You will use R, a programming language built for data analysis, to analyze data with the models we learn. You should have it **installed** on your computer. It is also recommended to use **RStudio** as its development environment.

If you are new to R, you should learn it (mostly on your own) through this course. I recommend the following materials available online:

Gaston Sanchez (2023). *R Coding Basics*.

Emmanuel Paradis (2005). *R for Beginners*.

Winston Chang (2013). *Cookbook for R*. O'Reilly.

- **Slides:** Lecture slides are available under Canvas 'Files'; have them available for class meetings. Annotated slides will also be posted after class.
- **Piazza:** We will use **Piazza** (accessed from Canvas) instead of email for posting and answering questions. Personal questions should be directed to your instructor.
- **Email:** While most course related questions should be posted on Piazza, you can email the instructor and the GSIs for other requests or suggestions. When emailing us, please use your umich email and have 'STATS 500' in the subject line.
- **Lecture Recording:** Available after each lecture in Canvas. Lecture recordings are not meant to be a replacement for class attendance.

Grading Policy The graded work includes 11 homework assignments, 6 in-class quizzes, a final project and 2 exams. Your final course total will be the **maximum** between option 1 and 2:

	option 1	option 2
Class attendance	2%	2%
Homework	3%	3%
Quizzes	25%	25%
Final project	5%	5%
Midterm	30%	20%
Final	35%	45%

Your letter grade will be assigned in accordance with your rank in the class by the final course total. You will be informed of your current rank after the midterm exam. The grade distribution will be close to the historical grade distribution of this course on **ATLAS**.

Class attendance The class will be in person, and attendance will be 2% of the overall grade calculation. To receive the attendance credit for a lecture, you must be physically present and answer (correctly or incorrectly) at least 75% of the poll questions using iClicker Cloud. The attendance component of your grade is computed based on the formula

$$(\min(x, 24)/24) \times 2\%,$$

where x = number of lectures you attend (out of 26 lectures in total). See **here** to set up iClicker Cloud on your mobile device. Use **this link** to enroll in iClicker for this class.

Quizzes There will be **6 in-class quizzes**, each taking the **first 30 minutes** of a **Wednesday lecture** on the dates below. The quiz will be handed to you face down as you arrive, so please be seated before the hour. Every quiz covers the lectures listed next to it, together with the homework problems on the same material.

Each quiz may consist of multiple choice questions and questions requiring a short answer. Each quiz takes about 20 minutes to complete, so the 30-minute window is not meant to place you under time pressure. Quizzes are **closed book and closed notes**, and **no cheat sheet is allowed**. They are proctored; phones and other devices must be put away for the full 30 minutes. Quizzes are closely related to homework problems that have been assigned recently, so the best way to prepare for them is to work on the homework problems.

	Date	Lectures	Chapters
Quiz 1	Wed Sep 16	L1 – L3	\$1, \$2, \$3, Apdx A
Quiz 2	Wed Sep 30	L4 – L7	\$4, \$5, Apdx B, \$6
Quiz 3	Wed Oct 14	L8 – L11	Apdx C, \$7, \$8, \$9
Quiz 4	Wed Nov 4	L15 – L16	\$12
Quiz 5	Wed Nov 18	L17 – L19	\$16, \$18, \$13
Quiz 6	Wed Dec 9	L20 – L24	\$14, \$15, \$20, \$21, \$22

Your **single lowest quiz score** (including 0 due to absence) will be dropped, so each of the remaining 5 quizzes counts for **5%** of the final course total. Because of this drop, a quiz cannot be taken outside its scheduled lecture. If you anticipate difficulty in attending a quiz, contact the instructor **beforehand** to arrange a makeup. Quizzes will be scanned and returned on **Gradescope**, where you can also submit regrade requests; see the Regrades section below.

Exams The midterm and the final are **closed book and closed notes**. However, you are allowed to bring **two pieces of letter-sized paper (you can write on both sides)** as cheat sheet; preparing your cheat sheet is an excellent chance to review the materials. Practice exams will be available approximately one week before each exam.

Midterm	2:30 - 4:00 pm, Mon Oct 26	1202 SEB	Lec 1 - 14
Final	4:00 - 6:00 pm, Wed Dec 16	1202 SEB	Everything

No make-up exams will be given unless you have made arrangements with me **before the exam**. Make-up exams will only be granted in exceptional/unforeseen circumstances or for university excused absences. If you miss an exam and have not made arrangements, you will earn 0 points on that exam.

Regrades If you believe that something has been graded in error, submit a **regrade request through Gradescope**, not by email. Requests must be submitted within **one week** of the scores being released. Please note that the entire problem will be re-evaluated, so your score may go up or down.

Homework There will be **11 homework assignments**, assigned approximately weekly and due on 11:59pm Fridays on **Gradescope**. Homework is graded on **completion** rather than correctness: a submission showing a genuine attempt at every problem receives full credit. What you learn from the homework is assessed on the quizzes and the exams instead. Each week we read **a random sample of the submissions** and post a short note on the common issues alongside the solutions. If a submission drawn in this sample does not show a genuine attempt, it will receive **zero** for that assignment. To handle “life happens” situations, your **single lowest homework score**, including a zero from a missing submission, will be dropped, so you can skip one submission without penalty. Homework assignments will be posted on Canvas and collected via **Gradescope**.

1. You may handwrite and/or type (with LaTeX or **GNU TeXmacs**) your homework solutions. To submit your homework,
 - (1) Create a PDF that will be uploaded to Gradescope. Make sure it is legible.
 - (2) Upload the PDF to Gradescope.
 - (3) On Gradescope, select **the correct pages** for each question.
2. You should show justification/work for your answer.
3. Late homework submission will **not** be accepted. A missing homework submission will be scored zero. If you have a valid reason to request late homework submission, send an email to the instructor **before the due**.
4. Solution to each homework will be posted on Canvas.
5. You are required to comply with the University regulations on **academic integrity**.

Final Project Near the end of the term I will post a dataset on Canvas, and you will hand in a **2–3 page write-up** of your analysis of it. The project is due **11:59pm Friday Dec 11** on **Gradescope** and counts for **5%** of the final course total.

Organize your write-up around the following, which is also how it will be graded:

- (1) the model you specify, and why it is appropriate for these data;
- (2) the diagnostics you run;
- (3) any problem that the diagnostics reveal;
- (4) how you address that problem, and how your conclusions change once you do;
- (5) what you conclude, with the appropriate caveats.

Include the R code you used in an appendix, which does not count toward the page limit. This is **individual work**: both the analysis and the writing must be your own. Be aware that the dataset is chosen so that a routine, unexamined analysis can produce something wrong.

Accommodation If you need extra time or other special accommodations, please visit <https://ssd.umich.edu> to register, and plan ahead of time. For the **midterm and the final**, reserve a seat with the **Testing Accommodation Center**, where you can schedule your exam to be proctored in comfort. For the **quizzes**, contact me within the first two weeks of the term instead. Because the quizzes are short and frequent, we will arrange your accommodation **once for the whole term** rather than quiz by quiz. Let me know if you have any questions.

Well-being and self-care We all need to take our physical and mental well-being very seriously. If you are experiencing concerns, seeking help is a courageous thing to do for yourself and those who care about you. If the source of your stressors is academic, please contact me so that we can find solutions together. For personal concerns, UM offers a variety of resources, many which are listed on the [Well-being Collective](#).

Schedule Below is a tentative schedule. **Q1 – Q6** mark the quizzes, each held in the first 30 minutes of that lecture.

Week	Mon	Wed	Chapters	Due (Fri)
1	L1 (8/31)	L2 (9/2)	\$1, \$2, Apdx A	
2	<i>Labor Day</i> (9/7)	L3 (9/9)	\$3	HW1
3	L4 (9/14)	L5 (9/16), Q1	\$4, \$5	HW2
4	L6 (9/21)	L7 (9/23)	Apdx B, \$6	HW3
5	L8 (9/28)	L9 (9/30), Q2	Apdx C, \$7, \$8	HW4
6	L10 (10/5)	L11 (10/7)	\$8, \$9	HW5
7	L12 (10/12)	L13 (10/14), Q3	\$10, \$11	HW6
8	<i>Study break</i> (10/19)	L14 (10/21)	Midterm review	HW7
9	Midterm Exam (10/26)	L15 (10/28)	\$12	
10	L16 (11/2)	L17 (11/4), Q4	\$12, \$16	HW8
11	L18 (11/9)	L19 (11/11)	\$18, \$13	HW9
12	L20 (11/16)	L21 (11/18), Q5	\$14, \$15, \$20	HW10
13	L22 (11/23)	<i>Thanksgiving</i> (11/25)	\$21	
14	L23 (11/30)	L24 (12/2)	\$22	HW11
15	L25 (12/7)	L26 (12/9), Q6	\$24, Final review	Project
			Final Exam (12/16)	