STATS 500
Regression Analysis
Winter 2026

Last updated January 7, 2026

Lectures: Mon Wed 4:00-5:30 pm
Location: 170 Weiser

Instructor: Richard Guo, Assistant Professor of Statistics (he/him)
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Office: 269 West Hall
Office Hours:

Wed	2:30-3:30 pm	(in person)
Fri	3:00-4:00 pm	(in person and via zoom)

GSI: Yuqing Zhou
Office Hour: Tue 3:30-6:30 pm (G219 Angell Hall)
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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 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 GSI 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 12 homework assignments and 3 exams. Your final course total will be the **maximum** between option 1 and 2:

	option 1	option 2
Class attendance	2%	2%
Homework	28%	28%
Midterm	30%	20%
Final	40%	50%

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.

Exams Exams 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	4:00 - 5:30 pm, Wed Oct 15	170 Weiser	Lec 1 - 14
Final	1:30 - 3:30 pm, Thu Apr 23	170 Weiser	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.

Accommodation If you need extra time or other special accommodations, please reserve a seat with the **Testing Accommodation Center**, where you can schedule your exam to be proctored in comfort. Please plan ahead of time and visit https://ssd.umich.edu to register. Let me know if you have any questions.

Homework There will be **12 homework assignments**, assigned approximately weekly and due on 11:59pm Fridays on **Gradescope**. To handle "life happens" situations, your **single lowest homework score** (including 0 due to no submission) will be dropped so each of the remaining assignment counts for 2.55% of the final course total. 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.

Please follow these guidelines to make it easier to grade your work.

2. Full credit for each homework problem can only be earned through showing your justification/work on each problem.

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 and LSA regulations on academic integrity. In particular,

   - Homework is designed to *help you learn* and *get prepared for exams*, and you are encouraged to seek help from the instructor and the GSI. You may also work with each other, in person and through piazza.
   - However, you must write and submit **your own solutions**. Copying answers from solution manuals or previous offerings of the course is considered a breach of integrity.

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.

Week	Mon	Wed	Chapters	Due
1		L1 (1/7)	§1, §2	
2	L2 (1/12)	L3 (1/14)	Apdx A, §3	HW1
3	*MLK* (1/19)	L4 (1/21)	§4	HW2
4	L5 (1/26)	L6 (1/28)	§5, Apdx B, Apdx C, §6	HW3
5	L7 (2/2)	L8 (2/4)	§6, §7	HW4
6	L9 (2/9)	L10 (2/11)	§8, §9	HW5
7	L11 (2/16)	L12 (2/18)	§10, §11	HW6
8	L13 (2/23)	L14 (2/25)	§12, §13, Midterm review	HW7
9		*Spring break*		
10	**Midterm Exam** (3/9)	L15 (3/11)	§14	
11	L16 (3/16)	L17 (3/18)	§15, §16	HW8
12	L18 (3/23)	L19 (3/25)	§17, §19	HW9
13	L20 (3/30)	L21 (4/1)	§20	HW10
14	L22 (4/6)	L23 (4/8)	§21	HW11
15	L24 (4/13)	L25 (4/15)	§22, §23	HW12
16	L26 (4/20)		Final review	
			Final Exam (4/23)	