

STT 867: Linear Model Methodology

Michigan State University, Fall 2025

Instructor: Shrijita Bhattacharya

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OFFICE HOUR: Mondays 12:00 PM - 2:00 PM at office or by appointment.

Teaching Assistant: Rachita Mondal.

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Lectures Schedule: Mondays and Wednesdays 8:40 AM-10:00 AM, NS205 NatSci Building.

Help Room: <https://stt.natsci.msu.edu/academics/statistics-learning-center/>.

Course Web Page: All course materials and homeworks will be posted on D2L.

Recommended Background: Knowledge of mathematical statistics at Casella & Berger level (STT 862). One year of calculus and linear algebra.

Required Course Materials: André I. Khuri (2009). *Linear Model Methodology*, CRC Press.

Main References:

- Rencher and Schaalje (2008). *Linear Models in Statistics*, John Wiley & Sons.
- Rao and Toutenburg (1999). *Linear Models: Least Squares and Alternatives*, Springer-Verlag.
- Hastie, Tibshirani and Friedman (2009). *The Elements of Statistical Learning*, Springer-Verlag.
- Hastie, Tibshirani and Wainwright (2015). *Statistical Learning with Sparsity*, Chapman & Hall/CRC.

Tentative Course Topics:

- Least squares, Gauss-Markov Theorem and extensions
- Hypothesis testing and confidence region
- Simultaneous confidence intervals
- *Less-than-full-rank* linear models
- Estimable/Testable linear functions
- Distributional properties of quadratic forms
- Model selection and prediction
- Shrinkage methods

Attendance: You are expected to attend all meetings of the class. If you miss a class for whatever reason, you are responsible for all covering materials, assignments and deadlines.

In case a student is unable to attend lectures over an extended period, please collect lecture notes uploaded online and reach out to the instructor for additional help.

In case the instructor is unable to attend lectures over an extended period, lecture notes will be made available online. Also, make up classes and/or substitute lectures shall be arranged for.

Exams: There will be 1 midterm during the term, and the final exam.

Table 1: **Examination Schedule**

EXAM	DATE	TIME
MIDTERM:	Wednesday, October 15	8:40 AM - 10 AM at NS205 NatSci Building
FINAL:	Monday, December 8	7:45 AM - 9:45 AM at NS205 NatSci Building

If you cannot take an exam, contact the instructor as soon as possible to make other arrangements (to be considered only in case of verifiable excuses). Make-ups cannot be given after the exams have been returned.

Homework: There will be ten homeworks to turn in (each contributing to 3% of the total grade). Unexcused late homework (turned in up to one class date late) is given only 60% credit. Later homework is given no credit. There is no make-up for homework.

Grading: Homework: 30%, Midterm: 30%, Final: 40%.

4.0 : $90\% \leq \text{Score} < 100\%$	2.0 : $60\% \leq \text{Score} < 65\%$
3.5 : $80\% \leq \text{Score} < 90\%$	1.5 : $55\% \leq \text{Score} < 60\%$
3.0 : $70\% \leq \text{Score} < 80\%$	1.0 : $50\% \leq \text{Score} < 55\%$
2.5 : $65\% \leq \text{Score} < 70\%$	0.0 : $0\% \leq \text{Score} < 50\%$

Academic Honesty: The Department of Statistics and Probability adheres to the policies of academic honesty as specified in the General Student Regulations 1.0, Protection of Scholarships and Grades, and in the All-University of Integrity of Scholarships and Grades which are included in Spartan Life: Student Handbook and Resource Guide. Plagiarism or any other sort of fraudulent behavior in exam and/or homework assignment will result in an automatic zero in that exam and/or homework assignment.

ADA: To arrange for accommodation, a student with special need should contact the Resource Center for People with Disabilities [Phone: 353-9642, Web Site: <http://www.rcpd.msu.edu>].

Mandatory reporting: MSU employees, with limited exceptions, are required to report allegations of sexual assault, sexual harassment, and other prohibited conduct involving members of the University community. Details for reporting can be found at

<https://civilrights.msu.edu/policies/relationship-violence-and-sexual-misconduct-and-title-ix-policy.html>.

Grief absences: MSU has a policy on grief absences. It is described at

<https://reg.msu.edu/ROInfo/Notices/GriefAbsence.aspx>.

FERPA rules on student privacy rights are available at

<http://www.reg.msu.edu/ROInfo/Notices/PrivacyGuidelines.asp>.

Emergency situations: For additional suggestions for handling emergency situations in the classroom, contact the Ombudsperson's office

<https://ombud.msu.edu/education-training-assessments/presentations-trainings>.

MSU 2030: Excellence for Global Impact: Background about the Access, Opportunity and Excellence framework can be found on the IDI website

https://inclusion.msu.edu/about/access-opportunity-and-excellence-at-msu.html?utm_source=other-email&utm_medium=em&utm_campaign=faculty-staff

and broader updates will be forthcoming.

Disclaimer: The instructor reserves the right to make any changes she considers academically advisable. Changes will be announced in class and on the course web page. It is students' responsibility to keep up with any changed policies and assignments.

Important Dates:

Aug 25	Classes begin; late enrollment fee begins.
Aug 29	Close of add period.
Sep 1	Labor Day (no classes).
Sep 18	Last day for 100% refund.
Oct 13	Middle of semester; last day to drop with no grade.
Oct 15	Midterm (8:40 AM - 10:00 AM)
Oct 20-21	Fall break.
Nov 27-28	Thanksgiving break.
Dec 07	Last day of classes.
Dec 08	Final exam.
