STAT 6950
Applied Statistics I (27234)
Autumn 2026

Syllabus - Graduate Instructor Information

- Name: Jennifer Sinnott

  Professional Qualifications

  Ph.D., Biostatistics, Harvard University
  M.A.S., Applied Statistics, The Ohio State University
  A.B., Mathematics, Harvard University

Syllabus - Required or Recommended Readings

Sanford Weisberg, Applied Linear Regression, 4th Ed. John Wiley & Sons, Inc., NJ. 2014.

An electronic version of the book can be accessed for free through The Ohio State University Libraries here.

Syllabus - Course Schedule

Week	Topic
1-2	One- and two-sample problems
3-6	Simple linear regression
7-10	Multiple linear regression
11-16	Topics in linear regression

Course Details - Instructor Contact Details

Email address: sinnott.12@osu.edu or jsinnott@stat.osu.edu

Course Details - Office Hours

Monday 3pm-4pm by Zoom

Course Details - Class Meeting Details

Class Meeting Details: 09:25 AM-11:15 AM - 209 W 18th Ave 285 - TR

Course Details - Course Description

One and two-sample problems, exploratory data analysis, simple and multiple linear regression, diagnostics and model selection. Intended primarily for students in the PhD program in Statistics or Biostatistics. Coreq: Stat 6801, or permission of instructor. Not open to students with credit for 6450.
Prerequisite(s) / Corequisites: Coreq: Stat 6801, or permission of instructor. Not open to students with credit for 6450.

Course Details - More About This Course

Stat 6950 is an applied statistics course that emphasizes principles of data analysis in the linear model setting. While the focus is applied, the methods of data analysis are presented and motivated in the context of statistical theory at a level appropriate for first year graduate students in Statistics or Biostatistics. The theoretical background assumes facility with multivariable calculus and basic matrix operations from linear algebra. The R language and environment for statistical computing and graphics will be used as the main tool for data analysis.

Course Details - Course Learning Outcomes

By the end of this course, students should successfully be able to:

- identify and implement appropriate methods of data analysis in the one- and two-sample problem settings;
- use an exploratory analysis of data to guide the linear regression modeling process;
- fit, interpret, and perform statistical inference based on linear regression models;
- use appropriate diagnostics for model checking and case-influence analysis to identify deficiencies with a fitted model;
- recognize and employ appropriate modeling strategies for common examples of nonconstant variance functions;
- employ appropriate strategies for regression modeling with many predictors;
- summarize an analysis appropriately.

Course Details - Course Supplies

Necessary Software and Equipment

- This class requires you to use the statistical software packages called R (The R Project for Statistical Computing; http://www.r-project.org/) and RStudio (https://posit.co/). These software packages are available as Free Software with versions compatible with current macOS and Windows operating systems. More details will be given in lectures.
- You may choose to use the (free) R Markdown (https://rmarkdown.rstudio.com) or Quarto (https://quarto.org) authoring frameworks to complete assignments.

- Access to a computer capable of running the required software, which typically includes Mac and PC devices running the current macOS or Windows operating system.
- Office hours will be held by CarmenZoom (go.osu.edu/zoom-meetings)

Course Details - Detailed Course Schedule

Week	Dates	Topics
1	Aug 25, 27	One and two-sample problems
2	Sep 1, 3	One and two-sample proportions
3	Sep 8, 10	Quiz 1 (15 min), EDA, statistical models, simple linear regression intro
4	Sep 15, 17	Simple linear regression
5	Sep 22, 24	Testing, techniques for model validation
6	Sep 29, Oct 1	Midterm 1 (1 hr), Regression diagnostics
7	Oct 6, 8	Transformations
8	Oct 13	Multiple linear regression (MLR)
9	Oct 20, 22	Quiz 2 (15 min), MLR inference, added variable plots, multicollinearity
10	Oct 27, 29	Nested models, general linear F test
11	Nov 3, 5	Asynchronous on Nov 3, Regression with categorical predictors
12	Nov 10, 12	Midterm 2 (1 hr 45 min), Weighted least squares
13	Nov 17, 19	Residuals and diagnostics, Polynomial regression
14	Nov 24	Group project presentations, interaction effects
15	Dec 1, 3	Quiz 3 (15 min), Model comparison and selection
16	Dec 8	Variable selection
FINAL	Dec 11, 8am - 9:45am	Final Exam (1 hr 45 min)

Course Details - Grading Policy

Assignment Category	Percentage
Homework	10
Quizzes	12
Midterm 1	15
Midterm 2	25
Project	10
Final Exam	28
Total	100

Homework will be assigned approximately weekly, with a few weeks off during the semester. While adjustments may need to be made, I expect that homework assignments will be due on Carmen on Wednesdays by 11:59pm. Instructions for how to prepare and turn in your homework solutions will be given at the beginning of the semester.

Quizzes: There will be three short quizzes during the semester. These will be multiple choice or short answer.

Project: A group project will be due in late November. The project will tie together the concepts learned throughout the course. Details will be provided in the beginning of October.

Exams: The first midterm is tentatively scheduled to be on Tuesday, September 29 during our regularly scheduled class time. The second midterm is tentatively scheduled to be on Tuesday, November 10 during our regularly scheduled class time. The first midterm will last for one hour, and the second midterm will last for 1 hour and 45 minutes. The final exam has been scheduled by the registrar for Friday, December 11, 8:00am–9:45am.

All quizzes and exams are closed book/closed notes. Further details will be given in advance of each exam. A basic calculator is allowed.

Course Details - Grading Scale

Letter Grade	Percentage Range
A	100% to 93%
A-	< 93% to 90%
B+	< 90% to 87%
B	< 87% to 83%
B-	< 83% to 80%
C+	< 80% to 77%
C	< 77% to 73%
C-	< 73% to 70%
D+	< 70% to 67%
D	< 67% to 60%
E	< 60% to 0%

Course Details - Instructor Policies

Communication: I will usually communicate through announcements or email on Carmen, so please be sure to check Carmen frequently and/or turn on any Carmen notifications. If you email me, I try to respond within 1-2 business days.

Course Details - Course Policies

Academic Integrity

- Quizzes and exams: You must complete the quizzes, midterm, and final exams on your own without assistance from any technology other than a basic calculator, and anyone other than a course instructor.

- Homework: You may work together on the homework, but do not copy any part of your solutions from another person or another source, including generative AI. While study groups are allowed, remember that you must produce your own, original work. If you're unsure about a particular situation, please feel free to ask ahead of time.

- Reusing past work: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.

Course Details - AI Use Policy

It is hard to avoid the use of AI altogether. However, you are here to learn concepts, skills, and techniques, and the use of AI may not be conducive to that.

In this course, acceptable use of GenAI is strictly limited to:

- use as a tool to complement the lectures and assigned readings to help you learn the course material. You are allowed to query GenAI about general questions you have as you learn the material in the same way that you might look up information using a search engine like Google. As with any online resource, please treat the information you receive with appropriate skepticism.
- use as an extended "help manual" for R functions you might use during this class. In the same way that you might use Google to find out what a specific R function can do (or what R function to use for a specific task), you can pass the same queries to GenAI.

All of the work that you turn in for credit in the course (solutions to homework assignments and the class project, and quizzes and exams) must be your own original work. The use of GenAI to produce work that you will turn in for credit is prohibited. This includes, but is not limited to:

- use of GenAI or other tools such as Google Translate as a translation tool is prohibited. The ability to "summarize an analysis appropriately" is one of the course learning outcomes and so the writing you produce must be entirely your own.
- use of GenAI to produce written work is prohibited. All written work you turn in must be your own original work, including all elements of the course project.
- use of GenAI to answer homework questions is prohibited. Your solutions to homework questions must be your own work and cannot be generated either in whole or part by GenAI. You may not input a homework question into GenAI either in whole or part. The materials in this course may be subject to copyright protection. Do not input into AI systems or allow AI to access external or instructor-created course materials (e.g., assigned readings, slides) without explicit instructor permission.
- use of GenAI to write R code is prohibited. While querying GenAI about specific features of R functions is acceptable, asking GenAI to write code for you to complete a task for an assignment is not.

Representing AI-generated content as your own work is a violation of the Code of Student Conduct. And remember that GenAI can provide inaccurate information, fabricate information (for example, creating citations to sources that do not exist) or omit key information. You are ultimately

responsible for the accuracy and integrity of your submitted work. Please check with me if you have questions.

Course Details - College and/or Department Policies

Copyright

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Disclaimer

This syllabus should be taken as a reliable guide for the course content. However, you cannot claim any rights from it, and we reserve the right to change due dates or the methods of grading and/or assessment if necessary. Any changes will be communicated to you through official course announcements.

Syllabus - University Policies

Office of Undergraduate Education - Standard Syllabus Statements

- Academic Misconduct
- Religious Accommodations
- Accommodations for Disability and Illness
- Intellectual Diversity
- Grievances and Solving Problems
- Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct
- Copyrights
- Content Warnings
- Mental Health Support
- Resources for Military-Connected Students
- Campus-wide Class Cancellations