

Syllabus: STAT 5000

Course Information

STAT 5000 | Statistical Methods I | Fall 2024

Lecture | MWF @ 9:55 - 10:45 am | Sweeney 1116

Lab | T @ 2:10 - 4:00 pm | Snedecor 1105

Department: Statistics

Credit Hours: 4

Course Prerequisites: STAT 588 or current enrollment in STAT 542; knowledge of matrix algebra

Instructor Information

Name: Danica Ommen

Email: dmommen@iastate.edu

Office Address: 2415 Snedecor Hall

Student (Office) Hours: Thursdays @ 10-11 am

Course Learning Objectives (CLOs)

Upon completing this course, students will be able to do the following:

- analyze of data from designed experiments and observational studies
- randomization-based and model-based inference on group means
- pairing/blocking and other uses of restricted randomization
- model assessment and diagnostics
- remedial measures
- alternative approaches based on ranks
- simple linear regression, multiple linear regression, and model selection criteria
- use of linear models to analyze data
- least squares estimation
- estimability
- sampling distributions of estimators

- general linear tests
- inference for parameters and contrasts

Course Materials

Required Textbook

- *The Statistical Sleuth: A Course in Methods of Data Analysis*, 3rd Edition (2013) by Fred L. Ramsey and Daniel W. Shafer, Brooks & Cole, Cengage Learning, ISBN: 978-1133490678 (E-book available via "Immediate Access" in Canvas)

Optional Textbooks

- *Applied Linear Statistical Models*, 5th Edition (2005) by Michael H. Kutner, McGraw-Hill Irwin, ISBN: 978-0072386882
- *R for Data Science*, 2nd Edition (2023) by Hadley Wickham, Mine Çetinkaya-Rundel, and Garrett Golemund, O'Reilly Media, Inc., ISBN: 978-1492097402 (Free e-book available via the ISU Library: <https://www.lib.iastate.edu/> (<https://www.lib.iastate.edu/>))
- *SAS[®] Statistics by Example*, 1st Edition (2011) by Ron Cody, SAS[®] Institute, Inc., ISBN: 978-1612900124 (Free e-book available via the ISU Library: <https://www.lib.iastate.edu/> (<https://www.lib.iastate.edu/>))

Course Technologies

- **Canvas:** Many of the course materials will be posted online using the course's Canvas webpage. Please make a habit of routinely checking Canvas for materials or set up Canvas to provide you with notifications when course materials are added/alterd or an announcement has been posted.
- **Computing:** Most assignments in the class will require some computing in R (<https://www.r-project.org/> ↪ (<https://www.r-project.org/>)) or SAS (https://www.sas.com/en_us/software/on-demand-for-academics.html ↪ (https://www.sas.com/en_us/software/on-demand-for-academics.html)). Please make sure that you have a working laptop capable of installing R/RStudio and with a web browser to access SAS Studio.
- **Gradescope:** Homework and Lab assignments will be turned-in online via Gradescope. See here for additional help resources -> <https://guides.gradescope.com/hc/en->

[us/categories/21540043398413-Student-Hub](https://guides.gradescope.com/hc/en-us/categories/21540043398413-Student-Hub) [↗ \(https://guides.gradescope.com/hc/en-us/categories/21540043398413-Student-Hub\)](https://guides.gradescope.com/hc/en-us/categories/21540043398413-Student-Hub)

- **Immediate Access:** Our course's textbook will be made available to you online via Immediate Access at a reduced cost.

Learning Activities & Assessments

- **Homework:** Individual practice is an important part of learning. For this reason, homework problems will be assigned each week of the semester. Homework assignments will be due (on Canvas in Gradescope) at 11:59 pm on the due date (typically Fridays) unless otherwise announced. Solutions to the homework problems will be posted on Canvas after the due date. *For this reason, late homework assignments will only be accepted under extreme circumstances on a case-by-case basis.* At the end of the semester, your lowest homework score will be dropped.
- **Labs:** During the lab meeting time, we will explore concepts from lecture through the use of simulations and basic data analysis, using both R and SAS. We will also work in small groups and/or individually on additional problems related to the lecture material. Your solutions to these lab exercises will be due online (onCanvas in Gradescope) by the end of the lab period. You must be present for the entire lab to receive credit for this assignment. Solutions to the lab will be posted to Canvas at the completion of the lab, *so no make-up labs will be given or accepted.* At the end of the semester, your lowest lab score will be dropped.
- **Exams:** There will be 2 midterm exams and 1 final exam for this course. Please see the tentative course schedule for approximate dates. Absences from exams due to school activities must be submitted to your instructor at least one week prior to the exam. Requests for a make-up exam due to an emergency (student illness or death in the family) should be submitted to your instructor as soon as possible, before exam time, given the circumstances.

Grading

Grade Distribution

Your grade in this course includes the following participation areas:

Course Components	Contribution
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Homework

20%

Course Components	Contribution
Lab	20%
Exams	60%

Table 1. Grade Distribution

Extra Credit

Extra credit assignments may be provided to the entire class at the discretion of the instructor. Under no circumstances will individualized extra credit assignments be given.

Course Policies

Feedback

The solutions to all graded assignments will be made available in Canvas approximately 1 week after the posted due date.


Missed and late coursework

Late work will not be accepted after the solutions have been posted to Canvas. Inform the instructor at least 1 week in advance of planned absences or as soon as possible for unplanned absences.

ISU Syllabus Statements

Required

Free Expression


Iowa State University supports and upholds the First Amendment protection of [freedom of speech](https://freespeech.iastate.edu/) (<https://freespeech.iastate.edu/>) and the principle of [academic freedom](#) 

(<https://www.iowaregents.edu/plans-and-policies/board-policy-manual/310-academic-freedom>) in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

No employee, student, applicant, or campus visitor is compelled to disclose their pronouns. Anyone may voluntarily disclose their own pronouns.

Recommended

Academic Dishonesty

The class will follow Iowa State University's policy on academic misconduct ([5.1 in the Student Code of Conduct](#) (<https://www.policy.iastate.edu/policy/SDR>)). Students are responsible for adhering to university policy and the expectations in the course syllabus and on coursework and exams and for following directions given by faculty, instructors, and ISU Test Center regulations related to coursework, assessments, and exams. Anyone suspected of academic misconduct will be reported to the [Office of Student Conduct in the Dean of Students Office](#) (<https://studentconduct.dso.iastate.edu/know-code-resources/facultystaff>). Information about academic integrity and the value of completing academic work honestly can be found in the [Iowa State University Academic Integrity Tutorial](#)  (<https://iastate.pressbooks.pub/academicintegrity/>).

Accessibility Statement

Iowa State University is committed to advancing equity, access, and inclusion for students with disabilities. Promoting these values entails providing reasonable accommodations where barriers exist to students' full participation in higher education. Students in need of accommodations or who experience accessibility-related barriers to learning should work with Student Accessibility Services (SAS) to identify resources and support available to them. Staff at SAS collaborate with students and campus partners to coordinate accommodations and to further the academic excellence of students with disabilities. Information about SAS is available online at www.sas.dso.iastate.edu (<https://sas.dso.iastate.edu/>), by email at accessibility@iastate.edu (<mailto:accessibility@iastate.edu>), or by phone at 515-294-7220.

Discrimination and Harassment

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu. (<mailto:eooffice@iastate.edu>)

Mental Health and Well-Being Resources

At Iowa State, we're committed to your success and well-being. As a Cyclone, you can access 24/7 resources, services, and people dedicated to helping you achieve your goals and be your best in and out of the classroom. Whether you need academic support or just someone to talk to, we're here for you at Cyclone Support (cyclonesupport.iastate.edu (<https://cyclonesupport.iastate.edu/>)). If you are struggling emotionally and need support, there's confidential help available 24/7/365. You can call or text 988 or use the chat at 988lifeline.org [↗](https://988lifeline.org/) (<https://988lifeline.org/>).

Statement on Prep Week

This class follows the Iowa State University Prep Week policy, as noted in the ISU Policy Library and the Senior Vice President and Provost's website.

Religious Accommodation

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request the reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the [Dean of Students Office](https://www.studentassistance.dso.iastate.edu/) (<https://www.studentassistance.dso.iastate.edu/>) at 515-294-1020 or the [Office of Equal Opportunity](https://www.eoc.iastate.edu/) (<https://www.eoc.iastate.edu/>) at 515-294-7612.

Disclaimer: In extenuating circumstances, the schedule, policies, or procedures are subject to change. All efforts will be made not to alter assignment due dates or scheduled exams. Any modifications will be communicated in

writing, verbally in class, and/or published in the Canvas course.