

Statistics 588

Fall 2022

Instructor: V. Roy

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Website: Canvas

Office hours: M T 12.30 -1.30 pm in 3415 Snedecor and by appointment

Lectures: MW 3:20-4:10pm, F 2:15-4.05pm Carver 0202

Grader: Name: Yushan Gu

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Office Hours: **W** – 2:10-3:10 pm Snedecor 3219

H- 2 –3.30 pm Snedecor 3219

Textbook: *John E. Freund's Mathematical Statistics, 8th ed., By I. Miller & M. Miller*

Objectives: This course introduces the theoretical basis of fundamental statistical methods for graduate students in the applied sciences.

Tentative Course Topics:

1. Review of set operations and combinatorics
2. Definitions and properties of probability
3. Discrete and continuous distributions
4. Marginal and conditional distributions
5. Expectation, moments and moment generating function of probability distribution
6. Various useful probability distributions
7. Transformation of random variables
8. Sampling Distributions
9. Properties of estimators
10. Methods for obtaining estimators
11. Interval estimation
12. Basic theory of hypothesis testing
13. Methods for obtaining statistical tests
14. Examples of statistical tests

Grading System: The following system will be used to determine course grades:

Homeworks	30%
Lowest percentage score of Exams 1, 2 = 15%, Other exam = 25%	
Final	30%

Letter Grades: Grades will be assigned as follows: If your course grade is 90% or higher, you will receive at least an A-. If your course grade is between 80% and 89%, you will receive at least a B-. If your course grade is between 70% and 79%, you will receive at least a C-. If your course grade is between 60% and 69%, you will receive at least a D-

Tentative Schedule: Fall 2022

Aug 22-26 :	Week 1	Chapter 1 – Permutations and Combinations Chapter 2 – Probability
Aug 29- Sept 2 :	Week 2	Chapter 2 (Cont.) Chapter 3 (3.1-3.4 –Discrete and Continuous Random Variables and Probability)
Sept 5- 9 :	Week 3	Chapter 3 (3.5-3.7)- Joint Distributions/densities
Sept 12-16 :	Week 4	Chapter 3 (Cont.) Chapter 4 (4.1-4.5)–Expectation, Moments & MGF Chapter 4 (4.6-4.8)- Product Moments, ...
Sept 19 – 23	Week 5	Chapter 4 (Cont.) Chapter 5 –Special Probability Distributions

Friday 9/23/22

***EXAM 1 over materials through part of week 5**

Sept 26 – Sept 30 :	Week 6	Chapter 5(cont.) Chapter 6 - Special Probability Densities
Oct 3 – 7:	Week 7	Chapter 6 (cont.)
Oct 10 –14:	Week 8	Chapter 7 –Functions of Random variables
Oct 17 - 21:	Week 9	Chapter 7 (cont.), Chapter 8–Sampling Distributions

Friday, 10/21/22

***EXAM 2 over materials from part of Week 5 – Week 9**

Oct 24– Oct 28:	Week 10	Chapter 8 –Sampling Distributions
Oct 31 - Nov 11 :	Week 11, 12	Chapter 10 - Estimation :Properties
Nov 14 –Nov 18:	Week 13	Chapter 10(cont), Chapter 11 –Interval Estimation
Nov 21 – 25:	Week 14	Thanksgiving Holiday: No Class
Nov 28– Dec 2 :	Week 15	Chapter 12 -Testing of Hypothesis

Dec 5 – 9: Week 16

Chapter 12 (cont), Chapter 13 (reference)
Additional topics, if time permits.

Dec 12– 16: Week 17

Final Exam Monday, Dec 12th 2:15-4:15pm

Canvas: The course materials will be posted online and assignments will be submitted 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.

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 at 11:59 PM on the due date 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.

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. Documentation (e.g., doctors' note or funeral program) will be required for make-up exams.

Free Expression: Iowa State University supports and upholds the First Amendment protection of and the principle of 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.

Accessibility Statement: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at www.sas.dso.iastate.edu, by contacting SAS staff by email at accessibility@iastate.edu, or by calling 515-294-7220. Student

Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

Prep Week: This class follows the Iowa State University Dead Week guidelines as outlined in <https://www.provost.iastate.edu/academic-programs/dead-week>

Harassment and Discrimination: 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.

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 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 at 515-294-1020 or the Office of Equal Opportunity at 515-294-7612.

Academic Dishonesty: This class will follow Iowa State University policy on academic dishonesty found in the Iowa State University Catalog. A score of zero will be given for the entire assignment in which the academic dishonesty occurred. If a pattern of academic dishonesty has been found to occur, a grade of F for the entire course may be given.

Public Health: If you are not feeling well, you should stay home and focus on your health. Should you miss class due to illness, it is your responsibility to work with your instructor to arrange for accommodations and to make up coursework, as consistent with the instructor's attendance policy.

You may choose to wear a face mask and/or receive the COVID-19 vaccine and boosters, as well as other vaccines such as influenza, but those options are not required. Thielen Student Health Center will continue to provide COVID-19 vaccinations free-of-charge to students. The university will continue to offer free masks and COVID-19 test kits during the fall 2022 semester. Other wellbeing resources for students are available at:

Public health information for the campus community continues to be available on Iowa State's public health website <https://health.iastate.edu/public-health/>. All public health questions should be directed to publichealthteam@iastate.edu.