

Introduction to Mathematical Statistics II

STAT 4202

Course Information

- Instructor:
Andrew Heeszel
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- Teaching assistant:
Haotian Xie
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Tutoring hours: TBD
- Prerequisites: C- or better in 4201, Math 4530, or 5530H, or permission of instructor. Not open to students with credit for 3202, 6201, 6302, or 6802.
- Lecture Time: 3:00 P.M. - 3:55 P.M., M,W,F, Jennings Hall – Room: 001. **The instruction mode for this course will be in-person** (see <https://teaching.resources.osu.edu/StudentInstructionalModes>).
- Office Hours: Tuesdays 10:15 AM - 11:15 AM and Thursdays 11:30 AM - 12:25 PM at Cockins Hall 217 and by appointment.
- Recitation: This course requires students to sign up for a lab/recitation session. Recitations will review important course concepts, and cover extra practice problems on class material. Quizzes will be given regularly during recitation activities. See the Homework & Quizzes section for more information.
- Course website: Most course material will be available on Canvas <https://carmen.osu.edu/>. Please check it regularly for class announcements and material.

Course textbook

- *John E. Freund's Mathematical Statistics with Applications (8th edition)* by Irwin Miller and Marylees Miller (reserved at OSU library, available at [Amazon](#))
- The textbook and/or courseware for this course is being provided via CarmenBooks. Through CarmenBooks, students obtain publisher materials electronically through CarmenCanvas, saving them up to 80% per title. The fee for this material is included as part

of tuition and is listed as CarmenBooks fee on your Statement of Account. In addition to cost-savings, materials provided through CarmenBooks are available immediately on or before the first day of class. You can access this eBook through the CarmenBooks reader link in the course navigation.

Course Description

This course is the second part in a series of two courses (STAT4201-STAT4202), which cover the fundamentals of mathematical statistics and statistical inference. STAT 4202 focuses on point and interval estimation, statistical tests, and regression, with rigorous mathematical treatments and various applications. A list of tentative topics is given below.

- Chapter 10: Point Estimation (3 weeks)
- Chapter 11: Interval Estimation (2 weeks)
- Chapter 12: Hypothesis Testing (2 weeks)
- Chapter 13: Hypothesis Testing Involving Means, Variances, and Proportions (3 weeks)
- Chapter 14: Regression and Correlation (2 weeks)
- Chapter 15: ANOVA (1 week)
- Chapter 16 Nonparametric Tests (1 week)
- Chapter 9 Decision Theory (1 week)

Course Learning Outcomes

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

- Calculate and evaluate point estimators.
- Formulate, construct and interpret confidence intervals about parameters in a statistical model.
- Formulate statistical hypotheses, construct appropriate hypotheses tests and interpret results.
- Formulate linear regression models, fit these models and interpret the results.
- Formulate one-way ANOVA models, fit these models and interpret the results.

Homework & Quizzes

Homework assignments will be posted on Carmen. There will be 8 – 10 homework assignments, each containing about 10 problems. Homeworks are graded by a combination of correctness and completion. Students are encouraged to discuss homework problems with each other but must submit their own work. There will be 5 – 7 quizzes, each containing 1 or 2 problems. All quizzes will be closed book/notes. Students are allowed to use a basic scientific calculator on quizzes. The quiz problems will be similar to assigned homework problems. For most weeks, there will be a quiz and/or a homework assignment due in recitation. Students' lowest homework and quiz score will be dropped at the end of the semester. No other late work will typically be accepted throughout the semester, but please contact me as soon as possible about your situation in other cases. Additionally, please contact me as soon as possible if you are experiencing a prolonged absence preventing you from completing either the homework or quizzes. All homework assignments will be scanned and submitted on Carmen.

Exams

STAT 4202 will have two midterm exams, and one final exam. All exams will be closed-book. Statistical tables will be provided as needed. Calculators may be used on the exams, but no cell phones or other communication devices are allowed. Students can use one handwritten 8.5 by 11 inch sheet of paper for each Midterms, and two for the final exam.

The final exam will be cumulative, but will emphasize more on recent material. The two midterm exams will be in the regular lecture room Jennings Hall - Room: 001; and the location of the final exam will be posted later according to the university arrangement. The exams are tentatively scheduled for:

Midterm I	Week 6 (during lecture)
Midterm II	Week 11 (during lecture)
Final Exam	Friday, April 26th, 4:00pm-5:45pm

These dates are still tentative, and I will announce the date of any exam at least two weeks prior to the exam date.

Grade Disputes

Students have one week to dispute their grades on any homework, quiz or exam. The recorded grade is final after the dispute period.

Evaluation

Students' final grades for this course will be determined by homework, quizzes, and exams. The weights for each are as follows:

Homework	20%
Quiz	20%
Midterm I	20%
Midterm II	20%
Final Exam	20%

GE Course Information

This course satisfies the General Education foundation requirement in Mathematical and Quantitative Reasoning or Data Analysis which has the following goals and expected learning outcomes:

Goals: Successful students will be able to apply quantitative or logical reasoning and/or mathematical/ statistical methods to understand and solve problems and will be able to communicate their results.

Expected Learning Outcomes (ELOs): Successful students are able to:

- Use logical, mathematical and/or statistical concepts and methods to represent real-world situations.
- Use diverse logical, mathematical and/or statistical approaches, technologies and tools to communicate about data symbolically, visually, numerically and verbally.
- Draw appropriate inferences from data based on quantitative analysis and/or logical reasoning.
- Make and evaluate important assumptions in estimation, modeling, logical argumentation and/or data analysis.
- Evaluate social and ethical implications in mathematical and quantitative reasoning.

This course also satisfies the Legacy General Education requirement in Data Analysis. which has the following goals and expected learning outcomes:

Goals: Students develop skills in drawing conclusions and critically evaluating results based on data.

Expected Learning Outcomes:

- Students understand basic concepts of statistics and probability.
- Students comprehend methods needed to analyze and critically evaluate statistical arguments.
- Students recognize the importance of statistical ideas.

Other comments

- **E-mail correspondence:** In order to protect your privacy, all course e-mail correspondence must be made through a valid OSU name.nn account. Students should expect to receive a response by 1 business day.
- **Group tutoring:** The Mathematics and Statistics Learning Center provides group tutoring. More information can be found at <https://mslc.osu.edu/tutoring/statistics-shared-office-hours>.
- **Attendance:** Attendance will not be recorded throughout the semester, but is strongly encouraged. The concepts in this course are build throughout the semester, so it is recommended to attend lecture and recitation in order to avoid falling behind. Students must also attend recitation in order to receive credit for quizzes.

- **Calculators:** Please note that during exams students are not permitted to share a calculator with another student, or use any internet enabled device or cell phone.
- **Recording of Class:** Audio, video, and photographic recording of class content (e.g., lectures) is not allowed without authorization from the instructor. The transmission of all course content onto public or commercial sites is prohibited.

Academic Integrity

Although students are encouraged to work together on homework assignments, each student must submit their own written work. Academic misconduct will not be tolerated and will be dealt with procedurally in accordance with University Rule (<http://oaa.osu.edu/procedures>).

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (<http://studentlife.osu.edu/csc/>).

Disability Statement

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614-292-3307; email: slds@osu.edu.

If you are isolating while waiting for a COVID-19 test result, please let me know immediately. Those testing positive for COVID-19 should refer to the Safe and Healthy Buckeyes site for resources. Beyond five days of the required COVID-19 isolation period, I may rely on Student Life Disability Services to establish further reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Statement on Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student’s ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and

other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Religious Accommodation Statement

It is Ohio State's policy to reasonably accommodate the sincerely held religious beliefs and practices of all students. The policy permits a student to be absent for up to three days each academic semester for reasons of faith or religious or spiritual belief.

Students planning to use religious beliefs or practices accommodations for course requirements must inform the instructor in writing no later than 14 days after the course begins. The instructor is then responsible for scheduling an alternative time and date for the course requirement, which may be before or after the original time and date of the course requirement. These alternative accommodations will remain confidential. It is the student's responsibility to ensure that all course assignments are completed.

Statement on title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu.

Disclaimer

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advanced notice.