

Syllabus

Introduction to Mathematical Statistics I

STAT 4201 Autumn 22

Course Information

- **Course times and location:** MWF 8:00 - 8:55 in Pomerene 160
- **Credit hours:** 4
- **Mode of delivery:** In Person

Instructor

- **Name:** Dr. Andrew Richards
- **Email:** richards.1227@osu.edu **note: *do not*** use my old buckeyemail as it is not monitored
- **Office location:** 325 Cockins Hall
- **Office hours:** TBD based on student input
- **Preferred means of communication:**
 - My preferred method of communication for questions is **email**.
 - My class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your [notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to be sure you receive these messages.

Teaching Assistant

- **Name:** TBD
- **Email:** TBD
- **Recitation times:** Tuesdays at 8, 4:10, or 5:20 in Cockins 312

Course Prerequisites

C- or better in Math 2153, 2162.xx, 2182H, or 4182H, or permission of instructor. Not open to students with credit for 3201, 4202, 6201, 6301, 6801, Math 4530 or 5530H.



Course Description

This is the first course in a two-semester sequence on probability and mathematical statistics. The focus of STAT 4201 will be on introducing some of the basic concepts in probability theory. Topics to be covered include basic counting, set theoretic notation, the axioms of probability spaces, discrete and continuous distributions and densities, random variables, expectation and moments, functions of random variables and transformation techniques, common sampling distributions, and order statistics. These topics are covered in the first 8 chapters of the required textbook.

Learning Outcomes

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

- Understand the basic concepts in probability and statistics.
- Compute probabilities and statistics of discrete and continuous distributions.
- Comprehend the probabilistic methods needed to analyze and critically evaluate statistical models and arguments.
- Recognize the importance of statistical ideas.



How This Course Works

Mode of delivery: This course is designed to be in person. In the event that circumstances force a change, we will adapt. Details of the adaptation will depend on the circumstances.

The instructor will hold weekly office hours in person and/or online. I am usually available to meet either in person or online by appointment if arrangements are made in a timely manner.

Each week, a recitation activity (usually a set of problems) will be posted on the course webpage. The recitation activities will be led by the TA.

The tutor hours of the TAs can be accessed through the Math and Statistics Learning Center (MSLC). The Math and Statistics Learning Center (MSLC) will be open beginning the second week of classes. Details about how Zoom tutoring will work through the MSLC, along with the MSLC Zoom link, can be found on the following site: <https://mslc.osu.edu/online-tutoring>. Hours in which STAT 4201 assistance will be available through the MSLC will be posted on Carmen before the start of Week 2 of the semester. Essentially, you can think of the MSLC hours as times when our teaching assistants will be available to provide you with one-on-one assistance with the course content. We strongly encourage you to take advantage of this resource.

Credit hours and work expectations: This is a **4-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 4 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 8 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Course Materials, Fees and Technologies

Required Materials and/or Technologies

- *John E. Freund's Mathematical Statistics with Applications*, 8th edition, by Irwin Miller and Marylees Miler, Pearson, 2014

The textbook for this course is being provided via CarmenBooks. Through CarmenBooks, students obtain publisher materials electronically through CarmenCanvas. The fee for this material is included as part of tuition and is listed as CarmenBooks fee on your Statement of Account. Materials provided through CarmenBooks are available immediately on or before the first day of class.

Unless you choose to opt-out of the program, you do NOT need to purchase any materials for this course at the bookstore. For more information on the program or information on how to opt out, please visit the CarmenBooks website.

Access this eBook through the CarmenBooks reader link in the course navigation.

Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection
- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for technology and internet access at go.osu.edu/student-tech-access.

Required Software

Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Visit the [installing Office 365](http://go.osu.edu/office365help) (go.osu.edu/office365help) help article for full instructions.

You will need to have the ability to scan written work to upload certain assignments as PDF files through Carmen. There are a variety of free apps that can do this (search for “PDF scanner”). For instance, the Notes application that comes standard on an iPhone or iPad has this capability. Alternatively, you may use a tablet computer with a stylus to write your solutions using a handwriting app, then save them as a PDF file to upload to Carmen.

CarmenCanvas Access

You will need to use [BuckeyePass](https://buckeyepass.osu.edu) (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](https://go.osu.edu/add-device) (go.osu.edu/add-device) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- [Install the Duo Mobile application](https://go.osu.edu/install-duo) (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at [614-688-4357 \(HELP\)](tel:614-688-4357) and IT support staff will work out a solution with you.

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- [Navigating CarmenCanvas](https://go.osu.edu/canvasstudent) (go.osu.edu/canvasstudent)
- [CarmenZoom virtual meetings](https://go.osu.edu/zoom-meetings) (go.osu.edu/zoom-meetings)
- [Recording a slide presentation with audio narration and recording, editing and uploading video](https://go.osu.edu/video-assignment-guide) (go.osu.edu/video-assignment-guide)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** go.osu.edu/it
- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** servicedesk@osu.edu

Grading and Faculty Response

How Your Grade is Calculated

Assignment Category	Points
Homework	15
Lab	15
Exam 1	15
Exam 2	15
Exam 3	15
Final Exam	25
Total	100

See [Course Schedule](#) for due dates.

Descriptions of Major Course Assignments

Homework

Description: There will be eleven homework assignments. They will consist of mostly textbook problems, with some additional problems motivated by real-world applications. Homework must be uploaded to Carmen by the due date. The solutions may be handwritten and scanned, entered directly into a tablet, or typed. **All work and software output must be uploaded as a single pdf file.**

Academic integrity and collaboration: The purpose of the written homework is to assess and provide feedback on your understanding of and ability to explain the reasoning behind complex derivations or probabilistic arguments. **Therefore, answers with little or no explanation or work shown will receive no credit.** For the homeworks as well the exams, your solution should be clear and detailed to explain your understanding of the course.

While grading the homeworks, it may not be possible for us to provide detailed explanations on each question that is graded. To make up for this, I will endeavor to create homework solutions that are detailed enough to allow you to understand how the question could be approached. You may consult with other students, however, **the work submitted must be your own.**

Recitation lab activities

Description: Weekly lab activities will be completed in recitation. These are designed so you can work on difficult problems together and under the guidance of your TA. These problems will be designed to run the range from simpler problems for gaining experience to challenging problems that may exceed the difficulty of exam questions.

Academic integrity and collaboration: You are encouraged to work together with your fellow students and seek help from your TA.

Exams

Description: There will be three midterm exams and one final exam. The midterms will be held during lecture on the dates listed in the schedule.

Academic integrity and collaboration: You must complete the midterm and final exams yourself, **without any external help or communication. Again, answers with little or no explanation or work shown will receive no credit.** Students are **strongly advised** to prep a formula highlight sheet in advance.

Late Assignments

Assignment solutions will be posted shortly after submission. No late assignments will be accepted without **prior permission** and/or **formal documentation**. Please refer to Carmen for due dates. Accommodations can be made in case of severe illness, so please notify me as soon as possible if this situation arises. Deadlines are crucial in order, among other things, to:

- Get grading done and provide feedback in a timely manner
- Grade all assignments at the same time to maintain consistency and fairness
- Provide a mechanism to help ensure students keep up with the material and are prepared for follow-on lectures
- Protect students from their inability to predict their own future behavior – “I’ll somehow manage to catch up at the end of the semester.”

Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical

problem.)

- **Preferred contact method:** I prefer to communicate via email (Richards.1227@osu.edu not @buckeyemail.osu.edu). **Please write “STAT 4201” somewhere in the subject line**, as this will help me to quickly identify and reply to class emails. It is reasonable to expect a response within **one business day**.
- **Class announcements:** I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Grading and feedback:** You can generally expect feedback within **7 days**.

Grading Scale

93–100: A
 90–92.9: A-
 87–89.9: B+
 83–86.9: B
 80–82.9: B-
 77–79.9: C+
 73–76.9: C
 70–72.9: C-
 67–69.9: D+
 60–66.9: D
 Below 60: E

Other Course Policies

Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.
- **Synchronous sessions:** During our Zoom sessions I ask you to use your real name and a clear photo of your face in your Carmen profile. During our full-group lecture time, you may turn your camera off if you choose. When in breakout rooms or other small-group discussions, having cameras and mics on as often as possible will help you get the most out of activities. You are always welcome to use the [free, Ohio State-themed virtual backgrounds](https://go.osu.edu/zoom-backgrounds) (go.osu.edu/zoom-backgrounds). Remember that Zoom and the Zoom chat are our classroom space where respectful interactions are expected.]

Academic Integrity Policy

See [Descriptions of Major Course Assignments](#) for specific guidelines about collaboration and academic integrity in the context of this online class.

Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's [Code of Student Conduct](https://studentconduct.osu.edu) (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

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/>.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)
- [Ten Suggestions for Preserving Academic Integrity](http://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](http://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

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.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Your 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. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find

yourself feeling isolated, anxious or overwhelmed, [on-demand mental health resources](#) (go.osu.edu/ccsondemand) are available. You can reach an on-call counselor when CCS is closed at [614- 292-5766](tel:614-292-5766). **24-hour emergency help** is available through the [National Suicide Prevention Lifeline website](#) (suicidepreventionlifeline.org), by calling [1-800-273-8255\(TALK\)](tel:1-800-273-8255) or by dialing the Suicide and crisis Lifeline [988](tel:988). [The Ohio State Wellness app](#) (go.osu.edu/wellnessapp) is also a great resource.

Accessibility Accommodations for Students with Disabilities

Requesting Accommodations

The university strives to make all learning experiences as accessible as possible. 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 \(SLDS\)](#). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

- [CarmenCanvas accessibility](http://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](http://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)

Disclaimer

The planned instruction for this course may be disrupted for a number of reasons. Such disruptions may affect individual students for a brief period of time, the entire class, the instructor, or the entire university. If the class is disrupted, we will adjust as needed. The adjustments may include changes to course delivery, assignments, grading of assignments, and determination of final course grade.

This syllabus should be taken as a fairly reliable guide for the course content. However, you cannot claim any rights from it and in particular 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.

Acknowledgement

Thank you to Dr. David Sivakoff for his kind sharing of advice and course materials in preparation for this semester.



Course Schedule

Refer to the CarmenCanvas course for up-to-date due dates.

Week	Dates	Topics; Chapters; Holiday , Assignment and Exam Dates
1	8/24-8/26	Intro and combinatorics (1)
2	8/29-9/2	Probability and Bayes Theorem (2) HW1 9/2
3	9/5-9/9	Random variables (3.1-3.3) Labor Day 9/5
4	9/12-9/16	CDFs; joint and conditional distributions (3.4-3.7) HW2 9/12
5	9/19-9/23	Means (4.1-4.2) HW3 9/19 MT1 9/21
6	9/26-9/30	Expected values, moments, MGFs (4.3-4.6) HW4 9/30
7	10/3-10/7	Covariance; conditional expectation (4.7-4.8) HW5 10/7
8	10/10-10/14	Discrete uniform; binomial (5.1-5.3) Fall Break 10/14 MT2 10/10
9	10/17-10/21	Other discrete distributions (5.4-5.9) HW6 10/19
10	10/24-10/28	Continuous distributions (6.1-6.5) HW7 10/26
11	10/31-11/4	Normal approximation; bivariate normal (6.6-6.7) HW8 11/4
12	11/7-11/11	Univariate transformations (7.1-7.3) Veterans Day 11/11 MT3 11/7
13	11/14-11/18	Multivariate transformations; sampling; CLT (7.4-8.3) HW9 11/16
14	11/21-11/25	Finite population sampling (8.4) Thanksgiving 11/23-11/25
15	11/28-12/2	Chi-squared, T and F distributions (8.5-8.6) HW10 11/30
16	12/5-12/7	Order statistics (8.7) HW11 12/7

Final Exam

The final exam is scheduled to occur 12/12/22, 8:00am-9:45am, in our usual classroom.