



THE OHIO STATE UNIVERSITY

COLLEGE OF ARTS AND SCIENCES

# **SYLLABUS: STAT 6801**

## **STATISTICAL THEORY I**

### **AUTUMN 2023**

## **Course overview**

### **Instructor**

Instructor: Dr. Laura Kubatko

Email address: [kubatko.2@osu.edu](mailto:kubatko.2@osu.edu)

Office Location: 221 Cockins Hall

Office hours: In-person: MW 10:30-11:30am; other times by appointment

\*\* You may also contact me to schedule a virtual meeting via zoom

### **Grader or Teaching Assistant**

Grader: Wenxin Du

Email address: [du.888@osu.edu](mailto:du.888@osu.edu)

### **Course description**

This is the first course in a two-semester sequence on probability and theoretical statistics. The course is required for the MS and PhD in Statistics and for the PhD in Biostatistics. In it, we will cover the basics of probability, random variables, common distributions, distribution theory, and concepts of convergence, and we will get a start on principles of inference.

### **Course materials**

#### **Required**

Statistical Inference (2<sup>nd</sup> Edition), by George Casella and Roger Berger.

## Course technology

This course is not technology heavy. The current plan is to offer the course in person. Depending on events during the semester, this may change. In preparation for the possibility of a change, you should (i) be familiar with Carmen, The Ohio State University's course management system, (ii) develop the ability to submit homework/quizzes/exams directly to Carmen (i.e., in electronic format), and (iii) have the ability to work with Carmen Zoom. You will develop skill in areas (i) and (ii) as the term progresses (see below).

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at <https://ocio.osu.edu/help/hours>, and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** <http://ocio.osu.edu/selfservice>
- **Phone:** 614-688-HELP (4357)
- **Email:** [8help@osu.edu](mailto:8help@osu.edu)
- **TDD:** 614-688-8743

## Necessary equipment

- Computer: current Mac (OS X) or PC (Windows 10+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed (if instruction transitions to virtual)
- Microphone: built-in laptop or tablet mic or external microphone (if instruction transitions to virtual)

## Course delivery

This course is designed to be in person. In the event that circumstances force a change, students will be provided with comprehensive details about how to complete all components of the course. If anything is unclear at any point in the semester, please contact me for clarification.

# Grading and faculty response

## Grades

Your numerical grade for this course will be computed on the basis of:

Homework Assignments – 20%  
 Quizzes – 40%  
 Midterm Exam – 20%  
 Final Exam – 20%

Your lowest quiz and your lowest homework grades will be dropped before computing your quiz score and homework score. If you miss a quiz or homework assignment, you will receive a zero for the assignment (which would then be the one that you would drop).

## Assignment information

You will have homework assignments at a pace of roughly one assignment per week. The baseline expectation is for you to spend two hours outside of class on this course for each nominal hour in class. Depending on your background and the pace at which you work, your actual time may be longer or shorter than this expectation.

Homework assignments will contain a mix of problems from the textbook and additional problems. The assignments will be available on Carmen. Solutions to the assignments will be posted after the assignments are due. Only a subset of the problems will be graded. You are responsible for comparing your solutions to the posted solutions for the ungraded problems.

Quizzes will be 30 minutes in length and will be given in class on most Fridays. The midterm exam is tentatively scheduled for Friday, October 6.

## Late assignments

Assignments will be due at the time posted on Carmen. With few exceptions, late assignments will not be accepted.

## Grading scale

Final grades will be assigned on the basis of performance in the course. The grades will not be lower than those in the “straight scale” of 90% for an A, 80% for a B, 70% for a C and so on. The quizzes and exams will contain some difficult problems, and it is likely that the cutoffs will be lower than this traditional scale.

## Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course.

### Grading and feedback

For large weekly assignments, you can generally expect feedback within **7 days**.

### E-mail

I will reply to e-mails within **24 hours on school days**.

## Attendance

The class is designed around the lectures. Attendance is strongly encouraged as is class participation. If you have questions, ask in class or see me after class or during office hours.

If you are unable to attend due to COVID-19 or for other reasons, please let me know right away. If you test positive for the virus or believe that you have symptoms, it is best that you take care of health concerns before worrying about this class. Let me know of the situation promptly and we will make special arrangements (see also below).

## Other course policies

### Health and safety

The Ohio State University Wexner Medical Center's Coronavirus Outbreak site (<https://wexnermedical.osu.edu/features/coronavirus>) includes the latest information about COVID-19 as well as guidance for students, faculty and staff. Information about campus safety guidelines and requirements can be found at <https://safeandhealthy.osu.edu> . Please note that face masks must be worn in all indoor settings, including classrooms and office hours.

### Religious accommodation

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

### Potential disruptions to instruction

The university strives to make all learning experiences as accessible as possible. 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. 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. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

## **Student academic services**

Student academic services offered on the OSU main campus <http://advising.osu.edu/welcome.shtml>.

## **Student support services**

Student support services offered on the OSU main campus <http://ssc.osu.edu>.

## **Academic integrity policy**

The main purpose of this course is for you to learn the material and to increase your understanding of Statistics. For the homework assignments, you are encouraged to talk with fellow students and to work on the problems with them. However, your write-up should be your own. For quizzes and exam, you are to work solely on your own, and you may not use materials other than those designated by the instructor.

Note that this policy of open discussion on the homework is specific to this course. Other instructors and other courses may well have a different policy. Make sure that you understand the policy for each course that you take.

### **Ohio State's academic integrity policy**

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/>.

## **Copyright disclaimer**

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.

## 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, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

## Accessibility accommodations for students with disabilities

The university strives to make all learning experiences as accessible as possible. 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. 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. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; <http://slds.osu.edu>; 098 Baker Hall, 113 W. 12th Avenue.

### Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system). If you need additional services to use these technologies, please request accommodations with your instructor.

## 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. 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](https://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 through the 24/7 National Suicide Prevention Hotline at 1-800-273- TALK or at [suicidepreventionlifeline.org](https://suicidepreventionlifeline.org)

## Disclaimer

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, I 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.

## Course schedule (tentative)

The plan below is tentative. Expect departures from the rough guide below as we spend a little more time or a little less time on particular parts of the material.

Week	Dates	Topics, Readings, Assignments, Deadlines
1	8/23 – 8/25	Sections 1.1 – 1.2
2	8/28 – 9/1	Sections 1.3 – 1.5
3	9/6 – 9/8	Sections 1.5 – 2.1 (No class on 9/4 – Labor Day Holiday)
4	9/11 – 9/15	Sections 2.1 – 2.4
5	9/18 – 9/22	Sections 3.1 – 3.3
6	9/25 – 9/29	Sections 3.3 – 3.4
7	10/2 – 10/6	Sections 3.5 – 3.6 – MIDTERM EXAM: FRIDAY, OCT. 6
8	10/9 – 10/11	Sections 4.1 - 4.2 (No class on 10/13 – Fall Break)
9	10/16 – 10/20	Sections 4.3 – 4.4
10	10/23 – 10/27	Sections 4.4 – 4.7
11	10/30 – 11/3	Sections 4.7 – 5.3
12	11/6 – 11/8	Sections 5.3 – 5.4 (No class on 11/10 - Veteran's Day)
13	11/13 – 11/17	Sections 5.5 – 5.6

Week	Dates	Topics, Readings, Assignments, Deadlines
14	11/20	Sections 5.5 – 5.6 (No class on 11/22 or 11/24 – Thanksgiving)
15	11/27 – 12/1	Section 5.6 – 6.3
16	12/4 – 12/6	Section 6.4, course wrap-up

**FINAL EXAM: Monday, December 11 from 10:00 – 11:45am**