

STATISTICS: 2450 INTRODUCTION TO STATISTICAL ANALYSIS I AUTUMN 2022

Course overview

Office Hours for Course Coordinator & Instructor

Teaching Assistant (to be completed by student)

Jonathan Baker SmithLab 4188 <u>baker.375@osu.edu</u>

MW 1p – 130p (Campbell Hall 1st Fl. behind lecture hall, or, in Campbell 1st fl. classroom.)

W4p – 430p Virtual hours are had via the CarmenZoom

Additional TTh hrs. to be added based upon student input.

Contact Information for other Students and/or Instructors

Meeting Days/Times

MW 1:50p – 2:45p Campbell 200 w/recitations F @ 11:30a,12:40p, 1:50p, or 3p in the EA bldg.

I am considering also supplementing lectures with simulcasted Zoom sessions.

Course description

Calculus-based introduction to statistical data analysis. Includes sampling, experimental design, probability, binomial and normal distributions, sampling distributions, inference, regression, ANOVA, two-way tables. The prerequisite for this 3-credit hour course is differential calculus.

Your Support System

Lecturer Provide the overarching view of the clusters of concepts.

Recitations Reinforce and extend content covered in lecture. Students will attend

recitations with their TAs on Fridays. Recitation assignments must be submitted via Carmen DropBox by 11:59p.m. on Fridays. Students should

still expect to be active participants in these sessions.

Tutor Hours The Math-Stat Learning Center will have an online component. The face-

to-face part of the operation opens Mon.-Thurs. at 10:20a. Closing at 7:30p each of those days. Look for exact times that 2450 TAs will be

available to help you. https://mslc.osu.edu/tutoring .

Primary Course Goal:

To develop skills in drawing conclusions & critically evaluating results based on data.

Course learning outcomes

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

- Understand basic concepts of statistics and probability.
- Comprehend methods needed to analyze and critically evaluate statistical arguments.
- Recognize the importance of statistical ideas.

Course Objectives:

- To enable you to use statistical tools for presentation and descriptions of data
- To enable you to correctly apply probability rules and counting techniques.
- To enable you to understand the use of sampling distributions as the foundation of inference.
- To enable you to analyze data through linear regression, confidence intervals, and hypothesis tests.
- To enable you to use your knowledge of calculus to conceptually understand its role in computing probabilities.

GE Course Information:

- Quantitative & Logical Analysis Category {Data Analysis Sub-category}
- Develop students' quantitative literacy and logical reasoning.
- Identify valid arguments
- Use mathematical models
- Draw conclusions & critically evaluate results based upon data.

Dr. Baker's vision for your completion of STAT 2450

- You will become proficient in collecting, organizing, analyzing, and interpreting data
- You will become competent in the use of data analysis software.
- You will conceptually understand situations involving random phenomena.
- You will interpret findings and improve your ability to justify your results.
- Your metacognition & desire to reflect upon what you have learned will be heightened.
- You will respond to a problem by: considering any relevant assumptions, analyzing, and effectively communicating your results.
- You will gain a greater appreciation for statistics (and the underpinning mathematics).
- You will complete the Data Analysis GE requirement.

Personal Vision Statement & Commitment

Personal Vision Statement for STAT	Personal Commitment to STAT 2450:
2450:	To successfully complete STAT 2450, I must:
By successfully completing STAT 2450 I will:	•
•	
	•
•	
	•
•	

Top Hat

We will use the *Top Hat* software to elicit student responses during lectures. Students will use their smart phones to text responses to questions posed. Please use the following information and the Student Quick Start Guide that is posted on Carmen to complete the registration process. Your username must be name.# (e.g. obama.3).

Top Hat course name: STAT 2450 AU 2022 6-digit course code: 762592

Direct Link: https://app.tophat.com/e/762592

Course Materials

Required Materials

Introductory Statistics: A Problem-Solving Approach (3rd ed.) Kokoska.
 ISBN 9781319272685

This course requires electronic access to the accompanying web-based materials via *Sapling*. The ebook, quizzes, and homework assignments are all located within this resource.

The cost is \$67.49 through CarmenBooks.

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. There is no need to wait for financial aid or scholarship money to purchase your textbook.

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, <u>please visit the CarmenBooks website</u>.

• [Kokoska] [SaplingPlus for The Basic Practice of Statistics] • [3rd edition] • [Macmillan]

Access the courseware for this title through the Macmillan Higher Education Learning tab on the left-side of the course navigation.

STUDENT REGISTRATION INSTRUCTIONS

- Log into STAT 2450 through Carmen.
- Click the MacMillan App in the left navigation panel.
- Click the Achieve Leaning link (note: if you encounter an error message or blank screen, you will need to adjust your browser settings and/or disable pop-up blockers).
- Agree to Macmillan Learning terms of use and end user agreement.
- Select your access option (credit card payment, use an activation code, or, request trial access). Click on any Sapling assignment link to launch the assignment.
- Follow the associated steps and continue to your assignment page.
- You are now enrolled in the course and can access future assignments through the links on your instructor's course page.
- To access your ebook click on the image of the cover on the right sidebar of your course site. Create an account or login with an existing Macmillan Learning ebook account.

(Very) Highly recommended materials

- Texas Instruments 83 Plus (or higher) Graphing Calculator.
- University provided iPad.

Course technology

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, & 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
 TDD: 614-688-8743

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Carmen

Technology skills necessary for this specific course

- CarmenConnect text, audio, and video chat
- Collaborating in CarmenWiki
- Recording a slide presentation with audio narration
- Recording, editing, and uploading video

Necessary equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Necessary software

- Microsoft Office 365 ProPlus All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Each student can install Office on five PCs or Macs, five tablets (Windows, iPad® and Android™) and five phones.
 - Students are able to access Word, Excel, PowerPoint, Outlook and other programs, depending on platform. Users will also receive 1 TB of OneDrive for Business storage.

Office 365 is installed within your BuckeyeMail account. Full instructions for downloading and installation can be found https://ocio.osu.edu/kb04733.

Grading

Grades

Assignment or category	Percentage	Your Grade
(September Quiz) (Monday, October 3 rd)	10%	
(October Quiz) (Monday, October 31st)	10%	
(November Quiz) (Monday, December 5 th)	10%	
(Comprehensive Quiz) (Wednesday, December 14 th)	20%	
Small Project "S.P." ("Ess-P.")	20%	
Homework Assignments	10%	
(6 total, none are dropped)		
Semi-monthly Quizzes	10%	
(6 total, 1 is dropped)		
Attendance & Participation	10%	
(Combined For Lecture & Recitation)	10%	
Total	100	

The exact due dates will appear in the daily calendar at the end of this document.

Homeworks & quizzes are completed in our learning management system, Sapling Plus. They'll be generally due on Mondays at 11:59p.m. Exams will be administered similarly or via Carmen "Secure Exam Proctor." The S.P. will not be due in either of the December recitations – with intermediate progress points.

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

Additional Policies, Resources, & Information

Instructor feedback and response time

Grading and feedback

Midterm examinations will be available within 1 recitation.

E-mail

All course e-mail correspondence must be done through a valid OSU name.n account. Expect a 24-hour response time when communicating with TAs and lecturers. We are here to support you, but just not quite in a true "on-demand" sense.

Discussion board

I will check and reply to messages in the discussion boards every 24 hours on school days.

Student participation and responsibility

We expect you to be actively engaged in the learning process. You are responsible for your learning. Schedule a minimum of 6 hours to prepare for this course. This equates to 9 hours weekly when the 3 hours for lecture and recitation attendance are included. Successful students perform a variety of positive academic behaviors like: reviewing the Carmen page, downloading notes, being proactive in contacting a TA or classmate as necessary, etc.. Please seek assistance in managing any non-academic responsibilities prior to any potential for underperformance.

Successful students perform a variety of positive academic behaviors like: reviewing the Carmen twice a week, reviewing the weekly learning units the first half of each week, and completing all homework assignments and quizzes during the second half of each week.

Student participation requirements

Because this is a distance-education course, your attendance is based on your online activity and participation. Lectures will occur synchronously during scheduled class times. Please inform both your TA & Dr. Baker if this poses any difficulty. Lecture recordings will be available the following morning. The following is a summary of everyone's expected participation:

- Logging in: AT LEAST ONCE PER WEEK
 Be sure you are logging in to the course in Carmen each week, including weeks with holidays or weeks with minimal online course activity. (During most weeks you will probably log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me as soon as possible.
- Office hours and live sessions: RECOMMENDED

 The TAs and I will provide an array of times to accommodate you. To receive credit virtually, you must log in AND participate in the discussion.

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 remember that this is a university course, and not a casual dialogue occurring via a cellular phone.

- 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 proper grammar, spelling, and punctuation. Be selective in the usage of emoticons.
- **Tone and civility**: Maintaining a supportive learning community is critical. Everyone must feel safe and comfortable expressing their opinions. Attempt to obtain clarification with an individual (including myself) privately and respectfully.
- **Citing your sources**: Please include the exact page number (of the textbook or notes) and/or exercise when requesting assistance. For online sources, use links and reference the last time the link was accessed.
- **Saving your work**: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Electronic devices

As a courtesy to fellow classmates, all cellular phones and other electronic devices must be silenced during lectures and recitations. Your engagement with the class will require an attentiveness for note-taking. If necessary, TAs and lecturers can request that students place these devices out of plain view if their usage is deemed irrelevant to instruction.

Student academic services

Student academic services offered on the OSU main campus:

http://advising.osu.edu/welcome.shtml.

Tech Tutors who can help you navigate your devices:

https://digitalflagship.osu.edu/tech-tutoring-student-mentors

Key Ideas to help you succeed during the pandemic:

https://keepteaching.osu.edu/student-success

Name Coach if you'd like to set this up to assist with pronunciation:

https://odee.osu.edu/news/2020/02/27/pronoun-selection-and-name-pronunciation-carmencanvas

Academic integrity policy

A guiding principle is that, if you are considering doing something that might be unethical, then "Don't do it!!"

This mantra applies to both academic and non-academic settings.

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/.

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. http://studentlife.osu.edu/csc/.

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. In short, if you are considering doing something that might be unethical, then resist and refrain from pursuing it. This will help you in college and well-beyond.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me. Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (<u>COAM Home</u>)
- Ten Suggestions for Preserving Academic Integrity (<u>Ten Suggestions</u>)
- Eight Cardinal Rules of Academic Integrity (<u>www.northwestern.edu/uacc/8cards.htm</u>

Policies for this synchronous online course

- Homework, Quizzes, and exams: Homework & quizzes will be completed in our Learning Management system, Sapling Plus. Exams will have two primary components. One part administered via "Secure Exam Proctor." The other component submitted by the appropriate date as part of an overall course project.
- **Recitations**: Students will attend online recitations synchronously in alignment with their scheduled times on Fridays. Recitation assignments must be submitted via CarmenDropBox prior to the next lecture (usually by 1:49p on Mondays).
- Written assignments: Your written assignments, including discussion posts, should be
 your own original work. In formal assignments, you should follow [MLA/APA/?] style to
 cite the ideas and words of your research sources. You are encouraged to ask a trusted
 person to proofread your assignments before you turn them in--but no one else should
 revise or rewrite your work.
- Reusing past work: In general, you are prohibited in university courses from turning in
 work from a past class to your current class, even if you modify it. If you want to build
 on past research or revisit a topic you've explored in previous courses, please discuss
 the situation with me.
- Falsifying research or results: All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.
- **Collaboration and informal peer-review**: The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on a quiz or

assignment is not permitted. If you're unsure about a particular situation, please feel free just to ask ahead of time.

• **Group projects**: This course includes group projects, which can be stressful for students when it comes to dividing work, taking credit, and receiving grades and feedback. I will make the guidelines for group work as clear as possible for each activity and assignment, but please let me know if you have any questions.

Grade Appeals

Your TAs are highly capable and follow established rubrics in evaluating your work. Only in the rarest of cases will an exam grade need to be appealed. In these situations:

- a) (within 1 week of receipt of your assessment) Inform your TA of the issue in writing
- b) Attach a statement of the issue at-hand to your work and submit to Dr. Baker.

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.

Course Registration and Completion

Students will be able to work with department staff on any ADD and SECTION changes. Students can begin communicating with Jean Scott (Cockins Hall 408A), Tuesday, August 31st.

Date	Event	
Friday, August 26 th	The last day to add the course without instructor permission.	
Friday, September 2 nd	The last day to register and avoid additional fees.	
Please note that students who are dropped for non-payment are not guaranteed re-enrollment.		
Friday, September 16 th	The last day to drop without a 'W' appearing on your record.	
Friday, October 21st	The last day to drop the course without petitioning.	

FYI, Incompletes will only be awarded when 70% of the coursework has been completed.

Accommodations for accessibility

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; 614-292-3307; slds.osu.edu; 098 Baker Hall,113 W. 12th Ave.

Grade Appeals

Your TAs are highly capable and follow established rubrics in evaluating your work. Only in the rarest of cases will an exam grade need to be appealed. In these situations:

- a) (within 1 week of receipt of your assessment) Inform your TA of the issue in writing
- b) Attach a statement of the issue at-hand to your work and submit to Dr. Baker

Make-Up Mid-term Examinations

The established exam dates and times are a priority for both students and university officials. Valid and documented absences during exam dates require final pre-approval from Dr. Baker. In requesting a make-up exam you must communicate with both your TA and Dr. Baker. Your performance on the final exam items most associated with the missed exam will count as the missed exam grade with up to an additional 10% point deduction. If you miss an exam because of an emergency, contact Dr. Baker immediately to request a makeup exam. You'll need to provide evidence of need for rescheduling this exam.

Students can find information about academic services available at OSU on this website: http://artsandsciences.osu.edu/current-students/university-resources, and about general student services on this website: http://ssc.osu.edu.

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

Remember to be Safe & Healthy: https://safeandhealthy.osu.edu/current-students

Other Student Support Resources

(Including: Mental Health, Equity, Respect, Diversity, & Private Transportation)

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 through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.

Wellness app: https://it.osu.edu/ohio-state-app-suite#ohio-state-wellness-app

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

Students can find information about academic services available at OSU on this website: http://artsandsciences.osu.edu/current-students/university-resources, and about general student services on this website: http://ssc.osu.edu.

Student Advocacy Center http://advocacy.osu.edu/

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."

The Ohio State University affirms the importance and value of **diversity** in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Lyft Ride Smart at Ohio State offers eligible students discounted rides, inside the university-designated service area, from 9 p.m. to 3 a.m. Each month, 10,000 discounted rides will be made available on a first-come, first-served basis with the average cost expected to be \$2 or less. Prices may be impacted by distance, traffic, time of day, special events and prime time surcharges. To qualify for program discounts, users must select "shared ride" when booking in the Lyft app. When using ride sharing, remember to visually confirm vehicle info/descriptions in the company app and ask the driver to say who they are picking up.

Autumn 2022 STAT 2450 Calendar

Mondays	Wednesdays
August 22	August 24
No Lecture - Autumn Semester Eve	Chp.1 An Intro. to Statistics & Statistical Inference
August 29 2.1–2.3 Types of Data, Bar Charts, Pie Charts, Stem-and-Leaf Plots	August 31 2.4 Frequency Distributions and Histograms
September 5 No Lecture – Labor Day	September 7 3.1,3.2 Measures of Central Tendency& Variability
September 12 3.3 Empirical Rule, Measures of Position, Box Plots	September 14 4.1 Experiments, Sample Spaces, Events
September 19 4.2 An Introduction to Probability 4.3 Counting Techniques September 26 HW 2 & Qz. 2 Due	September 21 4.4 Conditional Probability 4.5 Independence September 28 Short Qz. Review
5.4 The Binomial Distribution (with ref. to 5.1)	6.2 The Normal Distribution (with ref. to 6.1)
October 3 September Quiz (Chps. 1, 2, 3 & 4)	October 5 6.3 Checking the Normality Assumption 6.4 Exponential Distribution
October 10 HW 3 & Qz 3 Due 7.1 Statistics, Parameters&Sampling Distributions 7.2 Sampling Distribution of the Sample Mean	October 12 7.3 Distribution of the Sample Proportion (FallBreakEve)
October 17	October 19
8.1 Point Estimation	8.2 Conf. Int. for a Pop. Mean when σ is Known (z)
October 24 8.3 Conf.Int.for a Pop.Mean when σ is Unknown (t)	October 26 Short Qz. Review 8.4 Confidence Interval for a Population Proportion
October 31	November 2
October Quiz (Chps. 4, 5, 6)	9.1, 9.2 Parts of a Hypothesis Tests & Errors
November 7 HW 5 & Qz. 5 Due 9.3HypothesisTestsfor a Pop.Mean when σ is Known(z)	November 9 9.4 P-Values 9.5 Hypothesis for Pop. Mean w/σ Unknown(t)
November 14	November 16
9.6 Hypothesis Tests for a Population Proportion November 21 HW6 &Qz.6 Due	11.1 One-Way ANOVA November 23
12.1 Simple Linear Regression	No Lecture – Thanksgiving Break
November 28 12.2 Hypothesis Tests and Correlation	November 30 Short Qz. Review 13.1 Two-Way Tables
December 5 November Quiz (Chps. 7, 8, 9)	December 7 Short Exam Review Course Wrap-up (FinalExamWednesday,December 14th 2:00p-3:45p)