Arts & Sciences
Department of Statistics

THE OHIO STATE UNIVERSITY

STATISTICS: 2450
INTRODUCTION TO STATISTICAL ANALYSIS I
SPRING 2020

Course overview

Instructor & Office Hours

Jonathan Baker baker.375@osu.edu 614-247-2757
TR 12p – 12:30p (Arps (AP) 193); Also by appointment.
WF 8:30a – 9a, {Younkin 260C before Spring Break; Smith 4144 after Spring Break}.

Teaching Assistant (to be completed by student)

_____ _____ _____

Contact Information for other Students and/or Instructors

_____ _____ _____

Meeting Days/Times

TR 12:45p – 1:40p Evans Lab (EL) 1008. with recitations on R @ 1:50p or 3p in the EA bldg.

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 should expect to be active participants in these sessions.
Tutor Hours	Are in Cockins (CH) 132 and provide you with additional support on a walk-in basis M- R 9:10a – 5:20p & Fridays 9:10a – 12:45p.

Primary Course Goal:

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

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.

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.

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

Course Materials

- *Introductory Statistics: A Problem-Solving Approach (2nd ed.)* Kokoska.
  ISBN 1464157618 or 19781464157615

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.

It is recommended that you purchase both a text and *Sapling* (our HW management system). http://ohiostate.bncollege.com/webapp/wcs/stores/servlet/BNCBHomePage?storeId=33552&catalogId=10001&langId=-1 . Learners who pursue this option tend to prefer: using a physical textbook for supplemental annotation, relying on resources that can function independent of Internet functionality. The cost is under $100.

STUDENT REGISTRATION INSTRUCTIONS

The following link includes more detailed instructions on how to register for your course: https://macmillan.force.com/macmillanlearning/s/article/Students-Register-for-Sapling-Learning-courses-via-your-school-s-LMS

- Log into STAT 2450 through Carmen.
- Click the MacMillan App in the left navigation panel.
- Click the Sapling 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.

- **Need Help?** Our technical support team can be reached by phone, chat, or by email via the Student Support Community. To contact support please open a service request by filling out the webform: https://macmillan.force.com/macmillanlearning/s/contactsupport.

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 SP 2020**
Direct Link: https://app.tophat.com/e/641169 6-digit course code: 641169

(Very) Highly recommended materials

Texas Instruments 83 Plus (or higher) Graphing Calculator.

Optional materials

The JMP statistical software will be used in recitation.
If you interested, you should be able to:

Click on www.jmp.com/macmillan .
Enter SE146414253X as the 12-digit authorization code.
Proceed to download and install JMP-Student Edition.

Grading

Grades

Assignment or category	Percentage	Your Grade
Exam 1 (Tuesday, February 18th, during lecture)	**20%**	
Exam 2 (Tuesday, April 7th, during lecture)	**20%**	
Final Exam (Thursday, April 23rd, 2 p.m. - 3:45 p.m.)	**30%**	
Homework Assignments (7 total, 1.43% each, none are dropped)	**10%**	
Quizzes (7 total, 1.67% each, 1 is dropped)	**10%**	
Attendance & Participation (Combined For Lecture & Recitation)	**10%**	
Total	**100**	

The exact due dates are included in the calendar at the end of this document.

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 **2 recitations**.

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**.**

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 under-performance.

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.

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 (COAM Home)
- *Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)*
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm

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.

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, January 14th.

Date	Event
Friday, January 10th	The last day to add the course without instructor permission.
Friday, January 17th	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, January 31st	The last day to drop without a 'W' appearing on your record.
Friday, March 20th	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. 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 Avenue.

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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. These exams will be offered at 7a & 3p.

Other Student Resources (Including: Mental Health, Relationship Violence & Diversity)

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.

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.

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.

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.

Spring 2020 STAT 2450 Calendar

Lecture Schedule:

Tuesdays	*Thursdays*
January 7 Chp.1 An Intro. to Statistics & Statistical Inference	**January 9** 2.1–2.3 Types of Data, Bar Charts, Pie Charts, Stem-and-Leaf Plots
January 14 2.4 Frequency Distributions and Histograms	**January 16** **HW 1 Due F 1/17 Qz.1 Due M 1/20** 3.1,3.2 Measures of Central Tendency& Variability
January 21 3.3 Empirical Rule, Measures of Position, Box Plots	**January 23** 4.1 Experiments, Sample Spaces, Events

January 28 4.2 An Introduction to Probability 4.3 Counting Techniques	**January 30** HW 2 Due F 1/31 Qz.2 Due M 2/3 4.4 Conditional Probability 4.5 Independence
February 4 5.4 The Binomial Distribution (with ref. to 5.1)	**February** 6.2 The Normal Distribution (with ref. to 6.1)
February 11 6.3 Checking the Normality Assumption 6.4 The Exponential Distribution	**February 13** HW 3 Due F 2/14 Qz.3 Due M 2/17 **Short Exam Review** 7.1 Statistics, Parameters&Sampling Distributions 7.2 Sampling Distribution of the Sample Mean
February 18 **Exam 1 (Chps. 1 – 4)**	**February 20** 7.3 Distribution of the Sample Proportion
February 25 8.1 Point Estimation	**February 27** HW 4 Due F 2/28 Qz.4 Due M 3/2 8.2 Conf. Int. for a Pop. Mean when σ is known (z)
March 3 8.3 Conf.Int.for a Pop.Mean when σ is Unknown (t)	**March 5** 8.4 Confidence Interval for a Pop. Proportion
March 10 Spring Break (no lecture)	**March 12 Spring Break (no lecture)**
March 17 9.1, 9.2 Parts of a Hypothesis Tests & Errors	**March 19** HW 5 Due F 3/20 Qz.5 Due M 3/23 9.3 Hypothesis Tests for a Pop. Mean when σ is Known(z)
March 24 9.4 P-Values 9.5 Hypothesis for a Pop. Mean when σ is Unknown(t)	**March 26** 9.5 Hypothesis for a Pop. Mean when σ is Unknown (t) 9.6 Hypothesis Tests for a Pop. Proportion
March 31 11.1 One-Way ANOVA	**April 2** HW 6 Due F 4/3 Qz.6 Due M 4/6 12.1 Simple Linear Regression **Short Exam Review**
April 7 **Exam 2 (Chps. 5 – 9)**	**April 9** 12.2 Hypothesis Tests and Correlation
April 14 13.1 Univariate Categorical Data	**April 16** HW 7 Due F 4/17 Qz.7 Due M 4/20 13.2 Bivariate Categorical Data **Short Exam Review** **(Final Exam Thursday, April 23rd 2:00p – 3:45p)**