Stat 3450 (23568) Basic Statistics for Engineers
Autumn 2019

Instructor: Jiae Kim
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Class Room: Macquigg Laboratory 264
Office Hours: M 2:45pm - 3:45pm
W 12:00 pm - 1:00 pm at MA317
Class Hours: T,R 4:10 - 5:05 pm

Course Description

STAT 3450 provides an introduction to probability and statistics targeted toward students studying mechanical engineering. Topics covered include probability, random variables, the normal and binomial distributions, confidence intervals for means, hypothesis tests for means, multifactor experiments and experiments with blocking.

GE Data Analysis Expected Learning Outcomes

Students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize the importance of statistical ideas. STAT 3450 helps students achieve these ELOs by teaching students the basic concepts and techniques of statistics, including populations and samples, probability, expectations and variances, the binomial and Normal distribution, the Central Limit Theorem, confidence intervals and hypothesis testing, type I and II errors and power, experiments and numerical summaries and graphical summaries of data.

Course Prerequisites

Calculus, integration, exponential function, finite and infinite sums, union and intersection of sets. Prerequisite courses are Math 1152 (153), 1161.xx, 1172 (254), or 1181.

Textbook

Principles of Statistics for Engineers and Scientists by William Navidi

- This book is available on reserve in the 18th Avenue Library and Thompson Library.

Topics

We will be covering all or parts of chapters 1,3,4,5,6,7,9.

Website

The course website is carmen.osu.edu; please check it regularly. On the site you will find announcements, the syllabus, lecture notes, homework assignments, quizzes, solutions, and grades.

Lines of Communication

All correspondence must be using your OSU name.# address, otherwise we cannot respond. Please make sure to include "STAT 3450 (12600)" in the subject line. You can also contact the instructor through Carmen. Thanks for your cooperation!

MSLC - Mathematics and Statistics Learning Center

The Mathematics and Statistics Learning Center provides group tutoring in Cockins Hall 122 beginning August 27th. More information can be found at

http://mslc.osu.edu/courses/stat/3450.

Grading Policy

Your final grade will be based on the following weighting structure:

Component	Percentage
Homework	15%
Attendance	5%
Midterm 1	25%
Midterm 2	25%
Final	30%
Total	100%

Homework Assignments

There will be approximately 8 to 9 homework assignments throughout the semester. Assignments along with due dates is subject to change. All changes will be announced in class.

1. You are encouraged to discuss problems with each other in general terms, but you must write your own homework solutions.
2. Homework must be submitted in hardcopy (NO e-mailed copies).
3. You must show your work for all homework problems in order to receive credits; do NOT just write the final answer.

4. Late submissions will NOT be accepted. I understand that illness and other unplanned emergencies often come up during the semester, and so I will drop one of your lowest homework score.

5. Homework will be collected at the start of class on the due date.

6. A subset of assigned problems will be graded for accuracy and the rest for completion. Solutions to all problems will be posted on the website, so it is your responsibility to check the solutions and make sure you understand them for all problems.

Attendance

1. You are expected to attend every class session. Students who miss more than four classes will lose a percentage from attendance. Each additional absence will result in a loss of percentage until all 5% is gone.

2. Attendance will be taken through the use of Top Hat, starting from the second week of the semester. Students must register by going to tophat.com. Use the join code: 453725. Please be sure to register before the start of class on Tuesday, Aug 27th.

3. Each day, from 10 minutes prior to class, unique 4 digits of attendance code will be provided. You can check in anytime during class.

4. It is also your responsibility to get any and all material covered if you miss class. Arriving late or leaving early is distracting to your classmates, and me and will not be tolerated.

5. Exceptions can be made under the university rule 3335-9-22 (B):
When a student misses class in order to participate in a university sanctioned event, such as a field trip for another class, or an athletic or band event, or a specially scheduled class or examination scheduled in accordance with rule 3335-8-15 of the Administrative Code, it is the student's responsibility to present, at the earliest possible date, documentation of the required absence to each instructor whose class is to be missed. Documentation may include a copy of the course syllabus that shows the scheduled activity from a class scheduling an event or special session, or a memo from the instructor, coach, or person in authority requiring the absence. It shall be the responsibility of the instructor of the class or coordinator of the event causing the student to miss class to provide such documentation to the student. This documentation may be the basis of an excuse for an absence from class under the policies provided in rule 3335-9-21 of the Administrative Code.

6. Details about Top Hat can be found at
https://resourcecenter.odee.osu.edu/top-hat/using-top-hat-students

Exams

Two midterm exams will be given: the first is on Thursday, September 26 (in class), the second is on Thursday, November 07 (in class). The final is on Wednesday, December 11 from 4:00-5:45 pm.

1. You may bring one (for each midterm) or two (for the final) 8.5" $\times$ 11" sheet of paper(s) (both sides) with whatever handwritten facts, formulas or explanations you find helpful.

2. Cell phones must be silenced during exam and are not allowed to be on the desk or otherwise accessible during exams.

3. You must bring your Buck-ID, pencils (no pens please), and a scientific calculator (any type except one that can connect to the Internet) to each exam.

4. Exam questions are multiple choice, true/false, and short answer/work it out problems with interpretation. The amount of weight placed on the MC/TF vs the Short answer varies.

5. If you are late to an exam, had the wrong day on your schedule, or missed the exam for any unexcused reason, you might not be allowed to make it up and may receive a zero. Any missed exams with no communication to us (except for extreme emergencies) may receive a 0.

6. Make-up Exams: If you have an emergency and are going to miss an exam please notify the instructor as soon as possible so arrangements can be made. Please also have documentation (doctor's note, etc.) as to why you missed the exam. Your documentation must be approved prior to your being allowed to take a make-up exam. If you are allowed to take a make-up, you will receive a penalty of 20% of the total points possible on the exam.

7. No early final exams. Plan your schedule in advance, including the purchase of plane tickets, so you leave AFTER our final is over.

Final course grades will be assigned based on the standard grading scale:

A	A-	B+	B	B-	
$[93, 100]$	$[90, 93)$	$[87, 90)$	$[83, 87)$	$[80, 83)$	
C+	C	C-	D+	D	E
$[77, 80)$	[73,77)	[70,73)	[67,70)	[60,67)	[0,60)

Academic Misconduct

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/.

Special 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. 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.

Diversity

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.

Mental Health

Every student is entitled to appeal these 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.

Note

- If you have a personal issue that is confidential, requires special attention by the university, an unresolved issue, or would like a private discussion regarding your grade in the class, etc., contact Jiae Kim, the instructor at kim.3887@buckeyemail.osu.edu.
- • Cell phones and all other electronic devices.

- Cell phones are NOT to be used during class. Before class begins, please take the time to silence and put away all electronic devices. Following this policy will not only benefit yourself but also those around you. If cell phone use is an ongoing problem, students may be deducted points from their attendance/participation grade. If there is an emergency, please inform me ahead of time.
- Taking photos of anyone else's work at any time is considered academic misconduct and will be automatically submitted to the OSU Committee on Academic Misconduct.

The list of topics will include, not limited to

Chapter 1	Summarizing Univariate Data
1.1	Sampling
1.2	Summary Statistics
1.3	Graphical Summaries
Chapter 3	Probability
3.1	Basic Ideas
3.2	Conditional Probabilities and Independence
3.3	Random Variables
3.4	Functions of Random Variables
Chapter 4	Commonly Used Distributions
4.1	Binomial Distributions
4.3	Normal Distributions
4.7	Probability Plots
4.8	The Central Limit Theorem
Chapter 5	Point and Interval Estimation for a Single Sample
5.1	Point Estimation
5.2	Large-Sample Confidence Intervals for μ
5.4	Small-Sample Confidence Intervals for μ
Chapter 6	Hypothesis Tests for a Single Sample
6.1,6.2	Large-Sample Tests for μ
6.6	Fixed-level Testing
6.7	Power
Chapter 7	Inferences for Two Samples
7.1	Large-Sample Inferences on $\mu_1 - \mu_2$
7.3	Small-Sample Inferences on $\mu_1 - \mu_2$
7.4	Inferences Using Paired Data
Chapter 9	Factorial Experiments
9.1	One-factor Experiments
9.3	Two-factor Experiments
9.4	Randomized Complete Block Designs (Possibly, if time permits)
9.5	2^p Factorial Experiments (Possibly, if time permits)