

STAT 3450.01: Basic Statistics for Engineers

Fall 2026

Course Overview

This is a 2-credit-hour course, delivered in person on Tuesdays and Thursdays.

Distance Enhanced (DE) Section: This course includes an approved Distance Enhanced section for a pre-approved group of students. Lecture videos from the in-person lectures will be recorded and posted on Carmen for students enrolled in the Distance Enhanced section.

Lecture Logistics

Location: Hitchcock Hall 131

Days: Tuesdays and Thursdays

Time: 4:10 - 5:05 PM

Instructional Team

Instructor: Michael Okanta

Email: okanta.1@osu.edu

Office: Cockins Hall 212C

Office Hours:

Tuesdays & Thursdays, 10:00 AM – 12:00 PM

Course Website: Carmen (access through Course Page)

Teaching Assistants:

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Prerequisites

Students should have prior knowledge of calculus concepts, including integration, exponential functions, finite and infinite sums, and basic set operations (union and intersection).

Recommended prerequisite courses: *Math 1152 (153)*, *Math 1161*, *Math 1172 (254)*, or *Math 1181*.

Course Description

STAT 3450 introduces probability and statistics for engineering applications, primarily for students in mechanical, welding, and biomedical engineering.

Topics include:

- Probability and random variables
- Normal and Binomial distributions
- Confidence intervals and hypothesis testing
- Multi-factor experiments and randomized block designs.

Expected Learning Outcomes (ELO)

This course meets the General Education (GE) requirement in Quantitative Reasoning and Data Analysis.

Goals:

1. Successful students will be able to apply quantitative or logical reasoning and/or mathematical/statistical methods to understand and solve problems and will be able to communicate their results.

Expected Learning Outcomes: Successful students are able to:

- 1.1. Use logical, mathematical and/or statistical concepts and methods to represent real-world situations.
- 1.2. Use diverse logical, mathematical and/or statistical approaches, technologies and tools to communicate about data symbolically, visually, numerically and verbally.
- 1.3 Draw appropriate inferences from data based on quantitative analysis and/or logical reasoning.
- 1.4. Make and evaluate important assumptions in estimation, modeling, and logical argumentation and/or data analysis.
- 1.5. Evaluate social and ethical implications in mathematical and quantitative reasoning.

Quantitative Reasoning

Goals: Students develop skills in quantitative literacy and logical reasoning, including the ability to identify valid arguments, and use mathematical models.

Expected Learning Outcomes:

Basic Computation

1. Students demonstrate computational skills and familiarity with algebra and geometry.
2. Students apply these skills to practical problems.

Mathematical or Logical Analysis

1. Students comprehend mathematical concepts and methods adequate to construct valid arguments.
2. Students comprehend mathematical concepts and methods adequate to understand inductive and deductive reasoning.
3. Students comprehend mathematical concepts and methods adequate to increase their general problem solving skills.

Data Analysis

Goals: Students develop skills in drawing conclusions and critically evaluating results based on data.

Expected Learning Outcomes:

1. Students understand basic concepts of statistics and probability.
2. Students comprehend methods needed to analyze and critically evaluate statistical arguments.
3. Students recognize the importance of statistical ideas.

Course Materials, Technologies and Resources

Course Materials:

The required textbook for this course is: *Principles of Statistics for Engineers and Scientists* (2nd Edition) by William Navidi. Available digitally via **McGraw Hill Connect** and **CarmenBooks**.

CarmenBooks is an Inclusive Access program that offers digital copies of selected textbooks for a fraction of the cost of a new, physical copy. The fee for this material is included as part of tuition and is listed as CarmenBooks eText Library on your Statement of Account. If you wish to opt out of CarmenBooks, you will see a button to do so when you launch the materials on your CarmenBooks shelf. If you rely on assistive technology or need an accessibility accommodation for the digital materials provided via CarmenBooks, please contact the Alternative Media team in Student Life Disability Services at slds-altmedia@osu.edu.

Technology support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** ocio.osu.edu/help
- **Phone:** 614-688-4357 (HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

Technology skills needed for this course

- Basic computer and web-browsing skills
- Navigating CarmenCanvas (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (optional) (go.osu.edu/zoom-meetings)

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 (only necessary if you wish to meet with us via Zoom)
- Microphone: built-in laptop or tablet mic or external microphone (only necessary if you wish to meet with us via Zoom)
- Other: A mobile device (smartphone or tablet) for BuckeyePass authentication.
- Please note that OSU has a Student Technology Loan Program that provides iPad and Microsoft Surface loaner devices to students with limited technology access and identified financial needs. This is a good resource to look into if you are concerned about having access to an appropriate device to use in this course.

Required software

- Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Full instructions for downloading and installation can be found at go.osu.edu/office365help.
- There may be statistical software tools that we will ask you to use for different course assignments, but these will all be freely accessible via websites that we will share with you.
- We strongly encourage you to avoid using Safari as an internet browser because we have found that certain images in assignments and exams do not show up well in Safari. If you are able to use Chrome, Firefox, or Microsoft Edge, we hope you will do this.

CarmenCanvas access

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access course resources on CarmenCanvas. To ensure that you are able to connect to CarmenCanvas at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (go.osu.edu/add-device).
- 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.
- Download the Duo Mobile application (go.osu.edu/install-duo) to 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.

Tutoring and Help Hours:

The Mathematics and Statistics Learning Center (MSLC) offers free tutoring for this course.

[Placeholder - MSLC location, hours, and details for Fall 2026 have not yet been confirmed. This section will be updated once tutoring hours are finalized. In the meantime, please check Carmen and the MSLC website for updates.]

Course Delivery and Participation

Attendance is strongly encouraged to help you achieve the expected learning outcomes, although it will not be formally graded. This is a 2-credit-hour course, and according to Ohio State policy (go.osu.edu/credithours), students should expect around 6 hours of engagement with the class each week to receive a grade of C average. To excel and stay ahead of assignments, budgeting closer to 8 hours per week is recommended.

Office hours provide an opportunity for personalized assistance, and free tutoring is available through the Mathematics and Statistics Learning Center (MSLC), both in Cockins Hall and online via Zoom. Details will be posted on Carmen once confirmed.

The audio and video of the instructor at the front of the class may be recorded for all in-person lectures. Student audio and video are not expected to be typically recorded. However, students who walk past the front of the classroom or who speak particularly loudly when asking a question may be recorded. Lecture recordings will be made available to students enrolled in the approved Distance Enhanced (DE) section of this course. Students who participate during lecture agree to their recording potentially being made available to DE section students.

Students need to bring a TI-83/84 calculator to class. Students are permitted to take their own notes during class; annotated lecture notes are always posted to Carmen, typically within 12 to 18 hours after the class has ended.

If illness or emergencies prevent attendance to multiple classes, notify the instructor promptly and consult Carmen for missed materials.

Course Communication Guidelines

Email Correspondence: On business days, the instructor will respond to emails within 24 hours. Please note that emails received after 8:00 PM will typically be addressed the following business day. On weekends, emails will typically receive a response within 48 hours. All communication should maintain a professional tone, using clear language and proper grammar. Respectful interaction with peers and the instructional team is required.

Virtual Appointments: If you need a meeting outside of the scheduled office hours, virtual appointments can be arranged upon request. Please email the instructor or any of your TAs at least 48 hours in advance to coordinate a time.

Before You Email: To ensure efficient support for all students, please check your email, review the Carmen announcements, and the course syllabus. Often, questions regarding deadlines, exam locations, or technical setup are already addressed in these materials.

Technical Preparedness and Data Loss: To avoid data loss, it is highly recommended that you draft your work in an external word processor or save your progress frequently. Please refer to the *Late Policy* regarding technical difficulties and dropped scores.

These guidelines are designed to keep communication efficient and ensure that students receive timely support throughout the semester.

Assignments and Grading

COMPONENT	WEIGHT
Homework	19%
Quizzes	16%
Exam I	21%
Exam II	22%
Final Exam	22%
Total	100%

Homework Assignments (19%): There will be weekly homework assignments typically due on Sundays at 11:59 PM, beginning in Week 2 (each homework covers the previous week's material, and none are due during exam weeks).

These are completed and submitted online through McGraw-Hill Connect, which allows up to 2 attempts per assignment. Unless a question specifies otherwise, numeric answers should be entered as decimals, not fractions.

Quizzes (16%): There will be weekly quizzes typically due on Sundays at 11:59 PM through Carmen (Canvas) Quizzes, beginning with a short Syllabus Quiz in Week 1, followed by weekly content quizzes from Week 2 onward (also covering the previous week's material, with none due during exam weeks). Only one attempt will be given on quizzes.

Note: *Homework assignments are submitted through McGraw-Hill Connect. Quizzes are submitted through Carmen (Canvas) Quizzes.*

Late Policy and Dropped Scores: Late or missing assignments will receive a score of zero unless an approved extension has been granted. To provide a buffer for technical issues, illness, or other unforeseen circumstances, the lowest homework score and the lowest quiz score will each be dropped.

Extensions: Extensions will be granted for students with reasonable, documented excuses (e.g., illness, family emergency, or other significant circumstances). Students should contact the instructor as soon as possible, ideally before the deadline, to request an extension.

Late Submissions: Late submissions without an approved extension will come at a cost - a late penalty will be applied, as specified on Carmen. If you have a significant, documented circumstance that may result in multiple missed assignments, contact the instructor as soon as possible.

Quizzes and homework assignments: The assignments in this course are designed to be open-book, and students are encouraged to use various resources to strengthen their own understanding of the content. While AI-powered LLMs can be valuable tools for clarifying complex concepts or helping students “understand” the logic behind difficult problems, students must ensure that their final work is not a result of over-reliance or blind copying. Students are permitted to use these tools for learning support but are strictly prohibited from accessing sources that provide exact solutions to this specific class or the textbook's homework problems. Ultimately, student submissions must reflect their own intellectual contribution, and copying verbatim from another student or an AI without actively engaging with the material is strictly prohibited.

Exams (65%): There will be three exams: two midterm exams (worth 21% and 22% of the final grade) and a cumulative final exam (worth 22% of the final grade). Each exam consists of an online part and an in-person part. The online part is typically composed of true/false and multiple-choice questions and is proctored through Honorlock. The in-person part is written and completed on campus.

- **Exam I:** Tuesday, September 29, 2026, 8:00 PM – 9:45 PM. Location: McPherson Chemical Laboratory (MP) 1000.
- **Exam II:** Tuesday, November 3, 2026, 8:00 PM – 9:45 PM. Location: Hitchcock Hall 131 (combined with STAT 3450.02).
- **Final Exam:** Tuesday, December 15, 2026, 6:00 PM – 7:45 PM. Location: Sullivant Hall 220.

Exam II will cover only material studied after Exam I. The final exam is cumulative, with most of its multiple-choice and true/false portions drawn from material that appeared on Exams I and II.

Formula Sheets: For the in-person portion of each exam, students may bring a handwritten formula sheet as follows, which may be kept after the exam:

- **Exam I:** one side of one 8.5" x 11" sheet
- **Exam II:** both sides of one 8.5" x 11" sheet (two-sided)
- **Final Exam:** two full sheets (four sides total)

All students are expected to be present for all in-person exam sessions. If you have a reason that makes attendance on the scheduled exam date unavoidable, you must inform the instructor of this ahead of time so that an alternative exam arrangement can be considered. Please note that scheduling an alternative exam is very difficult, so all students are strongly encouraged to make every effort to be present for the scheduled exam date. Failure to notify the instructor in advance of an unavoidable absence will result in a score of zero for that exam unless an emergency can be proven.

A basic calculator is necessary for exams (a TI-83/84 is recommended, consistent with in-class use); statistical tables will be provided as needed. Online exam portions are closed-book and proctored through Honorlock; in-person portions are closed-book and written on campus.

Grading Scale:

Final course grades will be assigned based on the grading scale below. This grading scale is subject to adjustment only to raise a student's grade, not lower it.

GRADE	%
A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	60-66
E	<60

Grade Appeals: If you believe there is an error in the grading of an assignment or exam, you must notify the instructor in writing within one week of the grade being posted to Carmen. Appeals requested after this one-week window will not be considered.

Academic Policies

Academic Misconduct:

It is the responsibility of the Committee on Academic Misconduct to investigate all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed, including plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-48.7(B)). For additional information, see the Code of Student Conduct.

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.

Intellectual Diversity:

Ohio State is committed to fostering a culture of open inquiry and intellectual diversity within the classroom. This course will cover a range of information and may include discussions or debates about controversial issues, beliefs, or policies. Any such discussions and debates are intended to support understanding of the approved curriculum and relevant course objectives rather than promote any specific point of view. Students will be assessed on principles applicable to the field of study and the content covered in the course. Preparing students for citizenship includes helping them develop critical thinking skills that will allow them to reach their own conclusions regarding complex or controversial matters.

Religious Accommodations:

Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations about examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement and the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the Civil Rights Compliance Office. (Policy: Religious Holidays, Holy Days and Observances)

Accessibility Accommodations for Students with Disabilities:

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. 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.

If you are ill and need to miss class, including if you are staying home and away from others while experiencing symptoms of a viral infection or fever, please let me know immediately. In cases where illness interacts with an underlying medical condition, please consult with Student Life Disability Services to request reasonable accommodations. You can connect with them via email at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Sexual Misconduct:

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 support applied to offenses against other protected categories (eg. Race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at the Civil Rights Compliance Office or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu.

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 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 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Tentative Course Schedule

The table below outlines the tentative weekly topics, readings, and assignment due dates for the semester. Exam dates are shown within the week they occur; the instructor reserves the right to make adjustments as needed, with any changes announced in Carmen.

WEEK	DATES	TOPICS AND READINGS	ASSIGNMENTS (DUE SUNDAYS AT 11:59 PM)
1	8/25-8/30	Sampling, numerical & graphical summaries (1.1-1.3); Probability rules (3.1)	Syllabus Quiz
2	8/31-9/6	Conditional probability & independence (3.2); Discrete RVs, pmfs (3.3)	Homework #1 / Quiz #1
3	9/7-9/13	Expected values & variances (3.3); Continuous RVs, density functions (3.3)	Homework #2 / Quiz #2
4	9/14-9/20	Means & variances of continuous RVs (3.3); Binomial distribution (4.1)	Homework #3 / Quiz #3
5	9/21-9/27	Binomial distribution, cont. (4.1)	Homework #4 / Quiz #4
6	9/28-10/4	Tue: Review/Q&A for Exam I (pre-recorded worked-problems video posted beforehand); Exam I held that evening — Location: McPherson Chemical Laboratory (MP) 1000. Thu: Normal distribution (4.3); Linear combinations & normal probability plots (4.3, 4.7).	
7	10/5-10/11	Central Limit Theorem (4.8); CI for mean, known variance (5.1-5.2)	Homework #5 / Quiz #5
8	10/12-10/18	t-intervals, unknown variance (5.4); Hypothesis tests for means (6.1)	Homework #6 / Quiz #6
9	10/19-10/25	Significance levels & p-values (6.2, 6.6); t-tests (6.4)	Homework #7 / Quiz #7
10	10/26-11/1	Power (6.7); Two-sample t-tests (7.1, 7.3)	Homework #8 / Quiz #8
11	11/2-11/8	Tue: Review/Q&A for Exam II (pre-recorded worked-problems video posted beforehand); Exam II held that evening — Location: Hitchcock Hall 131. Thu: One-factor experiments & ANOVA F-test (9.1).	
12	11/9-11/15	ANOVA, cont. (9.1); Pairwise comparisons (9.2)	Homework #9 / Quiz #9
13	11/16-11/22	Two-factor experiments (9.3); Randomized block designs (9.4)	Homework #10 / Quiz #10
14	11/23-11/29	Randomized block designs, cont. (9.4)	Homework #11 / Quiz #11
15	11/30-12/6	Revision / Review	Homework #12 / Quiz #12
16	12/14-12/18	Final Exam (Sullivant Hall 220) — Tue 12/15, 6:00–7:45 PM	

Note: Starting Week 2, each homework and quiz covers the previous week's material, giving students a full week between when content is taught and when it's assessed. No homework or quiz is due during an exam week (Weeks 6 and 11); the Tuesday class that week is a live Review/Q&A session instead of new content, paired with a pre-recorded worked-problems video posted a few days before the exam. The Week 1 Syllabus Quiz counts toward the Quizzes grade category.

The instructor reserves the right to change syllabus items, with all official due dates and exam dates announced in Carmen.