

STAT 3470.02 – INTRODUCTION TO PROBABILITY AND STATISTICS FOR ENGINEERS SUMMER 2026

Course overview

Instructor & Office Hours

Instructor: Dhruv Arora

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Office Hours Location: Zoom

Office hours: Tuesdays and Thursdays 10:00 am - 11:00 am, or by appointment

TA & Office Hours

TA: Sooyon Kim

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Office Hours Location: Zoom

Office hours: Wednesdays and Fridays 08:00 am - 09:00 am, or by appointment

Class Schedule

Lecture videos will be uploaded to Carmen on a weekly basis. Roughly 4 hours of recorded lecture per week.

Course description

This 3-credit hour course is an introduction to probability and statistics for engineers. Topics covered include probability, Bayes Theorem, discrete and continuous random variables, probability distributions, expected values, sampling distributions, point estimation, confidence intervals, hypothesis testing and least squares regression models. A more detailed list of topics can be found in the tentative schedule below.

Prerequisites

MATH 1152, 1161.xx, 1172, 1181H or equivalent.

Course Learning Outcomes

This course satisfies the General Education foundation requirement in Mathematical and Quantitative Reasoning or Data Analysis which has the following goals and expected learning outcomes:

Goals: 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 (ELOs):

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, logical argumentation and/or data analysis.

1.5 Evaluate social and ethical implications in mathematical and quantitative reasoning.

Course delivery

This course delivers full online as asynchronous mode of learning. Lecture videos will be posted on Carmen weekly basis. Students are expected to watch lectures and participate in the class activities. Lecture videos will be used to provide in-depth investigation of the topics for the week.

Required Course Materials

Probability and Statistics for Engineering and the Sciences (9th edition), by Jay Devore and access to the accompanying homework management system WebAssign. The electronic version of this textbook and WebAssign are offered through CarmenBooks.

<https://affordablelearning.osu.edu/carmenbooks/students> Instructions for accessing this course's WebAssign page will be posted on Carmen. The course instructors and graders will have access to data collected by WebAssign, including all recorded homework solution attempts.

Online Materials

- Instructions, materials, assignments, announcements, and other information will be posted to the course Carmen site.

- Students are asked to use the Carmen discussion boards to ask questions or otherwise discuss topics relevant to this course. These will not be graded. However, students are expected to use these boards to ask any **content questions rather than emailing the instructor**.
- There will be a discussion board dedicated to the material from each assignment, but students are free to create their own boards as well. Students are encouraged to answer each other's questions and to read the questions in the board before posting a new one in case their question has already been answered.
- Students are expected to check the Carmen course site regularly, and are encouraged to customize Carman notifications to stay abreast of course announcements and activities (<https://resourcecenter.odee.osu.edu/carmencanvas/setting-notification-preferences>).
- In particular, important communication in the course will be done through Carmen announcements. Students are responsible for any information that is included in the announcements, so they are expected to read those fully.

Carmen

This class will use Carmen. In Carmen, you will find copies of the syllabus, homework assignments, lecture notes and other important documents. Carmen will also be used to keep track of your assignment grades. Additionally, materials for lectures will be uploaded to Carmen.

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>, 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
- **TDD:** 614-688-8743

Technology skills necessary for this specific course

- Navigating Carmen; the following website may help you if you encounter difficulties with Carmen: <https://resourcecenter.odee.osu.edu/canvas/>.
- Navigating WebAssign; the following website may help you if you encounter difficulties with WebAssign: <http://support.cengage.com/>. Only Cengage support personnel can assist you with linking your WebAssign account to the WebAssign course.
- Navigating Carmen quizzes.

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 virtual office hours)
- Microphone: built-in laptop or tablet mic or external microphone

Grading and faculty response

Assignment or category	Percentage
Quizzes	10
Homework	20
Midterm 1	20
Midterm 2	20
Final Exam	30
Total	100

Homework

- Students must submit solutions to these assignments online, through the WebAssign interface. Due dates will be posted on Carmen and Webassign. **Tentatively, there will be 7 homework assignments.**
- The lowest homework score will be dropped

- If you answer a question part correctly on the number specified attempts (**Ex: on the first 3 attempts), you get full credit.** You can keep answering after that (up to 100 attempts) but you will receive no credit for answers beyond the specified attempts (Ex: 3 attempts). However, this may be useful if later parts of the problem depend on that part.
- Students are encouraged to work together to understand course concepts, but students must submit their own work to WebAssign. Students are also encouraged to seek help from the discussion boards and instructor office hours for these problems. Students are allowed to use outside materials to help with understanding concepts but are not allowed to search for solutions to the specific problems on the assignment.
- **Please read the instructions on Webassign for each homework set carefully, as there are sometimes problems you are told to skip or given hints for.**

Homework Extension will not be given except in case of an emergency or unavoidable circumstances with proper documentation. If for some reason you are unable to do the Homework by due date, please contact your instructor directly as soon as possible. Late requests may be denied, or penalties may be assessed.

If you find a discrepancy in the grades of Homework, then you must bring it to my attention no later than one week from the day the scores are in Carmen. After that grades will typically not be changed.

Quizzes

- Quizzes will be given frequently using **Carmen**. These quizzes are meant to motivate you to participate actively inside or outside of the class and keep you up with the material introduced during class.
- Quizzes will be assigned on a regular basis. Students must submit solutions to these assignments online through **Carmen**. **Tentatively, there will be 8 quizzes.**
- Due dates will be posted on Carmen. Students may have specific attempts (Ex: 2 attempts). There will be a time limit (Ex: one hour for a quiz or 24 hrs for a quiz).
- Students are allowed to use outside materials to help with understanding concepts, but are not allowed to search for solutions to the specific problems on the assignment. Please read the instructions on Webassign or Carmen for each quiz and homework set carefully, as there are sometimes problems you are told to skip or given hints for, and there may be extra credit problems designated. **The lowest quiz score will be dropped.** Any outside help such as google search or AI usage is strictly prohibited for quizzes.

Quiz extensions will not be given except in case of an emergency or unavoidable circumstances with proper documentation. If for some reason you are unable to do the Quiz by due date, please

contact your instructor directly as soon as possible. Late requests may be denied, or penalties may be assessed.

If you find a discrepancy in the grades of Quiz, then you must bring it to my attention no later than one week from the day the scores are in Carmen. After that grades will typically not be changed.

Important:

- For both homework and quizzes, please be very careful about your rounding.
- Always round to the exact number of decimal places asked for.
- If there are intermediate steps in a problem, please hold several decimal places beyond those required for the final answer if you need to round intermediate steps.
- Please use SALT or other technology for more precision rather than statistical tables.
- Failure to do these things may cause you to lose points even if your method was correct. If you followed these steps and still got an answer wrong due to rounding discrepancies, feel free to contact your instructor.

Late Submission:

- For both homework and quizzes, no credit will be given for late submissions. If you need an extension due to emergency, illness, academic conflict, etc., **please contact before the due date of the assignment.**

Exams:

- Honorlock may be used for exams. Please see the following link to help you install honorlock. [Getting Started with Honorlock for Students | Teaching and Learning Resource Center](#). If you have questions about this, please reach out to me.
- There will be **two midterm exams and one final exam**. Each exam contains both multiple choice and short answer questions.
- The dates for the exams given below are tentative and I reserve the right to change the dates of any and all exams; at least one week of notice will be provided in case of a change.
- Please note that solutions, not answers, will be graded; a correct answer alone will not get full credit if the steps leading to it are not clear and/or correct.
- For each midterm exam you will be permitted one sheet of 8.5" x 11" paper with formulas/notes/examples (both sides of the paper may be used, and you may type it if you wish). For the final exam you will be permitted two such sheets of paper.
- Calculators will be allowed on the exam as long as they cannot connect to the internet.

If you miss an exam due to a documented emergency or official university activity, you may take a make-up exam without penalty. For known conflicts (e.g., university athletics), you must notify me at least 72 hours in advance. For unforeseen emergencies, please contact me as soon as it is safe and feasible to do so.

For all other unapproved absences, you may still request a make-up exam; however, a 20% penalty will be applied to your score for the first unapproved exam absence, and a 30% penalty from the second. Late requests to take a make-up exam for unapproved reasons may be denied entirely. These penalties may be waived for extenuating circumstances at my discretion.

If you find a discrepancy in the grading of a midterm exam (e.g., incorrect addition/subtraction, correct answer marked incorrect, etc.) then you must bring it to my attention (through email) no later than one week from the day the exams are returned. After that grades will typically not be changed.

Midterm Exam 1:
Wednesday Jun 10, 2026

Midterm Exam 2:
Tuesday Jul 07, 2026

Final exam
Monday Aug 03, 2026

Late assignments

Generally, late assignments are not accepted. Please plan your time so that you can complete assignments far enough in advance to avoid any last-minute problems uploading your completed work. If exceptional circumstances (sudden onset of illness, unexpected family situations, etc.) arise, contact the instructor to discuss the possibility of an extension.

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

Health and safety

The safe and healthy Buckeyes site is a good one to bookmark (<https://safeandhealthy.osu.edu/>). It is regularly updated with the latest advice from the university.

- **Masks are optional** in most settings on all Ohio State campuses, including general-purpose buildings, residence halls, dining facilities, classrooms, offices, the Ohio Union, and on public transportation. Masks are also optional outdoors. (Read guidance for individuals for specific circumstances)

Faculty feedback and response time

I am providing the following to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** if you have a technical problem.)

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**. Specific technical questions about the course material that require significant back-and-forth communication are not well suited for e-mail; while I will do my best to answer such questions, I may ask that you attend office hours if your question isn't easily answerable over email.

Attendance, participation, and discussions

Student participation requirements

The following is a summary of everyone's expected participation:

- **Watching class lectures:**
Students are expected to watch all recorded class lectures.

- **Logging in: AT LEAST ONCE PER WEEK**

Be sure you are logging in to the course in Carmen each week, including weeks with holidays. You will need to log in to Carmen to complete quizzes, view lecture content and upload homework assignments. (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:**

You are encouraged to attend office hours for assistance. If you need to speak with me privately about a topic that cannot be easily discussed during office hours, please contact me to schedule a time to meet.

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 thoughtful.

- **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 good grammar, spelling, and punctuation. Informality (including an occasional emoticon) is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. (For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.)
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Other course policies

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

Policies for this course

- **Exams:** You must complete the midterm and final exams yourself, without any external help or communication.
- **Written assignments:** Your written assignments, should be your own original work. In formal assignments, you should 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.
- **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 to ask the instructor.

Academic Misconduct

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the [Committee on Academic Misconduct](#) (COAM) expect that all students have read and understand the University's [Code of Student Conduct](#), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

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 please review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If an instructor suspects that a student has committed academic misconduct in this course, the instructor is obligated by University Rules to report those suspicions to the Committee on Academic Misconduct. If COAM determines that a student violated the University's Code of

Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in the course and suspension or dismissal from the University. If students have questions about the above policy or what constitutes academic misconduct in this course, they should contact the instructor.

Artificial Intelligence and Academic Integrity

There has been a significant increase in the popularity and availability of a variety of generative artificial intelligence (AI) tools, including ChatGPT, Sudowrite, and others. These tools will help shape the future of work, research and technology, but when used in the wrong way, they can stand in conflict with academic integrity at Ohio State.

All students have important obligations under the Code of Student Conduct to complete all academic and scholarly activities with fairness and honesty. Our professional students also have the responsibility to uphold the professional and ethical standards found in their respective academic honor codes. Specifically, students are not to use unauthorized assistance in the laboratory, on field work, in scholarship, or on a course assignment unless such assistance has been authorized specifically by the course instructor. In addition, students are not to submit their work without acknowledging any word-for-word use and/or paraphrasing of writing, ideas or other work that is not your own. These requirements apply to all students undergraduate, graduate, and professional.

To maintain a culture of integrity and respect, these generative AI tools should not be used in the completion of course assignments unless an instructor for a given course specifically authorizes their use. Some instructors may approve of using generative AI tools in the academic setting for specific goals. However, these tools should be used only with the explicit and clear permission of each individual instructor, and then only in the ways allowed by the instructor.

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. **No course materials provided by the instructor (notes, videos, recordings, computer code, homework assignments, homework solutions, quizzes, exams, etc.) may be distributed publicly or privately to anyone outside of the class.**

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

Disability Statement (with Accommodations for Illness)

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If students anticipate or experience academic barriers based on a disability (including mental health and medical conditions, whether chronic or temporary), they should let their instructor know immediately so that they can privately discuss options. Students do not need to disclose specific information about a disability to faculty. To establish reasonable accommodations, students may be asked to register with Student Life Disability Services (see below for campus-specific contact information). After registration, students should make arrangements with their instructors as soon as possible to discuss your accommodations so that accommodations may be implemented in a timely fashion.

If students are ill and need to miss class, including if they are staying home and away from others while experiencing symptoms of viral infection or fever, they should let their instructor 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 at slds@osu.edu; 614-292-3307; or slds.osu.edu

Accessibility of course technology

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

- [Carmen \(Canvas\) accessibility](#)

- Streaming audio and video
- Synchronous course tools

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 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

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 with regard to 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 a 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](#)

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.

Grievances and Solving Problems

According to University Policies, if you have a problem with this class, you should seek to resolve the grievance concerning a grade or academic practice by speaking first with the instructor or professor. Then, if necessary, take your case to the department chairperson, college dean or associate dean, and to the provost, in that order. Specific procedures are outlined in Faculty Rule 3335-8-23. Grievances against graduate, research, and teaching assistants should be submitted first to the supervising instructor, then to the chairperson of the assistant's department.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a welcoming community. 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 Civil Rights Compliance Office (CRCO):

Online reporting form: <http://civilrights.osu.edu/>

Call 614-247-5838 or TTY 614-688-8605

civilrights@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 Civil Rights Compliance Office 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.

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 we 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) & Textbook Reading

Week	Topic	Textbook Reading
1	Sample spaces and events, axioms and properties of probability, counting techniques, conditional probability	1.1-1.4, 2.1-2.4
2	Bayes' theorem and independence, discrete random variables, probability distributions, expectation and variance of (functions of) random variables	2.5, 3.1-3.3
3	Binomial, Poisson probability distributions	3.4, 3.6
4	Continuous random variables, density and distribution functions, percentiles and expected values, the Normal distribution	4.1-4.3
5	Exponential, Gamma distributions, joint probability distributions, conditional distributions, conditional expectation, covariance and correlation	4.4, 5.1-5.2
6	Sampling distribution of a statistic, distribution of the sample mean and central limit theorem	5.3-5.5
7	Populations and parameters, samples and statistics, concepts of estimation and inference Point estimation, including method of moments and maximum likelihood	6.1 6.2
8	Confidence intervals, large sample intervals for means and proportions	7.1-7.2
9	Confidence intervals for means of normal populations, hypotheses and testing procedures	7.3, 8.1
10	Hypothesis testing, tests for population means and proportions	8.2-8.4
11	Simple linear regression, estimation and inference	12.1 – 12.2 12.3 – 12.4
12	Simple linear regression model checking, transformations Multiple regression, goodness of fit tests	13.1-13.2 13.4, 14.1