



THE OHIO STATE UNIVERSITY

SYLLABUS:

STAT 3470.01 – INTRODUCTION TO PROBABILITY AND STATISTICS FOR ENGINEERS

Course overview

Instructor:

Daryl Swartzentruber (swartzentruber.20@osu.edu)

Office Hours: Cockins Hall 217

Mondays 10:15-12:15

Wednesdays 3:30-4:30

- On Mondays from 11:15-12:15 I will give priority to those who have scheduled an appointment with me to talk privately. Otherwise office hours will take on a group tutoring format.

MSLC Tutoring: Free tutoring is available in the MSLC, Cockins Hall room 122 (or possibly online, details TBD). I will post a schedule of tutor hours on Carmen.

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, 153, or 254, or equivalent.

Course learning outcomes

General Education (GE) Requirement: This course satisfies the GE requirement in Data Analysis.

Expected Learning Outcomes: Upon successful completion of this course, 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.

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 CarmenCanvas. The course instructors and graders will have access to data collected by WebAssign, including all recorded homework solution attempts.

Students are also required to register with **TopHat**, which is free for Ohio State University students. Please go to the TopHat home page (<https://tophat.com/>) and either login (<https://app.tophat.com/login>) or signup for an account (<https://app.tophat.com/register/>). Make sure you are using the latest version of the app or are accessing it through a browser. TopHat is already connected to the CarmenCanvas course, so it should be listed as one of your courses when you sign in. If not, you can use the join code **469285**. Please contact Daryl if you have difficulty accessing TopHat. You are expected to bring a device to class (phone, tablet, laptop, etc.) that can access TopHat.

Online Materials

Instructions, materials, assignments, announcements and other information will be posted to the course CarmenCanvas site. Students are asked to use the CarmenCanvas discussion boards to ask questions or otherwise discuss topics relevant to this course. These are not required and 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 board dedicated to the material from each chapter, 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 CarmenCanvas course site regularly, and are encouraged to customize CarmanCanvas 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.

If you are unable to come to class for illness or other reason, the lectures will be recorded using the Zoom integration feature on Carmen. Click on the Zoom link on the left of the Carmen page and then click Cloud Recordings to access the recordings.

Assessment

Participation (5% of the overall grade): The main part of this category is the TopHat questions that will be asked during class lectures. I will typically ask 2-3 TopHat questions per class. If you answer at least 80% of these questions you will be given full credit for the TopHat grade, regardless of whether your answers are correct. Another participation component is the welcome discussion board that will be used as the participation roster assignment. You will receive full credit for this assignment if you post in that discussion board by the deadline. I reserve the right to add other assignments to the participation category throughout the semester.

Homework (15%): Graded homework problems will be assigned for each chapter (the last two chapters will be combined). Students must submit solutions to these assignments online, through the WebAssign interface. Due dates will be posted on Carmen and Webassign. If you answer a question part correctly 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 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. At the end of the semester the overall homework percentage will be rounded up to the next highest 10 percentage points (i.e. 81.2 becomes 90, 99.2 becomes 100).

Quizzes (20%): Quizzes will be assigned for each chapter (the last two chapters will be combined). Students must submit solutions to these assignments online, through the WebAssign interface. Due dates will be posted on Carmen and Webassign. Students will have two attempts per question, but correct answers on the second attempt will only be worth half points. After using two attempts on a question it will show the answer. There will be a time limit of one hour for each quiz. Students may not work together or ask for help in office hours. 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, and there will be extra credit problems designated. The scores will not be rounded up at the end of the semester like the homework scores are, but the lowest quiz score will be dropped.

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 Daryl.

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 Daryl before the due date of the assignment.

Exams (17.5% for each of two midterms, 25% for the final): 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. The exams are closed book. 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. You will be given a packet of statistical tables for use during the exam. Calculators will be allowed on the exam as long as they cannot connect to the internet. 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.

As the exams take place during normal class periods, make-up exams will not be given except in case of an emergency or due to conflicts with other university activities. If for some reason you are unable to make the exams, please contact me as soon as possible. Late requests may be denied or penalties may be assessed.

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 (either in person or through email) no later than one weeks from the day the exams are returned. After that grades will typically not be changed.

The dates/times for the exams are:
Midterm 1: Wednesday, February 23
Midterm 2: Monday, April 4
Final Exam: Friday, April 29; 10:00-11:45 AM

Final grades in the course will be determined based on the following scale, and based on the percentage of total points that you earn during the semester. If a curve or grade adjustment is applied, it will be communicated to the students. No individual extra credit will be given.

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	E
Min %	93	90	87	83	80	77	73	70	67	60	0

Course schedule

The following is a tentative weekly list of topics that will be covered during this course

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	6.1
8	Point estimation, including method of moments and maximum likelihood	6.2

9	Confidence intervals, large sample intervals for means and proportions	7.1-7.2
10	Confidence intervals for means of normal populations, hypotheses and testing procedures	7.3, 8.1
11	Hypothesis testing, tests for population means and proportions	8.2-8.4
12	Simple linear regression	12.1-12.2
13	Simple linear regression, estimation and inference	12.3-12.4
14	Simple linear regression, model checking, transformations	13.1-13.2
15	Multiple regression, goodness of fit tests	13.4, 14.1

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>, 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

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- 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 TopHat: the following website may help you if you encounter difficulties with TopHat: <https://tophat.com/students/>.

Staff response

Staff feedback and response time

We are providing the following list to give you an idea of our intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

Email

A course instructor or teaching assistant will check and reply to email within **48 hours on school days (Monday – Friday, excluding university holidays; list of holidays at <http://registrar.osu.edu/staff/bigcal.asp>)**. Due to privacy law, the course instructor and teaching assistants will only respond to email sent from **official Ohio State University addresses**, such as your name.#@buckeyemail.osu.edu address.

Carmen Message

I have Carmen set up to forward Carmen messages to my email inbox. However, I have noticed that sometimes those messages are delayed or not forwarded at all. Therefore please use email rather than Carmen messages to communicate with me, as it is possible I will not see and respond to the Carmen messages.

Discussion board

A course instructor or teaching assistant will check and reply to messages in the discussion boards as appropriate every **48 hours on school days**.

Attendance, participation, and discussions

Communication guidelines

The following are expectations for how we should communicate. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to communicate 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.
- **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

Academic integrity policy

Policies for this online course

- **Assessments:** You must complete the assessments (exams and quizzes) yourself, without any external help or communication. More details are included in the assessment section of this syllabus.

Ohio State's academic integrity policy

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 I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

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.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact the instructor.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (<http://oaa.osu.edu/coam.html>)
- *Ten Suggestions for Preserving Academic Integrity* (<https://oaa.osu.edu/coamtensuggestions.html>)
- *Eight Cardinal Rules of Academic Integrity* (<http://www.northwestern.edu/uacc/8cards.htm>)

Advising

For help navigating this large university, you will find that you need advising. In addition, advisors can help you get information regarding accessing course materials to meet the needs of diverse learners. For more information, visit the university's advising website at <https://advising.osu.edu/>. In addition to advising services, OSU main campus students may find assistance at <http://ssc.osu.edu>.

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.

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

Accessibility accommodations for students with disabilities

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 Avenue.

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 (<https://community.canvaslms.com/docs/DOC-2061>)
- WebAssign
- TopHat

Mental health statement

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.