



THE OHIO STATE UNIVERSITY

SYLLABUS:

STAT 3470.02 – INTRODUCTION TO PROBABILITY AND STATISTICS FOR ENGINEERS (ONLINE)

Course overview

Instructors:

Prateek Sasan (sasan.1@osu.edu)

Office Hours: Tuesday 9:00-10:00, Thursday 4:00-5:00

MSLC Tutoring: Free online drop-in tutoring for this course is available through the Mathematics and Statistics Learning Center (MSLC). Details about tutoring through the MSLC are available [here](#). Specific STAT3470 tutoring hours will be made available [here](#) when finalized.

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.

Online Course Delivery

Instructions, materials (including links to lecture videos), assignments, announcements and other information will be posted to the course CarmenCanvas site. Students are expected to watch lecture videos, read textbook sections and study other materials as assigned each week. Students are also required to respond to questions housed in homework/quizzes in Webassign. Students should attend office hours as needed or desired.

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. Due to the large size of the class, students will be put into groups for the message boards.

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.

Assessment

Homework (20%): 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. These will **typically be due on Wednesdays at 11:59 PM** but see Carmen and Webassign for exact due dates. **Students will typically be given 10 attempts on each question. However after the 3rd attempt you would be deducted 10% of points after each additional attempt.** Students are encouraged to work together (via CarmenZoom or other preferred mechanism) 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.

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. These will **typically be due on Fridays at 11:59 PM** but see Carmen and Webassign for exact due dates. **Students will have two attempts per question, but correct answers on the second attempt will only be worth 75% of points. 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 lowest quiz score will be dropped.

For each of the above assignments, no credit will be given for late submissions. If you need an extension due to emergency, illness, academic conflict, etc., please contact me before the due date of the assignment.

Exams (20% for each of two midterms, 20% for the final): There will be two midterm exams and one final exam. Each exam contains both multiple choice and short answer questions. The multiple choice questions will be submitted via a Carmen quiz. The short answer questions will be available as pdfs within a Carmen quiz. Students will download each question, answer them either electronically or on paper, and then upload a pdf to a separate Carmen assignment. Students may refer to their textbook, course notes, and course sites (CarmenCanvas, WebAssign) during both exam components. However, students may not use outside resources (including third party websites or tutoring services) to create new notes for use during the exam or communicate with any person other than the course instructor about any aspect of the

exam until the exam scores have been posted or permission has been given. See the course policy on academic integrity for more details.

Each exam will have one primary time window, which will be in the evening. If you have a direct conflict between these exam times and another academic or university requirement, you can email me with the details of the conflict and if approved, you can take the exam at a different time that will be scheduled later. If you have a personal or work conflict with the exam times, please try to make arrangements to be able to take the exams during the scheduled windows first, and if you are unable to do so email me and i will handle those on a case-by-case basis. The midterm exams will consist of 30 minutes to answer the multiple choice problems and download the short answer problems, followed by 45 minutes to answer the short answer problems, for a total of 1 hour and 15 minutes. The final exam will consist of 45 minutes to answer the multiple choice problems and download the short answer problems, followed by 60 minutes to answer the short answer problems, for a total of 1 hour and 45 minutes.

Exams will be proctored via Zoom. This will allow us to answer any questions that come up the way we would if we were in person. If you have a question during the exam please send us a private message in Zoom and we will respond to you and/or the class as necessary. This will also allow us to tell you when to stop working and start uploading, and to troubleshoot any uploading issues in real time. You will be expected to have your camera on during the exam and to be listening for any announcements we make. If this is an issue for you due to Internet connections, lack of devices, etc, please let me know as soon as possible and we can make an alternate arrangement. If you do not show up to the Zoom room at the scheduled time you may be subject to a penalty of at least 10 percentage points.

The dates/times for the exams are:

Midterm 1: Wednesday, February 23; 7:00-8:15 PM (Syllabus: Ch2 (Sec 2.1, 2.2, 2.3, 2.4, 2.5), Ch3 (Sec 3.1, 3.2, 3.3, 3.4, 3.6), Ch4 (Sec 4.1, 4.2, 4.3, 4.4), Ch5 (Sec 5.1, 5.2, 5.3, 5.4, 5.5))

Midterm 2: Monday, April 4; 7:00-8:15 PM (Syllabus: Ch6 (Sec 6.1, 6.2), Ch7 (Sec 7.1, 7.2, 7.3), Ch8 (Sec 8.1, 8.2, 8.3, 8.4))

Final Exam: Thursday, April 28; 7:00-8:45 PM (Syllabus: ALL sections covered in lecture videos/notes. Focus on sections covered closer to the final)

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	Goodness of fit tests, simple linear regression	14.1, 12.1
13	Simple linear regression, estimation and inference	12.2-12.4
14	Simple linear regression, model checking, transformations	13.1-13.2
15	Multiple regression	13.4

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.
- Watching lecture videos on mediasite. Individual videos are linked on Carmen

Necessary equipment

- Computer: current Mac (macOS) or PC (Windows 10+) with high-speed internet connection and an up-to-date browser. A number of publicly available computers are available on campus, here is a link for their locations <https://odee.osu.edu/public-computing>.
- CarmenZoom text, audio, and video chat. If you need technical assistance, either call 614-688-HELP, or refer to the online instructions: <https://resourcecenter.odee.osu.edu/carmenzoom>

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.

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 online 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>)
- Streaming audio and video
- WebAssign

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.