

IEE 380: Probability and Statistics for Engineering Problem Solving

Instructor/Email: Dr. Linda Chatten linda.chatten@asu.edu (do not email through Canvas, please)
Office Hours: By Zoom appointment and usually on-demand.

Text (required): ***Applied Statistics and Probability for Engineers***, Douglas C. Montgomery and George Runger, 7th Ed. (Wiley Plus online text, study, and homework site)

You will access the text through our Canvas page. An automatic charge will be made to your student account simply by your enrollment in the course. This is a required purchase, as your homework sets are located on Wiley Plus and homework is a portion of your course grade.

Enrollment Requirements

Prerequisite(s): Fulton Engineering undergraduate student, Engineering Management minor, or Mathematical Concepts of Engineering certificate student; MAT 266 or 271 with C or better OR Industrial Engineering graduate student

Technology Requirements

- Computer with webcam or external USB camera
- TI-84 Emulator (online, used for exams) ti84calc.com
- TI-83 or TI-84 TI-89, Nspire or equivalent physical calculator (e.g., Casio or HP with probability and statistics functions).
- Excel (Excel can be accessed on myASU Apps if you do not have it on your computer)

Course Description

Applications-oriented course with computer-based experience using statistical software for formulating and solving engineering problems.

Learning Outcomes

Students will:

- Understand the differences between probability and statistics
- Solve conditional probability problems using Bayes' Theorem
- Be able to recognize and use common discrete and continuous probability functions
- Use sample statistics to draw inferences about a population of interest through hypothesis testing of means, variances, and proportions
- Build simple and multiple linear regression empirical models from data
- Understand and apply basic statistical process control charts and analyses

Canvas

You have all been enrolled on our Canvas page. All lecture slides, reading assignments, homework assignments, class schedules, and other items will be posted there.

Material

We will cover all or portions of each of these chapters:

Chapter 1:	The Role of Statistics in Engineering
Chapter 2:	Probability: independence, addition rule, intersection, union, complement
Chapter 3:	Discrete Random Variables: general, Discrete Uniform, Poisson, Bernoulli, Binomial, expected value, variance, pmf, CDF
Chapter 4:	Continuous Random Variables: general, Continuous Uniform, Normal, Standard Normal, Exponential, expected value, variance, pdf, CDF
Chapter 6:	Descriptive Statistics: histograms, Pareto charts
Chapter 7:	Point Estimation and Sampling Distributions: sample mean, sample variance, Central Limit Theorem
Chapter 8:	Statistical Intervals for a Single Sample: mean, variance, proportion
Chapter 9:	Tests of Hypothesis for a Single Sample: mean, variance, proportion
Chapter 10:	Statistical Inference for Two Samples: confidence intervals and hypothesis tests for difference between means, equality of variances, paired T-test, the difference between proportions
Chapter 11:	Simple Linear Regression and Correlation
Chapter 12:	Multiple Linear Regression
Chapter 15:	Statistical Process Control: $\bar{X}$ and R charts

Expectations

You are expected to follow the weekly “To-Do” lists on Canvas and to take notes on the accompanying slides. Much of what is presented in lectures shows up on exams. When you are viewing the lectures, it is expected that you will

- have copies of the slides out and take notes on them
- have your calculator out
- refrain from texting and other online activities

Rule of thumb for a 15-week course: spend 3 hours per credit hour each week with course material. This is a labor-intensive course and using this rule of thumb, which is quite accurate, will require you to spend at least 1.5 hours a day, 5-6 days a week, watching the lectures, reviewing course slides, re-writing your class notes, doing homework and reading the text and text examples to earn the C grade or better that is required by your academic program.

If you are taking more than two courses during a Session A, B, or C, this may not be the best time to take IEE 380. Please set up an appointment with me ASAP so I can advise you if you have a full schedule.

Schedule

See the weekly “To-Do” lists and accompanying modules on Canvas. It is your responsibility to watch lectures and keep track of what is due and when.

Extra Credit

There is no extra credit in this course at all. No extra credit after the final exam is over, either.

Email and Internet

ASU email is an [official means of communication](#) among students, faculty, and staff. Students are expected to read and act upon an email in a timely fashion. Students bear the responsibility of missed messages and should check their ASU-assigned email regularly. **All instructor correspondence will be sent to your ASU email account. If you have it forwarded elsewhere, you may miss important information. I suggest unforwarding your ASU email.**

Grading

There will be two midterm exams (Exam 1, Exam 2) and one cumulative final exam. Two averages will be computed for each student. You will receive the higher of the two averages to determine your final course grade.

Average 1:

*Exam 1, Exam 2	40% total
Homework (lowest two dropped)	25%
Final Exam	35%

*Your lowest of Exam 1 and Exam 2 will be weighted at 10%. The other will be weighted at 30%.

Average 2:

Exam 1, Exam 2	48% total, 24% each
Homework (lowest two dropped)	25%
Final Exam	27%

There is no curve in this class; one is not needed. You are guaranteed a final grade per below.

<u>Final Average (X)</u>	<u>Course grade</u>
$X \geq 90$	A
$80 \leq X < 89$	B
$70 \leq X < 79$	C
$60 \leq X < 69$	D
$X < 60$	E

The +/- system may be used for those students whose averages are truly borderline at the end of the session. The +/- cut-offs are never published. **There is no “Y” grade option for this course.**

Exams

There are two midterms, Exam 1 and Exam 2, and a Final Exam in this course. The Final Exam is cumulative, meaning that it covers all of the material from the entire session. Each of these exams has an accompanying practice exam.

The rules for each exam, the “musts”, “mays”, and “may nots”, will be detailed on our Canvas page well in advance of each exam.

All exams will be online and administered over 48 hours. These exams will be proctored using **HonorLock**. Your face, hands, workspace, and calculator must be on camera at all times while taking exams. I will be posting a video close to Exam 1 where I show you how to do this effectively and with little disruption to your view of the exam.

For some problems, you will be required to use the TI-84 emulator online calculator to show your work. For others, you can use your physical calculator.

Make-Up Exams

An oral made-up exam will be available only in the following situations:

- 1.Required class absence due to university-sanctioned events/activities (refer to ACD 304-02)
- 2.Religious observance recognized by ASU (refer to ACD 304-04)
- 3.Death of an immediate family member (spouse, domestic partner, child, parent, sibling). Grandparents are not considered as immediate family.
- 4.Your hospitalization

You must provide verifiable documentation for the above before a make-up exam will be approved.

Ed Discussion

Ed Discussion is on the left menu of our Canvas page and is where you will post your homework questions, help each other, and where the TAs and I will answer your course-related questions.

The TAs and I will not answer homework questions in an email. Instead, post your questions to Ed Discussion and I or a TA will answer them there so others can benefit from your question.

To reiterate, go to Ed Discussion with homework and other general course questions before emailing a TA or me. While there, help someone else with their question. If you are unable to resolve your issue there, see a TA or me during office hours for help.

Homework

Each homework is due on the appointed day **no later than 11:59 pm AZ time.** Homework is accessed directly on our IEE 380 Canvas page.

There are **no extensions** on the homework, but the lowest two scores are dropped. Each homework is worth the same weight regardless of how many problems are on it. For example, a score of 4 out of 5 problems is 80% and a score of 28/35 is also 80%.

Most of the homeworks have an accompanying Homework Help video where I give hints, helps, and solutions to the more challenging problems in a homework set.

The homework sets have a few problems from previous chapters in addition to the primary chapter that is covered. This review is intentional and meant to help keep you in a constant review cycle so that the material is not a stranger to you at the end of the session.

You may NOT use Chegg.com, CourseHero.com, or any other sites to find homework answers or solutions. If you do, you will be reported to the dean's office for an Academic Integrity Violation, you will receive a zero on the homework assignment, and there will be a recommendation that your course grade be lowered by a full letter grade.

Academic Integrity

Students in this class must adhere to ASU's academic integrity policy, which can be found at <https://provost.asu.edu/academic-integrity/policy>). Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. In addition, all engineering students are expected to adhere to both the ASU Academic Integrity Honor Code and the Fulton Schools of Engineering Honor Code. All academic integrity violations will be reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). The AIO maintains a record of all violations and has access to academic integrity violations committed in all other ASU colleges/schools.

Here is a portion of the policy that details the student responsibilities:

Each student must act with honesty and integrity and must respect the rights of others in carrying out all academic assignments. A student may be found to have engaged in academic dishonesty if, in connection with any Academic Evaluation or academic or research assignment (including a paid research position), he or she:

1. *Engages in any form of academic deceit;*
2. *Refers to materials or sources or uses devices (e.g., computer disks, audio recorders, camera phones, text messages, crib sheets, calculators, solution manuals, materials from previous classes, or commercial research services) **not authorized by the instructor** for use during the Academic Evaluation or assignment;*
3. *Possesses, reviews, buys, sells, obtains, or uses, without appropriate authorization, any materials intended to be used for an Academic Evaluation or assignment in advance of its administration;*
4. *Acts as a substitute for another person in any Academic Evaluation or assignment;*
5. *Uses a substitute in any Academic Evaluation or assignment;*
6. *Depends on the aid of others, including other students or tutors, in connection with any Academic Evaluation or assignment to the extent that the work is not representative of the student's abilities;*
7. *Provides inappropriate aid to another person in connection with any Academic Evaluation or assignment, including the unauthorized use of camera phones, text messages, photocopies, notes, or other means to copy or photograph materials used or intended for Academic Evaluation;*

8. *Engages in Plagiarism;*
9. *Uses materials from the Internet or any other source without full and appropriate attribution;*
10. *Permits his or her work to be submitted by another person in connection with any Academic Evaluation or assignment, without authorization;*
11. *Claims credit for or submits work done by another;*
12. *Signs an attendance sheet for another student, allows another student to sign on the student's behalf, or otherwise participates in gaining credit for attendance for oneself or another without actually attending;*
13. *Falsifying or misrepresenting hours or activities in relation to an internship, externship, field experience, clinical activity, or similar activity;*
14. *Attempts to influence or change any Academic Evaluation, assignment, or academic record for reasons having no relevance to academic achievement.*

Here are a couple of things you may not realize are violations of the Academic Integrity Policy that can get you into trouble:

- You may not provide old notes, reports, assignments, homework solutions, or exams to friends or others who take a class after you do unless your instructor says that you may.
- You may not post, sell or provide notes, reports, assignments, homework solutions, or exams to online sites such as Chegg.com or CourseHero.com.

If you are not sure if something you are doing is in violation or not, post on Ed Discussion or ask Dr. C. At Arizona State, the governing phrase about what is allowed and is not allowed during a course is as follows: Everything is forbidden until the teacher says it is permitted.

That said, I will detail here what is and is not permitted concerning homework. Specific exam permissions will be detailed before each exam in an announcement and an email sent to you.

Permitted in IEE 380 regarding homework:

1. You may and should work with other students in person, on Zoom, and on Ed Discussion to do the homework problems
2. You may post your homework problem statement on Ed Discussion at any time, even before the homework is due
3. You may answer other students' homework questions on Ed Discussion at any time, even before the homework is due

Forbidden in IEE 380:

1. You may not post any homework or exam questions to online sites such as Chegg.com, etc.
2. You may not copy your friends' answers to homework, or exams
3. You may not have another person take your exam or do your homework

4. You may not sell your notes to a third party. StudySoup.com may solicit you via email to do this; it is expressly forbidden per ASU policies.

5. You may not take pictures or screenshots of exam questions at any time. Ever. Even if you want to send a shot to me, you may not take a photo. I can see every question on your exam. I do not want any photos of questions on your computer or your phone. Ever.

Violations of any of the above “may nots” will be reported to the dean’s office for an academic integrity violation and the following penalties may occur:

- Your final course grade may be demoted (dropped down) by one full letter grade
- You may be assigned a failing grade of E in the course
- You may be suspended or expelled from ASU

Generative AI

Unless explicitly permitted by your instructor, the use of generative AI tools (e.g., ChatGPT) to complete any graded assignment, project, or exam in this course will be considered an academic integrity violation and reported to the dean’s office as such.

Disability Accommodations

Suitable accommodations will be made for students having disabilities and students should notify the instructor as early as possible if they will require the same. Such students must be registered with Student Accessibility and Inclusive Learning Services (SAILS) and provide documentation to that effect.

Copyright

All contents of these lectures, including written materials distributed to the class, are under copyright protection. Notes based on these materials may not be sold or commercialized without the express permission of the instructor. [Note: Based on [ACD 304-06](#).]

Exam questions are the property of ASU and Dr. Chattin. They are Dr. Chattin’s intellectual property and may not be copied, posted, or reproduced in any way without permission. You may not take photos of them, either.

Course content, including lectures, are copyrighted materials and students may not share outside the class, upload to online websites not approved by the instructor, sell or distribute course content or notes taken during the conduct of the course (see ACD 304–06, “Commercial Note Taking Services” and ABOR Policy 5-308 F.14 for more information).

You must refrain from uploading to any course shell, discussion board, or website used by the course instructor or another course forum, material that is not the student's original work, unless the students first comply with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.

Drop and Add Dates/Withdrawals

This course adheres to a compressed schedule and may be part of a sequenced program, therefore, there is a limited timeline to [drop or add the course](#). Consult with your advisor and notify your instructor to add or drop this course. If you are considering withdrawal, review the following ASU policies: [Withdrawal from Classes](#), [Medical/Compassionate Withdrawal](#), and a [Grade of Incomplete](#).

Grade Appeals

Grade disputes must first be addressed by discussing the situation with the instructor. If the dispute is not resolved with the instructor, the student may appeal to the department chair per the [University Policy for Student Appeal Procedures on Grades](#).

Prohibition of Commercial Note-Taking Services

Per [ACD 304-06 Commercial Note Taking Services](#), written permission must be secured from the official instructor of the class to sell the instructor's oral communication in the form of notes. Notes must have the note taker's name as well as the instructor's name, the course number, and the date.

Course Evaluation

Students are expected to complete the course evaluation. The feedback provides valuable information to the instructor and the college and is used to improve student learning. Students are notified when the online evaluation form is available.

Syllabus Disclaimer

The syllabus is a statement of intent and serves as an implicit agreement between the instructor and the student. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. Please remember to check your ASU email and the course site often.

Accessibility Statement

In compliance with the Rehabilitation Act of 1973, Section 504, and the Americans with Disabilities Act as amended (ADAAA) of 2008, professional disability specialists and support staff at the Student Accessibility and Inclusive Learning Services (SAILS) facilitate a comprehensive range of academic support services and accommodations for qualified students with disabilities. [Qualified students with disabilities may be eligible to receive academic support services and accommodations.](#) Eligibility is based on qualifying disability documentation and assessment of individual needs. Students who believe they have a current and essential need for disability accommodations are [responsible for requesting accommodations and providing qualifying documentation](#) to the SAILS. Every effort is made to provide reasonable accommodations for qualified students with disabilities.

Qualified students who wish to request accommodation for a disability should contact the SAILS by going to <https://eoss.asu.edu/accessibility>, calling (480) 965-1234, or emailing Student.Accessibility@asu.edu. To speak with a specific office, please use the following information:

ASU Online and Downtown Phoenix Campus	Polytechnic Campus
University Center Building, Suite 160	480-727-1165 (Voice)
602-496-4321 (Voice)	
West Campus	Tempe Campus
University Center Building (UCB), Room 130	480-965-1234 (Voice)
602-543-8145 (Voice)	

Harassment and Sexual Discrimination

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling> is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, <https://goto.asuonline.asu.edu/success/online-resources.html>.

Policy Against Threatening Behavior

Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services. Interfering with the peaceful conduct of university-related business or activities or remaining on campus grounds after a request to leave may be considered a crime. All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off-campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students.