SIE 305- Introduction to Engineering Probability and Statistics
Fall 2025, University of Arizona

Instructor:	Dr. Mike Kwinn Office: ENGR 107 Email: kwinnm@arizona.edu Office Hours: by appt
Teaching Assistants:	Mst Sadia Tamanna (Tucson), Office hours (In Person by appt), M and W 11-12. Zoom: https://arizona.zoom.us/j/5970478176 Savanna Silva (Yuma), Office hours: by appointment. Onsite in Yuma Friday 1-3pm Zoom: https://arizona.zoom.us/j/82547241619
Class meetings:	Mon, Wed, Fri, 10:00–10:50am, Education Room 211
Catalog description:	Axioms of probability, discrete and continuous distributions, sampling distributions. Engineering applications of statistical estimation, hypothesis testing, confidence intervals.
Prerequisite(s):	MATH 129 Each student must be able to: 1. Differentiate (derivatives of exp., log, and polynomial, etc.) 2. Integrate (single integrals, simple double integrals)
Textbook (required):	Devore, Jay L. *Introduction to Engineering Probability and Statistic*, CENGAGE Learning. (On-Line through D2L)
Software packages:	MS Excel, "R", and/or Minitab (optional, but encouraged)
Outcome Related Course Learning Objectives:	• Understand and apply basic probability correctly • Understand when and how to use discrete, continuous and joint probability distributions • Describe the use of point estimation • Analyze confidence intervals and hypothesis testing for a single sample • Analyze confidence intervals and hypothesis testing for two samples • Conduct Goodness-of-Fit tests
Topics covered:	• Descriptive statistics. • Basic probability • Discrete and continuous random variables • Joint random variables • Point estimation • Statistical intervals based on a single sample • Test of hypothesis based on a single sample • Inferences based on two samples • Goodness-of-Fit tests

D2L Website:

You will access this site by going to http://d2l.arizona.edu and logging in with your UA Net ID. If you need assistance with D2L you should contact D2L Help (http://help.d2l.arizona.edu); you may also try the 24/7 IT Support center on campus (http://the247.arizona.edu), which is available 24 hours a day, 7 days a week. When you log on to D2L, this course will be listed on the welcome page under "My Courses".

Announcements, class notes, PowerPoint files, spreadsheets used in class, homework assignments and solutions, and links to news items of interest will be posted to this website. You must be registered for the class to be permitted entry to the site.

Grading:

The final grades will be computed according to the table below. Grades are earned and they are not given. *Final grades are based on your performance throughout the semester and not on the generosity of the professor.* The beginning of the semester and throughout the semester is the time to be concerned about your grades, not after the final exam.

Homework assignments	10%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Field Trip Reports	10%
Course Project	15%
Final	20%
Total	**100%**

Homework Assignments

a. All assignments will be taken from the etext book, (Figure 1). This will be available on the D2L website described above. You have to purchase the license to use the text automatically as a part of the fees that you realize when you enroll in the class.

b. Reading assignments are listed in the lesson plan and should be completed prior to class.

c. Each student will be responsible for completing 10 homework assignments on-line through WebAssign. Due dates for assignments are as indicated on the schedule on page 7. If you need an extension on the homework, you must notify me ahead of time via email. No late homework will be accepted. If you have a valid reason for handing in late homework, you must let me know in advance. Emergencies will be considered on a case-by-case basis.

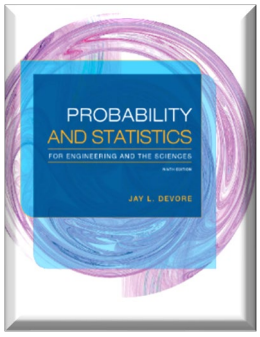

Figure 1: Devore, Jay L. *Introduction to Engineering Probability and Statistics*

d. Academic integrity: Students are expected to uphold the University of Arizona academic integrity policy.

e. Quality: Although the homework answers are submitted through WebAssign, it is a good practice to work through the homework in a spiral notebook. That way, you can review your work with the professor or a TA if you are having problems understanding the assignment. Always write legibly and write out each step of the process indicating your answers clearly at the end.

Exams

a. There will be three midterm exams during the semester and a final exam at the end of the semester. The final exam will be comprehensive.

b. Exams are closed book, but you may bring two sheets of paper with useful information **handwritten** on both sides and with your name printed on it for each midterm. You will be allowed the three note sheets on the final exam.

c. Calculators may not be programmed unfairly or connect wirelessly to internet or to each other.

d. All cellphones must be OFF and put away during exams. This applies to class time, too.

e. No one will be allowed to leave the room once the exam starts unless they have handed in their exam.

f. Anyone caught acting against UA Code of Academic Integrity, will receive a non-droppable grade of zero on an exam.

g. If you are stuck on a problem and write a verbal explanation of how you might approach it and what concepts apply, you will get partial credit. Partial credit is better than no credit!

h. Unless are registered for the online section of the course and have paid a fee, you must take the midterms and the final exam in person during the designated class period. *For online students only*, we will be using Honorlock to proctor the exams.

Field Trips and Reports:

There will be two "field trips" during the course. Participation in these is mandatory. You will develop a data set as a group and then complete a report individually. Online students will be provided the data set to do the lab report. It is important to note that the report will be done individually, not as a group. If you are part of the in-person, main campus course, you must be at the field trip event to collect the data. If you are not at the event without a Dean's Excuse, you

will not be able to complete the lab report and you will receive a zero for the assignment. If you have a special circumstance, you must coordinate prior to the event.

Course Project:

There will be a course project that will be conducted in small groups. This project will be a real-world application of the course material and is designed to bring the theory to life for the students. More specific information about the project will be shared later in the semester in a separate document.

Attendance policy:

Attendance for all exams is mandatory. To miss a scheduled exam, you must have a Deans Excuse and notify the instructor ahead of time. Class time is the best time to interact with the instructor and clarify information presented. It also helps make the class better when there are students there with whom to collaborate and learn. There will be material that is not in the text that will be presented in class. In class examples are performed, demonstrations will be done with the computer, and discussions will be conducted on the material. All material from the class is fair game on the exams. The webpage can be used as a backup for a missed class and for additional help, but it is not a substitute for class activities, discussions, demonstrations, and performed examples. Missed announcements that may pertain to exam schedules, modifications in syllabus, handouts, and homework assignments are your responsibility if you miss a class.

- All holidays of special events observed by organized religions will be honored for those students who have affiliation with that religion. Please work with the instructor to ensure awareness of the holiday. It is not the instructor's responsibility to track all the holidays.
- Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

Use of Generative AI - Red

In this course any and all uses of generative artificial intelligence (AI)/large language model tools such as ChatGPT, Dall-e, Google Bard, Microsoft Bing, etc. will be considered a violation of the Code of Academic Integrity, specifically the prohibition against submitting work that is not your own. This applies to all assessments in the course, including case studies, written assignments, discussions, quizzes, exams, and problem sets. The following actions are prohibited:

● entering all or any part of an assignment statement or test questions as part of a prompt to a large language model AI tool;

● incorporating any part of an AI-written response in an assignment;

● using AI to summarize or contextualize reading assignments or source materials; and

● submitting your own work for this class to a large language model AI tool for iteration or improvement.

Standard Policies for Students and Instructors:

All classroom policies and standard policies for courses at the University of Arizona are located at https://catalog.arizona.edu/syllabus-policies. Students are encouraged to review the policies located at this website.

Revisions:

Modifications may occur in this syllabus. The instructor will share any changes as soon as practical in class and through class announcements on D2L.

Student feedback:

Students may be asked to provide written feedback on the course and its contents. Students are encouraged to provide constructive and respectful feedback to the instructor throughout the course.

Monday	Wednesday	Friday
25 Aug – Lesson 1	**27 Aug – Lesson 2**	**29 Aug – Lesson 3**
Chapter 1		
Read 1.1 Populations, Samples and Processes	Read 1.2 Pictorial and Tabular Methods in Descriptive Statistics	Read 1.3 and 1.4 Measures of Location and Measures of Variability
1 Sep	**3 Sep – Lesson 4**	**5 Sep – Lesson 5**
Labor Day No Classes	**Chapter 2** Read 2.1 and 2.2 Sample Spaces, Events, and Properties of Probability **Homework 1 due**	**Field Trip 1: Probability in the Wild**
8 Sep – Lesson 6	**10 Sep – Lesson 7**	**12 Sep – Lesson 8**
Chapter 2		
Read 2.3 Counting Techniques	Read 2.4 and 2.5 Conditional Probability and Independence	Review Chapters 1-2 **Homework 2 due**
15 Sep – Lesson 9	**17 Sep – Lesson 10**	**19 Sep – Lesson 11**
	Chapter 3	
Exam 1	Read 3.1 and 3.2 Random Variables and Discrete Probability Distributions	Read 3.3 and 3.4 Expected Values and the Binomial Probability Distribution **Field Trip 1 Report due**
22 Sep – Lesson 12	**24 Sep – Lesson 13**	**26 Sep – Lesson 14**
Chapter 3	**Chapter 4**	
Read 3.5 and 3.6 Hypergeometric, Negative Binomial and Poisson Probability Distributions	Read 4.1 and 4.2 Probability Density and Cumulative Distribution Functions **Homework 3 due**	Read 4.3 and 4.4 The Normal Distribution and the Exponential and Gamma Distributions
29 Sep – Lesson 15	**1 Oct – Lesson 16**	**3 Oct – Lesson 17**
Chapter 4	**Chapter 5**	
Read 4.5 and 4.6 Other Continuous Distributions and Probability Plots	Read 5.1 Jointly Distributed Random Variables **Homework 4 due**	Read 5.2 Expected Values, Covariance, and Correlation
6 Oct – Lesson 18	**8 Oct – Lesson 19**	**10 Oct – Lesson 20**
Chapter 5		
Read 5.3-5.5 Sample Statistics and their Distributions and Linear Combinations	Review Chapters 3-5 **Homework 5 due**	**Exam 2**
13 Oct – Lesson 21	**15 Oct – Lesson 22**	**17 Oct – Lesson 23**
Chapter 6		
Read 6.1 Point Estimation Concepts	Read 6.2 Methods of Point Estimation	**Course Project Kickoff**

20 Oct – Lesson 24	22 Oct – Lesson 25	24 Oct – Lesson 26
Chapter 7		**Chapter 8**
Read 7.1 and 7.2 Confidence Intervals and Large-Sample Confidence Intervals for a Population Mean and Proportion **Homework 6 due**	Read 7.3 and 7.4 Intervals Based on a Normal Population Distribution and Variances	Read 8.1 Hypotheses and Test Procedures
27 Oct – Lesson 27	**29 Oct – Lesson 28**	**31 Oct – Lesson 29**
Chapter 8		**Field Trip 2: Statistics in the Wild**
Read 8.2 Tests About a Population Mean **Homework 7 due**	Read 8.3 Tests Concerning a Population Proportion	
3 Nov – Lesson 30	**5 Nov – Lesson 31**	**7 Nov – Lesson 32**
Chapter 8		
Read 8.4 P-Values **Homework 8 due**	**Review** **Field Trip 2 Report due**	**Exam 3**
10 Nov	**12 Nov – Lesson 33**	**14 Nov – Lesson 34**
	Chapter 9	
Project Proposal Due	Read 9.1 z Tests and Confidence Intervals for a Difference Between Two Population Means	Read 9.2 The Two-Sample t-Test and Confidence Interval
17 Nov – Lesson 35	**19 Nov – Lesson 36**	**21 Nov – Lesson 37**
Chapter 9		**Chapter 14**
Read 9.3 Analysis of Paired Data	Read 9.4 and 9.5 Inferences Concerning a Difference Between Population Proportions and Variances	Read 14.1 Goodness-of-Fit Tests When Category Probabilities are Completely Specified **Homework 9 due**
24 Nov – Lesson 38	**26 Nov – Lesson 39**	**28 Nov**
Course Project Workday **Homework 10 due**	Course Project Workday	**Thanksgiving Weekend No classes**
1 Dec – Lesson 40	**3 Dec – Lesson 41**	**5 Dec – Lesson 42**
Course Project Workday	Course Project Workday	Poster Session for Final Project
8 Dec – Lesson 43	**10 Dec – Lesson 44**	**12 Dec**
Review for Final	Review for Final	**Final Exam 1030-1230**