Probability and Statistics for Engineers and Scientists

MATH 3351.001 | FALL 2023

Instructor: Dr. Deborah Koslover

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Classroom: RBN 4025

Meeting Time: TTh 9:30 – 10:50 AM

**Office Hours**: MWF 10:40 – 11:40 AM or by appointment.

Course Description

We will study the fundamentals of probability and statistics with applications to engineering and the sciences. Some of the topics will be discrete and continuous random variables, statistical inference, parameter estimation, regression, experimental design and model verification.

The pre-requisite for this course is a grade of C or better in MATH 2414 – Calculus II. You may not receive credit for both MATH 3351 and MATH 4350.

Website

You will be using Canvas. Go to www.uttyler.edu/canvas to log into Canvas using your regular patriots account. If you have enrolled in the course, you will have access to the website.

You will find important documents, grades, lecture notes, and announcements on Canvas. In general, I will notify you by email and on Canvas if there are any disruptions or changes to our class.
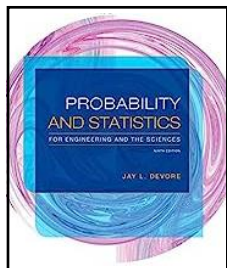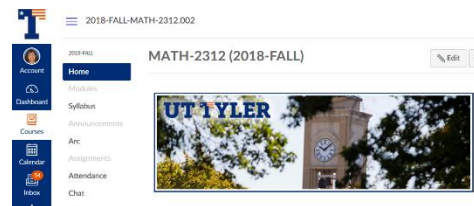
Textbook

Probability and Statistics for Engineering and the Sciences, 9th edition, by Jay L Devore, Cengage, 2016. ISBN-13: 978-1-305-25180-9, ISBN-10: 1-305-25180-6

Attendance is mandatory and records will be kept. Notify Dr. Koslover in advance if you must miss a class, be late or leave early. (University Policy: Class attendance is the responsibility of the student. When a student has a legitimate absence, the instructor may permit the student to complete missed assignments. In many cases class participation is a significant measure of performance, and non-attendance may adversely affect a student's grade. When a student's absences become excessive, the instructor may recommend that the student initiate a withdrawal.)

Learning Outcomes

At the conclusion of this course, you will be able to

1. Determine probabilities for discrete random variables from probability mass functions and for continuous random variables from probability density functions and use cumulative distributions functions in both cases;
2. Calculate means and variances for discrete and continuous random variables;
3. Select an appropriate probability distribution to calculate probabilities in specific applications;
4. Understand statistics and the central limit theorem;
5. Perform hypothesis tests and construct confidence intervals on the mean or variance of a normal distribution;
6. Explain and use the relationship between confidence intervals and hypothesis tests;
7. Perform hypothesis tests and construct confidence intervals involving two samples;
8. Understand how the analysis of variance can be used in an experiment to compare several means; and
9. Use simple linear or multiple linear regression for building empirical models for engineering and scientific data.
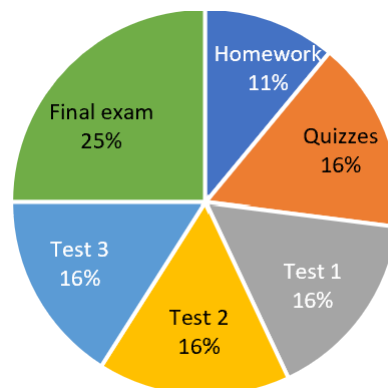
Course Evaluation

At the end of the semester, you will find your final grade on my.uttyler.edu. It will also be posted on Canvas.
A final course grade of
     90% is guaranteed to be at least an A
     80% is guaranteed to be at least a B
     70% is guaranteed to be at least a C
     60% is guaranteed to be at least a D.
All grades below 60% will be F.

The Plan

Homework **(11%)**: Homework will be assigned after each class period on Canvas. It will be due by 5:00 A.M. Thursday of the following week. Homework must be turned on Canvas. A link will be posted on Canvas for you to submit your assignments. You must scan your homework and submit it as a pdf file. Some free phone scanners are posted on Canvas. Photographs will not be accepted.

Each homework problem or if it is a long problem, each part of the problem will be worth up to 2 points.

2 pts – You seriously tried to do the problem and have shown a reasonable amount of effort and work. The answer does not need to be correct

1 pt – You put in some effort, but didn't really put your heart into it.

0 pt – You failed to do the problem, wrote nonsense trying to get points, or merely copied the statement of the problem, but no further work.

A wrong answer that showed effort is worth much more than a Chegg (or any other cheat site) answer. If any of your answers is copied from the internet and I find out, you will get a zero on the whole assignment, not just on the copied problem. Don't blindly copy from your friend's paper. If they copied their answer from the internet, then both of you will get a zero on the whole assignment.

Striving for success without hard work is like trying to harvest where you haven't planted. __David Bly

Quizzes **(16%)**: There will be four quizzes. Please see the calendar at the end of the syllabus for dates. The quizzes will be easier than the tests.

It's not that I'm so smart, it's just that I stay with problems longer. __Albert Einstein

TESTS (16% each) and FINAL EXAM (25%): There will be three tests and a final exam. These exams will test your knowledge of the material taught in the class and practiced on the homework. The final exam will be comprehensive, but will emphasize material in the final weeks of the course. No tests will be dropped. See Important Dates below for the schedule.

Success is dependent on effort. __Sophocles

- Test 1 – Thursday, September 7
- Test 2 – Thursday, October 5
- Test 3 – Thursday, November 2

Final Exam: (Tentative) Thursday, December 7, 9:30 – 11:30 AM

Please don't plan to start your holiday travel before the date the final exam is scheduled!

Make-ups

Make-ups for **documented** absences that are **required** as part of a UT Tyler obligation (e.g. athletes participating in an event, participating in a debate contest, etc.) or for religious observation will be granted. For all make-ups of this type, prior notification of at least one week and documentation are required. Other make-ups are granted only in extreme cases such as hospitalization and at the sole discretion of the instructor.

Make-ups will be allowed for the following excused absences.
1) Illnesses, with a doctor's note, no exceptions.
2) Your child's illness, with a doctor's note.
3) Court appearances, including citizenship court, with documentation
4) Weddings, funerals or military advancement with documentation **and** a photograph showing that you attended the event.

Other important information

Now is the time to think about what grade you "need" to make in this class. Three weeks before the end of the semester is too late to realize that you are not on the road to earning that grade. There will be no extra credit or special assignments for any reason. No quizzes or tests will be dropped. Take this class seriously. Attend every session and study. Make use of my office hours and the tutoring that is available to you.

Other Details

Calculator Policy: Non-graphing calculators will be needed in the course and will be allowed on tests. You may not use your phone. However, all work must be shown. Many different types of calculators, including many simple four function calculators with a square root key will be sufficient. I have some calculators to lend, but not enough for everyone.

Cell phones and other electronic devices: Please set your cell phones to silent mode. If you are expecting an emergency call, please notify the professor in advance, sit near the door, and answer the phone outside. You will not be allowed to wear electronic devices (except hearing aids) during an exam. During tests, cell phones must be turned off and placed in sight on your desk.

Calendar

AUGUST

MON	TUE	THUR
21	22	24
First Day		
28	29	31
		Quiz 1

September 4
Census Date

December 7
Final Exam
9:30 – 11:30 AM

SEPTEMBER

MON	TUE	THUR
4	5	7
Labor Day		Test 1
11	12	14
18	19	21
		Quiz 2
25	26	28

OCTOBER

MON	TUE	THUR
2	3	5
		Test 2
9	10	12
16	17	19
	Quiz 3	
23	24	26
30	31	
Drop Day		

NOVEMBER

MON	TUE	THUR
		2
		Test 3
6	7	9
13	14	16
		Quiz 4
20	21	23
Thanksgiving		
27	28	30