

MATH 23. 40Z  
Engineering Statistics. Spring 2024

**Online**  
**Tuesday and Thursday 6:30-8:45**

**Instructor:** Fatemeh Yarahmadi

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**Course Description**

This course provides a comprehensive introduction to probabilistic and statistical modeling for students in engineering, economics, finance and related disciplines in the mathematical sciences. It exposes students to a variety of applications requiring decision making in the face of uncertainty. Topics covered include the collection and analysis of information, making use of graphical and numerical techniques, discrete, continuous, cumulative, and joint probability distribution functions and use of statistical inference, experimental design, and equation fitting, when appropriate. Many of the applications require the use of technology (computers and graphic calculators). Computer simulations are used to illustrate difficult topics and provide visualization of advanced theoretical results (e.g. the Central Limit Theorem).

**Textbook & Required Materials:**

Devore, Jay. "Probability and Statistics for Engineering and the Sciences." 9th ed. Belmont, CA: Cengage, 2016.

**Software:** Python

**Computer/smartphone** to complete online homework assignments, submit activities on Canvas, and attend required live class meetings.

You should keep a **notebook** where you take notes and work the problems for reference.

**Prerequisite:**

Mathematics 1C (with a grade of C or better) or equivalent. Advisory: English Writing 211 and Reading 211 (or Language Arts 211), or English as Second Language 272 and 273

**Notebook**

I recommend that you work out each homework problem on paper in a notebook. Even though you won't be handing in problems (unless announced), I expect that you write out the solution to each problem in your notebook. I believe the best way to prepare for a test is to practice the skills that you will demonstrate during the test. Practice solving each problem in a clear, logical, and methodical way and you will earn more points on your test. This will also help me whenever you come to me with questions, because it allows me to see your work and offer helpful suggestions suited to your questions.

**Homework:**

Written sets for submission: During the term, I will send out homework and group activities sets to be discussed, written up, and submitted on Canvas. Homework and group activities is essential in any math class. You cannot expect to pass the class without putting consistent effort into homework and group activities. Show all work and explain any reasoning. Homework and group activities  
Guidelines:

**Group Quizzes:** There are group quizzes in our class. Quizzes will focus on the material covered during that week.

**Discussions:** There will be discussion topics posted throughout the term. The deadline for responding to the topic will be indicated when the assignment is posted. You may not respond to the discussion once the deadline has passed.

**Projects:** Projects will be assigned throughout the term. Project due dates are indicated on Canvas.

**Exam Reviews:** There will be an exam review assigned before each exam. The purpose of the review is to aid the student in studying for the exams.

**Midterm Exams:** There will be three midterm exams. Each exam includes handwritten portion which you will upload to Canvas. Each midterm exam will focus the material covered since the previous exam. More details on exam dates and procedures can be found in Canvas.

**Final Exam:** The final exam will cover all material from throughout the term. More details on the final exam will be available on Canvas.

**Grading Policy:**

Homework	100 pts (12.5%)
Discussion	100 pts (12.5%)
Projects	100 pts (12.5%)
Midterm Reviews/ Midterms	300 pts (37.5%)
Final	200 pts (25%)
Total	800 pts

A	100%	to 94.5%
A-	< 94.5%	to 89.5%
B+	< 89.5%	to 86.5%
B	< 86.5%	to 83.5%
B-	< 83.5%	to 79.5%
C+	< 79.5%	to 74.5%
C	< 74.5%	to 69.5%
D+	< 69.5%	to 66.5%
D	< 66.5%	to 63.5%
D-	< 63.5%	to 59.5%
F	< 59.5%	to 0%

For detailed information on Homework, Quizzes, Projects, Discussion please log into your Canvas course page.

**Important Dates and Deadlines:** <http://www.deanza.edu/calendar/dates-and-deadlines.html>

De Anza Final exams schedule: <https://www.deanza.edu/calendar/final-exams.html>

For detailed information on Homework, Quizzes, Projects, Discussion please log into your Canvas course page.

**Academic Integrity:**

All students are expected to exercise high levels of academic integrity throughout the quarter. You are encouraged to work together but you are expected to write up your answers independently. Any instances of cheating or plagiarism will result in disciplinary action, including getting a '0' on the assignment and report to the PSME dean, which may lead to dismissal from the class or the college

**Student Honesty Policy:**

“Students are expected to exercise academic honesty and integrity. Violations such as cheating and plagiarism will result in disciplinary action which may include recommendation for dismissal.”

**Disabled Services:**

Students who have been found to be eligible for accommodations by Disability Support Services (DSS), please follow up to ensure that your accommodations have been authorized for the current quarter. If you are not registered with DSS and need accommodations, please go to <http://www.deanza.edu/dss>.

This syllabus is subject to change at the instructor's discretion. Changes will be announced in class and on Canvas.

**Recipe for Success:**

- If you ever have any questions, Email me! You are welcome to send email to me whenever you need help!
- Visit the Online Tutoring Center.
- Form an online study group.
- Watch all lectures, participate in every discussion, and complete every homework assignment.
- Read the sections to be discussed in class prior to the lecture

## Tentative Schedule

WEEK	Description
1	Introduction; data and presentations; descriptive statistics
2	Sample spaces, set operations, axioms probability; conditional probability
3	Random variables (rv), pmfs/pdfs/cdfs; independence, expected value, joint rvs Exam 1 Due
4	Conditional rvs, variance/covariance/correlations; inequalities, weak law of large numbers (LLN) Discrete named distributions (Bernoulli, binomial, hypergeometric, Poisson, etc)
5	Continuous named distributions (normal, exponential, uniform, Chi-square); Poisson process
6	Parameters, likelihood, maximum likelihood estimation (MLE), central limit theorem (CLT) continuity corrections, general confidence intervals Exam 2 Due
7	z-scores, z-intervals, prediction intervals, sampling distribution of the mean estimator; t-intervals, binomial intervals
8	Hypothesis testing, z-tests under different situations
9	One sample t-tests, two samples, paired, binomial tests
10	Simple regression overview, MLE estimates and their distributions; multiple regression optimization Exam 3 Due
11	weighted least squares, multiple linear regression, one way/two way analysis of variance (ANOVA). Chi-square goodness of fit

April 8 Spring classes begin

April 19 Last day to add 12-week classes

April 20 Last day to drop classes

May 25-27 Memorial Day Weekend - no classes, offices closed

May 31 Last day to drop classes

June 19 Juneteenth Holiday - no classes, offices closed

June 24-28 Final exams Final Due June 28th

**Student Learning Outcome(s):**

- Organize, analyze, and utilize appropriate methods to draw conclusions based on sample data by constructing and/or evaluating tables, graphs, and numerical measures of characteristics of data.
- Use calculus based mathematics to construct, analyze, apply, and simulate probability and sampling distributions in theory and applications, and to justify appropriate statistical analyses and inferential methods.
- Collect data, interpret, compose and defend conjectures, and communicate the results of random data using statistical analyses such as interval and point estimates, hypothesis tests, and regression analysis.

**Office Hours:**

M,W 12:00 PM 12:00 PM Zoom,Canvas,Email,In-Person,By Appointment  
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