



Statistical Methods for Product and Process Development (ENME392)

Zoom:<https://umd.zoom.us/j/94010991712>

Instructional Staff

Dr. Michel Cukier (0101 and Frostburg)
Pronouns: he/him/his
Email: mcukier@umd.edu
Office Hours: Wednesday 4:00 - 5:00pm

Teaching Assistants

Kimia Forghani
Pronouns: she/her/hers
Email: kimiaf@umd.edu
Office Hours: Thursday 2:00 - 3:00 PM
in: 2103b Glenn L. Martin Hall

Mimi Quinn
Pronouns: she/her/hers
Email: mquinn14@terpmail.umd.edu
Office Hours: Sunday 4:00 - 5:00pm
Zoom:<https://umd.zoom.us/j/93062406755>

Connor Chang
Pronouns: he/him/his
Email: cchang04@umd.edu
Office Hours: Friday 12:00 - 1:00pm
in: 3109 Glenn L. Martin Hall

Credits: 3

Term: *Spring/2026*

Course Dates: From January 26, 2026 - May 8, 2026

Course Times: Tuesday and Thursday from 11:00-12:15 (Section 0101)

Classroom: JMP 3201

Course Description

This course covers the fundamental aspects of probability and statistics. The overall objective is for students to gain an appreciation of the inherent uncertainty and errors in all engineering and scientific data, and to provide the basic tools from probability and statistics to quantify these uncertainties.

Learning Outcomes

After successfully completing this course you will be able to:

- apply probability theory fundamentals;
- master discrete and continuous probability distributions;

- apply principles of estimation, construct confidence intervals, perform hypothesis testing, conduct analysis of variance, regression analysis and design of experiments;
- develop skills in summarizing and visualizing data, performing statistical inference, and interpreting the implications of data analysis in engineering.

Required Resources

- Course Website: elms.umd.edu
- Book: “Statistics for Engineers and Scientists” by Navidi, McGraw-Hill, 6th edition
- UMD Piazza: https://umd.instructure.com/courses/1399642/external_tools/90732
- Virtual Study Agent: You will note the link to the Virtual Study Agent on the ELMS home page. This is an excellent resource to answer questions that you may have about course logistics and content, provide guidance on homework problems, generate additional practice problems and solutions, and even write computer code! Become familiar with and utilize this resource often.

Course Structure

The class will meet twice a week on Tuesday and Thursday from 11:00-12:15 (Section 0101). The class meetings will be held in JMP 3201.

We will offer office hours, outside of class, for additional feedback and assistance as you work on homework assignments and prepare for exams. However, if you are ill, please do not attend in-person office hours. Contact us and we can set up remote office hours instead.

For Questions and Answers during the course, we will use Piazza (which is also linked to/embedded in ELMS). This is the best way to contact the instructors or TAs when you have questions (other than through attending office hours).

Posting questions/answers on Piazza has many benefits over sending email to the instructors.

If you email us and we email you back asking for you to post your question to Piazza, please remember that we are only trying to make sure we keep your questions organized and respond to them in a timely manner.

Note that if you have any questions directly relevant to an assessment, like a homework assignment or an exam, you need to submit them to Piazza at least 24 hours in advance of the due date. That is, you cannot expect the teaching staff to respond to homework or exam related questions within 24 hours of the due date. We encourage you to work on the homework assignment throughout the week prior to the deadline and to seek help in office hours during the week.

Tips for Success in this Course

1. **Participate.** We invite you to engage deeply, ask questions, and talk about the course content with your classmates. You can learn a great deal from discussing ideas and perspectives with your peers and professor. Participation can also help you articulate your thoughts and develop critical thinking skills.
2. **Manage your time.** Students are often very busy, and we understand that you have obligations outside of this class. However, students do best when they plan adequate time that is devoted to course work. Block your schedule and set aside plenty of time to complete assignments including extra time to handle any technology related problems.

3. **Login regularly.** We recommend that you log in to ELMS-Canvas several times a week to view announcements, discussion posts and replies to your posts. You may need to log in multiple times a day when group submissions are due.
4. **Do not fall behind.** This class moves at a quick pace and each week builds on the previous content. If you feel you are starting to fall behind, check in with the teaching staff as soon as possible so we can troubleshoot together. It will be hard to keep up with the course content if you fall behind in the pre-work or post-work.
5. **Use ELMS-Canvas notification settings.** Pro tip! Canvas ELMS-Canvas can ensure you receive timely notifications in your email or via text. Be sure to enable announcements to be sent instantly or daily.
6. **Ask for help if needed.** If you need help with ELMS-Canvas or other technology, IT Support. If you are struggling with a course concept, reach out to the teaching staff and your classmates for support.

Policies and Resources for Undergraduate Courses

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Course Guidelines

Names/Pronouns and Self-Identifications:

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. We invite you, if you wish, to tell us how you want to be referred to in this class, both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). Keep in mind that the pronouns someone uses are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, it is your choice whether to disclose how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. We will do my best to address and refer to all students accordingly, and we ask you to do the same for all of your fellow Terps.

Communication with the Teaching Staff:

If you need to reach out and communicate with the teaching staff, please email the teaching staff. Please DO NOT email the teaching staff with questions that are easily found in the syllabus or on ELMS (i.e. When is this assignment due? How much is it worth? etc.) but please DO reach out about personal, academic, and intellectual concerns/questions.

We will do our best to respond to messages within 24-48 hours during the week (Monday-Friday), but expect longer response times over the weekend. If you have an in-depth question, please consider visiting a TA or course instructor during office hours to discuss your question.

Communication with Peers:

With a diversity of perspectives and experience, we may find ourselves in disagreement and/or debate with one another. As such, it is important that we agree to conduct ourselves in a professional manner and that we work together to foster and preserve a virtual classroom environment in which we can respectfully discuss and deliberate controversial questions. We encourage you to confidently exercise your right to free speech—bearing in mind, of course, that you will be expected to craft and defend arguments that support your position. Keep in mind, that free speech has its limit and this course is NOT the space for hate speech, harassment, and derogatory language. We will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued.

Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please alert us immediately if you feel threatened, dismissed, or silenced at any point during our semester together and/or if your engagement in discussion has been in some way hindered by the learning environment.

Major Assignments

Homework Assignments

Homework assignments focus on helping you develop mastery of the course material, using an approach called Mastery Learning. We do this by leveraging the PrairieLearn system (referred to as "PL" throughout the course) located at: <https://prairielearn.umd.edu/>.

PL is an online problem solving system that allows you to get immediate feedback on your homework submissions. That is, you can submit answers to your homework and immediately get a response as to whether or not it is correct. If you get the problem correct, congratulations! If you get the question wrong, review your approach, see where you were wrong (or come to class or office hours to discuss), and then you can re-attempt the question multiple times until you are able to master the material. Note also that, while you can repeat the question again with no loss in points, you can only gain points up until the submission deadline (Sundays at 11:59pm). Weekly PL homework assignments are linked in ELMS.

Most weeks, the homework assignment will also include at least one old exam problem that will need to be solved on paper and uploaded on Gradescope. These questions will help students become familiar with the content and format of the midterms and final exam.

Because homework solutions will be distributed after the due date, homework assignments cannot be accepted late. Homework assignments are posted to ELMS several weeks in advance of their due date and you are welcome to begin working on the assignments as soon as they are made available.

Exams

The exams will be given in person in the classroom and/or alternate room. If you are unable to attend an exam, you must notify the instructor prior to the start time of the exam and subsequently provide appropriate documentation, e.g., a physician's note, describing the reason for your absence. You will be expected to complete the makeup exam within ONE business day of being cleared, e.g., by a physician, to return to the classroom.

For students with ADS accommodations, please ensure that you properly schedule your exams with the ADS office as no accommodations will be able to be offered in the classroom due to scheduling constraints.

Grading Structure

Assignment	Percentage %
Homework Assignments	10%
Exam 1	27.5%
Exam 2	27.5%
Final Exam	35%
Total	100%

Academic Integrity

The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, the University of Maryland does not tolerate academic dishonesty. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path. **As future professionals, your commitment to high ethical standards and honesty begins with your time at the University of Maryland.**

It is important to note that course assistance websites, such as CourseHero, or AI-generated content are not permitted sources unless the instructor explicitly gives permission. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might be inaccurate or biased and most importantly, relying on restricted sources will hamper your learning process, particularly the critical thinking steps necessary for college-level assignments.

Additionally, students may naturally choose to use online forums for course-wide discussions (e.g., Group lists or chats) to discuss concepts in the course. However, collaboration on graded assignments is strictly prohibited unless otherwise stated. Examples of prohibited collaboration include: asking classmates for answers on quizzes or exams, asking for access codes to clicker polls, etc. Please visit the [Office of Undergraduate Studies' full list of campus-wide policies](#) and reach out if you have questions.

Finally, on each exam or assignment you must write out and sign the following pledge: ***"I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment."*** If you ever feel pressured to comply with someone else's academic integrity violation, please reach out to me straight away. Also, ***if you are ever unclear*** about acceptable levels of collaboration, ***please ask!***

Grades

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email the teaching staff to schedule a time for us to meet and discuss.

Late work will not be accepted for course credit so please plan to have it submitted well before the scheduled deadline. We are happy to discuss any of your grades with you, and if we have made a mistake we will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade. Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone we have to establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same as making the cut ($89.99 \neq 90.00$). It would be unethical to make exceptions for some and not others.

Final Grade Cutoffs									
+	97.00%	+	87.00%	+	77.00%	+	67.00%	+	
A	94.00%	B	84.00%	C	74.00%	D	64.00%	F	<60.0%
-	90.00%	-	80.00%	-	70.00%	-	60.00%	-	

Course Outline

Week #	Topic	Deliverable
1	Course info; use of statistics in engineering; sample mean and variance. Event, sample space, probability, trees; counting rules, permutations, combinations.	Homework 1
2	Venn diagrams; addition and multiplication rules; conditional probability. Random variables, distributions, expected value and variance.	Homework 2
3	Functions of random variables; error-propagation. Bernoulli distribution; binomial distribution; hypergeometric distribution; poisson distributions.	Homework 3
4	Normal distributions. Exponential distributions.	Homework 4
5	Review and problem solving. Exam 1.	Exam 1
6	Sampling, estimators, Central Limit Theorem. Confidence intervals (concept, prediction interval, mean, proportion).	Homework 5
7	Confidence intervals (variance, two means).	Homework 6

	Confidence intervals (paired observations, two proportions, two variances).	
8	Spring Break.	None
9	Hypothesis testing (concept, P-value, type I and II errors, mean). Hypothesis testing (proportion, variance, two means).	Homework 7
10	Hypothesis testing (paired observations, two proportions, two variances). Hypothesis testing (goodness-of-fit, independence). Hypothesis testing (sign).	Homework 8
11	Review and problem solving. Exam 2.	Exam 2
12	Linear regression. Multiple regression. Analysis-of-variance (ANOVA).	Homework 9
13	Analysis-of-variance (ANOVA).	Homework 10
14	Statistical Process Control (SPC). Design-of-experiments (DOE).	Homework 11
15	Design-of-experiments (DOE). Review and problem solving.	Homework 12
16		Final Exam

Note: This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

Resources & Accommodations

Accessibility and Disability Services

The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The [Accessibility & Disability Service \(ADS\)](#) provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at adsfrontdesk@umd.edu.

Emergency Preparedness

Emergencies on campus can happen at any time. To prepare, visit prepare.umd.edu or use the emergency symbol in the UMD App to review information. Resources for persons with disabilities are available on the [emergency preparedness page of the ADA Coordinator's website](#).

Student Resources and Services

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit [UMD's Student Academic Support Services website](#) to learn more about the wide range of campus resources available to you.

In particular, everyone can use some help sharpening their communication skills (and improving their grade) by visiting [UMD's Writing Center](#) and schedule an appointment with the campus Writing Center.

You should also know there are a wide range of resources to support you with whatever you might need ([UMD's Student Resources and Services website](#) may help). If you feel it would be helpful to have someone to talk to, visit [UMD's Counseling Center](#) or [one of the many other mental health resources on campus](#).

Notice of Mandatory Reporting

Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible University Employee," and I must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD's Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct.

If you wish to speak with someone confidentially, please contact one of UMD's confidential resources, such as [CARE to Stop Violence](#) (located on the Ground Floor of the Health Center) at 301-741-3442 or the [Counseling Center](#) (located at the Shoemaker Building) at 301-314-7651.

You may also seek assistance or supportive measures from UMD's Title IX Coordinator, Angela Nastase, by calling 301-405-1142, or emailing titleIXcoordinator@umd.edu.

To view further information on the above, please visit the [Office of Civil Rights and Sexual Misconduct's](#) website at ocrsm.umd.edu.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit [UMD's Division of Student Affairs website](#) for information about resources the campus offers you and let me know if I can help in any way.

Veteran Resources

UMD provides some additional supports to our student veterans. You can access those resources at the office of [Veteran Student life](#) and the [Counseling Center](#). Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to the instructor.

Netiquette Policy [Optional]

Netiquette is the social code of online classes. Students share a responsibility for the course's learning environment. Creating a cohesive online learning community requires learners to support and assist each other. To

craft an open and interactive online learning environment, communication has to be conducted in a professional and courteous manner at all times, guided by common sense, collegiality and basic rules of etiquette.

Participation

- Given the interactive style of this class, attendance will be crucial to note-taking and thus your performance in this class. Attendance is particularly important also because class discussion will be a critical component for your learning.
- Each student is expected to make substantive contributions to the learning experience, and attendance is expected for every session.
- Students with a legitimate reason to miss a live session should communicate in advance with the instructor, except in the case of an emergency.
- Students who miss a live session are responsible for learning what they miss from that session.
- Additionally, students must complete all readings and assignments in a timely manner in order to fully participate in class.

Course Evaluation

Please submit a course evaluation through Student Feedback on Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to Course Experiences is confidential. Campus will notify you when Student Feedback on Course Experiences is open for you to complete your evaluations at the end of the semester. Please go directly to the [Student Feedback on Course Experiences](#) to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through Testudo the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

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