MA 222 – Probability and Statistics

School of Engineering and Sciences

Fall 2024

Instructor: Dr. Hong Do
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Office: North Building 320

Course Schedule (Section C): MWF 2:00-2:50 pm
Place: McLean 104

Office Hours: Mondays 3:00-4:00 pm
Wednesdays 11:00am-12:00pm
(If these hours do not work for you, please email me to make an appointment.)

Prerequisite: MA 124 or MA 126

COURSE MATERIALS

Required Textbook: Jay L. Devore, *Probability and Statistics for Engineering and the Sciences*, 9th Edition.
Other Readings: Supplementary reading materials will be provided in due course.

COURSE DESCRIPTION

This course introduces the essentials of probability theory and elementary statistics with applications. Contents include: descriptive statistics, pictorial and tabular methods, and measures of location and of variability; sample space and events, probability axioms, and counting techniques; conditional probability and independence, and Bayes' formula; discrete random variables, distribution functions and moments, and binomial and Poisson distributions; continuous random variables, densities and moments, normal, gamma, and exponential and Weibull distributions unions; distribution of the sum and average of random samples; the Central Limit Theorem; confidence intervals for the mean and the variance; hypothesis testing and p-

values, and applications for the mean; simple linear regression, and estimation of and inference about the parameters; and correlation and prediction in a regression model.

STUDENT LEARNING OUTCOMES

After successful completion of this course, students will

- Understand the basic principles of probability including the laws for unions, intersections, and complementation, bayes theorem and use these principles in problem solving situations.
- Understand the definitions of discrete, continuous, and joint random variables, compute the mean, variance and covariance of random variables, know the definition of density and distribution function of a random variable and be able to find one from the other, and be able to find the marginal density and distribution functions from the joint density function.
- Define the binomial, uniform, Poisson, negative binomial, hypergeometric, exponential, Gamma, Beta and normal random variables, know their probability density and distribution functions, compute the mean and variance of these random variables, and use the normal and Poisson distributions to approximate binomial probabilities.
- Estimate population parameters from data sets and use the sampling distributions to compute confidence intervals for these population parameters.
- Learn the basic components of hypothesis testing and perform hypothesis tests ton population means, variances and proportions.

COURSE FORMAT AND STRUCTURE

This course is on-campus. To access the course, please visit stevens.edu/canvas. For more information about course access or support, contact the Technology Resource and Assistance Center (TRAC) by calling 201-216-5500.

Course Logistics

PLEASE NOTE: The Registrar has us scheduled for Lectures on Monday and Wednesday and Recitations on Friday...THIS IS NOT CORRECT! The course is, and always has been, taught with 3 lectures each week, on Monday, Wednesday and Friday. **NO RECITATION**.

- Our weeks will run from Monday to Sunday. When assignments are due, they are due by 11:59 pm ET.
- Deadlines are an unavoidable part of being a professional, and this course is no exception. Course requirements must be completed and posted or submitted on or before

the specified due date and delivery time deadline. No late submissions will be accepted. Due dates and delivery time deadlines are in Eastern Time (as used in Hoboken, NJ). Avoid any inclination to procrastinate. Due dates have been established for each assignment to encourage you to stay on schedule, you can find them in the course calendar.

- An assignment file should be appended by your first name and last name as they appear in Canvas, such as "**HW 1_Hong Do.pdf**". All files must be in pdf format. This makes it easier for me to manage assignment files you download to my computer.
- A course calendar is provided ***at the end of this syllabus*** to help you keep track of the topics covered and assignments assigned each week. Please note that changes may need to be made, in which case they will be communicated in class and through Canvas announcements.
- Please make sure you check your course Canvas site for any announcements, assigned work and updates ***at least once a day*** to avoid any unexpected situation or issues.

Instructor's Online Hours

I will be available via email and respond as soon as I am available (generally within 24-48 hours). When emailing me, please place in the subject line the course number/section and the topic of the email (i.e., MA 222-C – HW 2 Question, MA 222-C – Hypothesis Testing Question). This will help me tremendously in locating your emails quicker when I scan the hundreds of emails that seem to make it into my box each day. If you feel you are being neglected in any way, please contact me again via email or talk to me after class.

COURSE REQUIREMENTS

Attendance/Class Participation: You are strongly encouraged to attend each class session and to participate in class activities. Class participation will be graded through these activities.

Homework: A homework assignment is assigned each week and is due the following Sunday at 11:59 pm. **No late homework will be accepted for any reason**. All homework assignments will be posted on Canvas and must be submitted to Canvas by uploading a pdf file. *Two lowest homework assignment grades will be dropped at the end of the semester.*

Group Projects: Two projects will be assigned in this course. These are group work. You will work in groups of three (or four) members. Group projects are assigned to help you have a bigger picture of how statistics is applied in real-life applications.

Midterm Exams: Two written in-class midterm exams will be given throughout the semester. Midterm exams are non-cumulative. The tentative dates can be found in the course calendar and more details will be discussed one week before the exams. You are required to be present

in class to take the midterms. No make-up midterm exams will be allowed unless you have strong documentation (e.g., from health provider/hospital) that shows you are not able to attend the exam (e.g., due to health problem).

Final Exam: A written on-campus final exam will be given at the end of the semester. The date and the place for the final exam will be announced later. You are required to be present on-campus to take the final exam. Make-up exams are only allowed in the case you provide official documentation that shows you are not able to attend the exam. If you have an exam conflict, please let me know at least one week before the date of the final. The final exam is cumulative.

Note: Please find in the table below the materials you are allowed to use for your assignments and during the exams. ✓ means ALLOWED and ✗ means NOT ALLOWED. For the final exam, a formula sheet will be provided to you.

Assignment	Textbook/Other books	Lecture Slides	Notes	Calculator	Electronic Device (Phone, Tablet, Computer, etc)	Cheat Sheet (One handwritten two-sided page only)	Other Materials
Class Activities	✓	✓	✓	✓	✗	✓	✗
Homework	✓	✓	✓	✓	✓	✓	✓
Midterm Exams	✗	✗	✗	✓	✗	✓	✗
Final Exam	✗	✗	✗	✓	✗	✗	✗

TECHNOLOGY REQUIREMENTS

Baseline technical skills necessary for this course:

- Basic computer and web-browsing skills
- Navigating Canvas
- Convert handwritten work to pdf
- You can use a calculator of your choice for your study and all exams, but no calculator app(s) on phone/tablet/computer are allowed during the (midterm and final) exams.

GRADING PROCEDURES

Grades will be based on:

Class Participation	10%
Homework	25%
Group Projects	5%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	20%

Grade scale:

A 90%-100%	A- 87%-89%	
B+ 84%-86%	B 80%-83%	B- 77%-79%
C+ 74%-76%	C 70%-73%	C- 67%-69%
D+ 64%-66%	D 60%-63%	F 0%-59%

Late Policy

You are encouraged to use the course calendar and check your course Canvas site regularly to keep track of all assignments and their due dates. No late submissions will be accepted.

ACADEMIC INTEGRITY

Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at https://stevens.smartcatalogiq.com/en/2021-2022/academic-catalog/academic-integrity/

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"I pledge my honor that I have abided by the Stevens Honor System."

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at https://stevens.smartcatalogiq.com/en/2021-2022/academic-catalog/academic-integrity/

LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/student-diversity-and-inclusion/disability-services. If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone: 201.216.3748.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression). Appointments are can be made by phone (201-216-5177).

EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text “Home” to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at care@stevens.edu. A member of the CARE Team will respond to your concern as soon as possible.