MATH 1780 (Fall 2025): Probability Models Face-to-Face Syllabus

Instructor Information

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If you would like to schedule a Zoom appointment, please submit your request at least 24 hours in advance by E-mail.

How to Communicate with Your Instructor

1. If you have a question about a **specific WebAssign homework problem**, click "**Ask Your Teacher**" near the top of the page and follow the prompts. This will allow me to see both your message and your previous attempts to solve the problem.
2. If you have a general question about the course material, please reach me through canvas. *To protect your privacy, I will only reply to emails sent from your UNT account.*
3. If you would like to schedule a Zoom appointment, please submit your request at least 24 hours in advance by E-mail.

I will check my messages every day (**except weekends and holidays**) and will make every effort to respond within 24 hours.

Course Description

3 hours, Probability rules, counting methods, discrete and continuous random variables, Markov chains, Central limit theorems, and applications in the sciences and engineering.

Course Structure

This is a 15-week, face-to-face course designed for STEM majors and serves as a foundational, calculus-based probability class. Students are expected to attend all lectures, take quizzes in class, read assigned sections from the eBook (available through WebAssign), and complete corresponding homework assignments in WebAssign. The course includes three midterm exams and a comprehensive final exam.

Course Prerequisites

MATH 1710. Students should have mastered differential and integral calculus of a single variable.

Course Objectives

By the end of this course, students will be able to:

- Examine how to make intelligent judgments and informed decisions in the presence of uncertainty and variation. (CO-1)

- Investigate randomness and uncertainty. (CO-2)
- Develop probability models for a single discrete/continuous random variable. (CO-3)

How to Succeed in this Face-to-Face Course

The best way to ensure you pass this course is to work consistently throughout the semester. In mathematics courses topics always build one upon the other making it very difficult to catch up later if you fall behind. To master the course material, you must exert consistent effort throughout the semester:

- **Read the relevant textbook section before each lecture.** This will help you identify what topics you need to focus on and what questions to ask during class.
- **Begin each homework assignment as soon as possible after the corresponding lecture.** Starting early reinforces your understanding while the material is still fresh.
- **When preparing for exams, make a genuine effort to solve all review problems on your own before watching the video solutions.** This strengthens your problem.

UNT strives to offer you a high-quality education and a supportive environment, so you learn and grow. As a faculty member, I am committed to helping you be successful as a student. To learn more about campus resources and information on how you can be successful at UNT, go to unt.edu/success and explore unt.edu/wellness. To get all your enrollment and student financial-related questions answered, go to scrappysays.unt.edu.

There are many academic resources available to help you succeed in this course:

- Navigate's Study Buddy (https://navigate.unt.edu)
- Math Lab (https://math.unt.edu/mathlab)
- UNT Learning Center (https://learningcenter.unt.edu/)
    - Tutoring (https://learningcenter.unt.edu/tutoring)

ADA Accommodation Statement

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodation at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (https://studentaffairs.unt.edu/office-disability-access). You may also contact ODA by phone at (940) 565-4323.

Creating an Inclusive Learning Environment

Every student in this class should have the right to learn and engage within an environment of respect and courtesy from others. We will discuss our classroom's habits of engagement and I also encourage

you to review UNT's student code of conduct so that we can all start with the same baseline civility understanding (Code of Student Conduct) (https://policy.unt.edu/policy/07-012).

Required Course Materials

This course has digital components. To fully participate in this class, students will need internet access to reference content on the Canvas Learning Management System (https://clear.unt.edu/supported-technologies/canvas/requirements).

Students will be expected to bring to class (including exams) a graphing calculator with statistical functions. I will demonstrate how to perform various statistical functions using a TI-83/84 Plus or Microsoft Excel (https://aits.unt.edu/support/office365apps).

Textbook (Required): Devore, Jay L. *Probability and Statistics for Engineering and the Sciences*, 9th edition. Cengage, 2016. **It is available online through WebAssign platform.**

- WebAssign (6 months = $128.75)
- Cengage Unlimited (4 months = $139.99, 1 year = $214.99)

Cengage WebAssign Required: WebAssign is an online delivery platform accessed directly through Canvas. WebAssign access includes all online homework assignments, the e-textbook and additional learning resources. **Use the link in Canvas to register immediately.** You must register in WebAssign by the 2nd class day of the semester.

What You Should Do Immediately

Log in to Canvas and click the WebAssign link at the top of the module page. Please use **your UNT E-mail address** to register for this course. See Video Tutorial: Access WebAssign from Canvas for more information. WebAssign grants **no-cost temporary 14-day access**. You must purchase your access before the temporary access expires. Students who do not purchase WebAssign by the end of the temporary access period may lose credit for all work previously completed with the possibility of no refund.

I strongly encourage you to get started with Enhanced WebAssign as soon as possible. If you delay, you run the risk of unforeseen technical problems that could prevent you from completing the first assignment.

Course Topics

The following chapters and sections of the textbook will be covered according to the projected schedule below. Dates may change as events warrant.

Chapter 1: Overview and Description Statistics
- 1.3 Measures of Location
- 1.4 Measures of Variability

Chapter 2: Probability
- 2.1 Sample Spaces, Events and set notations
- 2.2 Axioms, Interpretations, and Properties of Probability
- 2.3 Counting Techniques: Permutations and Combinations
- 2.4 Conditional Probability, Laws of Total Probability and Baye's theorem

2.5 Independence and Mutually Exclusive

Chapter 3: Discrete Random Variables and Probability Distributions
- 3.1 Random Variables
- 3.2 Probability Distributions for Random Variables
- 3.3 Expected Values
- 3.4 The Binomial Probability Distribution
- 3.5 Hypergeometric and Negative Binomial Distributions
- 3.6: The Poisson Probability Distributions

Chapter 4: Continuous Random Variables of Probability Distributions
- 4.1 Probability Density Functions
- 4.2 Cumulative Distribution Functions and Expected Values
- 4.3 The Normal Distribution
- 4.4 The Exponential and Gamma Distributions
- 4.5 The Weibull Distribution and The Lognormal Distribution
- 4.6 Probability Plots

Chapter 5: Joint Probability Distributions and Random Samples
- 5.4 The Distribution of the Sample Mean
- 5.5 The Distribution of a Linear Combination
- Approximations to Probability Distributions: The Central Limit Theorems
- Applications of the Central Limit Theorems

Additional advanced topics
- Introduction to Markov Chains
- Introduction to Law of Large Numbers

Tentative Face-to-Face Course Schedule

Date	Lecture/Assignment	Sections	Topic
Week 1			
		1.3, 1.4, 2.1	• Sample Spaces, Events and Set Notations • Mean and Standard Deviation
	Homework 0, 1	1.3, 1.4, 2.1	
Week 2			
		2.2, 2.4	• Probability: Axioms and Multiplication Rule • Probability: Addition Rule
	Homework 2	2.2	
Week 3			
9/1/2025	**Labors Day (No class)**		
		2.4, 2.5	• Independence and Mutually Exclusive • Law of Total Probability and Bayes' Theorem
	Homework 3, 4	2.4, 2.5	
Week 4			
		2.3	• Permutations and Combinations
	Homework 5	2.3	
Week 5			

	Review for Exam 1	Chapter 1 -2	• Review sheet for exam 1, • Practice Exam 1
9/23/2025	**Exam 1**		
Week 6			
		3.1, 3.2, 3.3	• Discrete Random Variables and Probability Distributions • Expected Value, Variance and Standard Deviation
	Homework 6, 7	3.1, 3.2, 3.3	
Week 7			
		3.4, 3.5, 3.6	• Binomial and Hypergeometric Distributions • Negative binomial Distribution • Poison Distribution
	Homework 8, 9	3.4, 3.5, 3.6	
Week 8			
	Review for Exam 2	Chapter 3	• Review sheet for exam 2, • Practice Exam 2
10/14/2025	**Exam 2**	7.1, 7.2	
Week 9			
		4.1, 4.2	• Continuous Random Variables
	Homework 10, 11	Review for Calculus I (Integration), 4.1-4.2	
Week 10			
		4.3	• The Normal Distribution • Continuity Correction • Approximating Bin (n,p) with the Normal Distribution
	Homework 12	4.3	
Week 11			
		4.4, 4.5	• The Exponential distribution • Gamma distributions • Weibull and the Lognormal distributions
	Homework 13, 14	4.4, 4.5	
Week 12			
		4.6, 5.4, 5.5	• Probability Plots • The Central Limit Theorem
	Homework 15	4.6, 5.4, 5.5	
Week 13			
	Review for Exam 3	Chapter 4, 5	• Review sheet for Exam 3 • Practice Exam 3
11/18/2024	**Exam 3**	Chapter 4, 5	
Week 14			
		Advanced topics	• Introduction to Markov Chains • Introduction to Law of Large Numbers
	Homework 16		
11/24/2025- 11/30/2025	**Thanksgiving Break (No class)**		
Week 15			
	Review for comprehensive final exam		
12/6/2025- 12/11/2025	**Comprehensive Final exam**	**TBT**	

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to the UNT Learning Management System (LMS) for contingency plans for covering course materials.

Assessing Your Work

WebAssign Homework	30%
Three regular exams and	50%
Final exam	20%
Total	**100%**

Grading

A = 90–100 % B = 80–89.9% C = 70–79.9% D = 60–69.9% F = below 60%

Grades are based on mastery of the content. As a rule, I do not grade on a "curve" because that is a comparison of your outcomes to others. I do, however, encourage you to find opportunities to learn with and through others. Please come to office hours or take advantage of the academic resources listed above if you find yourself struggling.

If you need to pass this course because it is your last semester, your financial aid depends on it, your scholarship depends on it, or your parent/guardian has threatened you in some manners then do yourself a favor and start studying right away. **I will not entertain any pleas for extra credit or offers to do additional work at the end of the semester.**

Academic Integrity Standards and Consequences

According to UNT Policy 06.003, Student Academic Integrity (https://policy.unt.edu/policy/06-003), academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Attendance and Participation

Students are expected to attend class regularly and engage with the material. Research has shown that students who attend class are more likely to be successful. If you miss class, you will be responsible for obtaining a copy of the notes and any other information discussed by a classmate. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the Student Attendance and Authorized Absences Policy (PDF) (https://policy.unt.edu/policy/06-039). If you cannot attend a class due to an emergency, please let me know. Your safety and well-being are important to me. You may also provide documentation verifying the reason for your absence to the Dean of Students

(https://studentaffairs.unt.edu/dean-of-students).I will record who attends class, and give up to an extra 3 points on your total grade for regular attendance.

Examination Policy

There will be 3 midterm exams and a comprehensive final exam administered in person during lecture.

Your lowest midterm exam score will drop. If you are happy with your scores on the first two midterms, then you may choose to omit the 3rd midterm exam.

Make-up Policy: Make up exams will NOT be given for any reason after the fact. I drop the lowest exam score to cover emergencies which may arise unexpectedly. An exam may be taken prior to the scheduled date if you have a conflict with another obligation and can provide documentation. I require notification a week in advance for this accommodation.

Academic Dishonesty: Cheating will not be tolerated. Any student caught cheating will receive a "0" on the exam and a report will be filed with the Office of Academic Integrity.

I reserve the right to test you on problems that are generalizations of material covered in the class and/or in the text. In short, the problems may not look exactly like the ones in the book. Everything that is covered in the course content is fair game for exam material. You will be responsible for everything unless I advise you to the contrary.

Use of Generative AI Tools

Generative AI tools (e.g., ChatGPT, Microsoft Copilot) are *not* permitted on exams. When working on homework, I encourage you to take advantage of the many available resources: my office hours, email, the Math Lab, and other approved support options. These are all designed to help you learn and understand the material more effectively.

While AI might seem helpful, it is often unreliable for learning math and statistics and can produce incorrect or misleading results. More importantly, one of the key goals of this course is to strengthen your critical thinking and problem-solving abilities—skills.

Homework Policies

Homework assignments can be accessed via WebAssign (http://www.webassign.net).

- When you log in, you will be able to see the due dates.
- Cooperation on homework assignments is encouraged.
- You have **4 submissions** for most questions. Your last submission will count as your final answer. If you use a help option (Read it, Watch it and Talk to a Tutor), it will count as 1 submission.
- You can save your work without using a submission.
- Some exercises will be randomized. In other words, it's possible that every student will have slightly different questions with different answers.

- **A 5% bonus will be awarded** to students who complete their homework more than 48 hours before the due date.

When computing grades, I will **drop ONE lowest homework grade** before computing the homework average. Therefore, in principle, you could get a 100% homework score and not turn in an assignment during the semester. I have this policy in case you get sick, a family emergency arises, etc., during the semester. You will still be responsible for the material in such assignments during the examinations. **Requests for manual extensions will NOT be granted.**