MATH 1780.501 (Spring 2026): Probability Models Syllabus

Instructor Contact

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Office Hours: In person at my office.
MW 12:00 pm-1:00 pm
TuTh 9:30 am-10:30 am
TuTh 1:30pm-2:00 pm

Course Meets: TuTh 2:00 pm-3:20 PM

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Communication Expectations**:** If you have a general question or concern, please send me a Canvas message or an email with "MATH 1780.501" in the subject line. You may expect a response within two business days. *To protect your privacy, questions about your academic performance must be sent via Canvas or your UNT email account.*

Course Description

3 hours. This course is a probability course and covers some classical tools, including counting rules, conditional probability and independence, discrete and continuous random variables, probability distributions and Central limit theorems.

Course Prerequisites

A grade of C or higher in Math 1710. Students should have mastered differential and integral calculus of a single variable.

Course Structure

This course will be a lecture-style, face to face course meeting three (2) days per week for spring semester. Knowledge of topics and concepts from the class will then be demonstrated through the homework on WebAssign and the in-class examinations.

Your participation during class time (e.g., by asking/answering questions) will help me gauge how the class is doing with certain topics while additionally making class meetings more engaging. Students who attend class regularly tend to perform better on homework and exams.

There will also be three exams and a comprehensive final exam.

Course Objectives

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

1. Examine how to make intelligent judgments and informed decisions in the presence of uncertainly and variation. (CO-1)
2. Investigate randomness and uncertainly. (CO-2)
3. Develop probability models for a single discrete/continuous random variable. (CO-3)

Required Text/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 or a laptop computer with a spreadsheet or statistical analysis program installed. 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 a **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.
For more directions, please go to the Cengage Zoom office hours: U of North Texas MATH (cengage.com)

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 looking at the solutions.** This strengthens your problem-solving skills.

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)

Technical Requirements & Skills

Minimum Technology Requirements

- Access to a computer, tablet, or laptop that is compatible with all required apps for the course.
- Access to reliable internet access
- Graphing calculator with statistical functions and/or Excel spreadsheet program
- Canvas Technical Requirements (https://clear.unt.edu/supported-technologies/canvas/requirements)

Computer Skills & Digital Literacy

Students are expected to be proficient at:

- Navigating Canvas and WebAssign
- Uploading documents to Canvas
- Completing assignments on WebAssign
- Scanning documents and creating pdf files (there are several free scanning apps for phones / tablets like Adobe Scan or Office Lens)
- Using a graphing calculator and/or spreadsheet program. I will demonstrate how to perform various statistical functions using a TI-83/84 Plus and/or Microsoft Excel.

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

Course/Assignment Schedule

I reserve the right to change this schedule as necessary throughout the semester. You are still responsible for being aware of any changes by attending the classes and reading Canvas announcements regularly.

Date	Lecture/Assignment	Sections	Topic
Week 1 (1/12-1/17)			
		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 (1/19-1/24)			
1/19/2026	**Martin Luther King Jr. Holiday (No class)**		
		2.2, 2.4	• Probability: Axioms and Multiplication Rule

			• Probability: Addition Rule
	Homework 2	2.2	
Week 3 (1/26-1/31)			
		2.4, 2.5	• Independence and Mutually Exclusive • Law of Total Probability and Bayes' Theorem
	Homework 3, 4	2.4, 2.5	
Week 4 (2/2-2/7)			
		2.3	• Permutations and Combinations
	Homework 5	2.3	
Week 5 (2/9-2/14)			
	Review for Exam 1	Chapter 1 -2	• Review sheet for exam 1, • Practice Exam 1
2/13/2026	**Exam 1**		
Week 6 (2/16-2/21)			
		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 (2/23-2/28)			
		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 (3/2-3/7)			
	Review for Exam 2	Chapter 3	• Review sheet for exam 2, • Practice Exam 2
3/6/2026	**Exam 2**		
3/9/2026-3/15/2026	**Spring Break**		
Week 9 (3/16-3/21)			
		4.1, 4.2	• Continuous Random Variables
	Homework 10, 11	Review for Calculus I (Integration), 4.1-4.2	
Week 10 (3/23-3/28)			

		4.3	• The Normal Distribution • Continuity Correction • Approximating Bin (n,p) with the Normal Distribution
	Homework 12	4.3	
Week 11 (3/30-4/4)			
		4.4, 4.5	• The Exponential distribution • Gamma distributions • Weibull and the Lognormal distributions
	Homework 13, 14	4.4, 4.5	
Week 12 (4/6-4/11)			
		4.6, 5.4, 5.5	• Probability Plots • The Central Limit Theorem
	Homework 15	4.6, 5.4, 5.5	
Week 13 (4/13-4/18)			
	Review for Exam 3	Chapter 4, 5	• Review sheet for Exam 3 • Practice Exam 3
4/17/2026	**Exam 3**	Chapter 4, 5	
Week 14 (4/20-4/25)			
		Advanced topics	• Introduction to Markov Chains • Introduction to Law of Large Numbers
	Homework 16		
Week 15 (4/27-4/30)			
	Review for comprehensive final exam		
5/1/2026	**Reading Day (No class)**		
5/4/2026-5/8/2026	**Comprehensive Final exam**		

Assessing your work

Homework	25%
Three regular exams and Final exam (After dropping the lowest grade)	60%
Quizzes	15%
Total	**100%**

Grading

A = 90–100 % B = 80–89.5% C = 70–79.5% D = 60–69.5% 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.
I strongly encourage you to begin studying and engaging with the course material as early as possible, as planning ahead will be essential for your success. Please note that extra credit opportunities or additional work at the end of the semester will not be available.

Course Policies

Attendance

Attendance is important and required. Attendance means active participation in this class; this means to be working through the examples in lectures and participating in class discussions. The instructor will not repeat whole lectures or offer personal lessons in office hours or by email. These venues are for specific questions / problems

Research has shown that students who attend class are more likely to be successful. 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.

Working on homework (While ongoing lecture) in class unless given extra time by the teacher is not acceptable.

No cellphone use is allowed in class.

Examination Policy

There will be 3 midterm exams and a comprehensive final exam administered in person during lecture. There are NO remote/online options for exams.

- After the exam is graded, you have 48 hours to appeal your grade. I will not listen to any appeals after this 48-hour period.
- There will be 3 midterm exams and a comprehensive final exam. **Your lowest exam score will be dropped.** If you are happy with your scores on the 3 midterms, then you may choose to omit the final exam.

Make-up Policy: Make up exams will not be given for any reason after the fact. I drop an exam 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 assignment and a report will be filed with the Office of Academic Integrity.

I reserve the right to test and quiz 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.

Homework Policies

All homework assignments are given via WebAssign.

- When you log in you will be able to see due dates.
- 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 use randomization. In other words, it's possible that every student will have slightly different questions with accordingly 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 also 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.**

Quiz Policy

There will be short (10-15 minutes) quizzes covering material from the prior week of class. I will drop your lowest score. Make-up quizzes will NOT be given for any reason after the fact. I drop the lowest quiz score to cover emergencies which may arise unexpectedly.

Late Work

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. 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 to harm you in some manner 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.**

Course Evaluation

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course. I will make an announcement in Canvas when the SPOT evaluation becomes available.

Online Rules of Engagement

Online Rules of Engagement refers to the way students are expected to interact with each other and with their instructors online. Here are some general guidelines:

- While the freedom to express yourself is a fundamental human right, any communication that utilizes cruel and derogatory language on the basis of protected qualities such as race, religion, ethnic origin, national origin, sex, disability, sexual orientation, or gender identity will not be tolerated.
- Treat your instructor and classmates with respect in any online communication, even when their opinion differs from your own.
- Speak from personal experiences. Use "I" statements to share thoughts and feelings. Try not to speak on behalf of groups or other individual's experiences.
- Use your critical thinking skills to challenge other people's ideas, instead of attacking individuals.
- Avoid using all caps while communicating online. This may be interpreted as "YELLING!"
- Be cautious when using humor or sarcasm, as tone can be difficult to interpret in an online medium.
- Avoid using "text-talk" unless explicitly permitted by your instructor.
- Proofread and fact-check your sources before you post.

Artificial Intelligence (AI) Policy

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. Artificial Intelligence (AI) may be used as a learning support tool in this course, provided its use aligns with academic integrity standards. Responsible AI use should enhance, not replace your learning by deepening conceptual understanding and promoting independent thinking. Acceptable uses include employing AI to explain concepts, generate formula sheets, or create practice problems without solutions for self-assessment.

Getting Help

Technical Assistance

Here at UNT, we have a Student Help Desk that you can contact for help with Canvas or other technology issues.

UIT Help Desk (http://www.unt.edu/helpdesk/index.htm)
Email: helpdesk@unt.edu
Phone: 940-565-2324
In Person: Sage Hall, Room 130
Walk-In Availability: 8am-9pm
Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm

For additional support, visit Canvas Technical Help (https://community.canvaslms.com/docs/DOC-10554-4212710328)

Student Support Services

- Registrar (https://registrar.unt.edu/registration)
- Financial Aid (https://financialaid.unt.edu/)
- Student Legal Services (https://studentaffairs.unt.edu/student-legal-services)
- Career Center (https://studentaffairs.unt.edu/career-center)
- Multicultural Center (https://edo.unt.edu/multicultural-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services)
- Student Affairs Care Team (https://studentaffairs.unt.edu/care)
- Student Health and Wellness Center (https://studentaffairs.unt.edu/student-health-and-wellness-center)
- Pride Alliance (https://edo.unt.edu/pridealliance)

Academic Support Services

- Academic Resource Center (https://clear.unt.edu/canvas/student-resources)
- Academic Success Center (https://success.unt.edu/asc)
- UNT Libraries (https://library.unt.edu/)
- Writing Lab (http://writingcenter.unt.edu/)
- MathLab (https://math.unt.edu/mathlab)

UNT Policies

Academic Integrity Policy

Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, 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. [Insert specific sanction or academic penalty for specific academic integrity violation.]

ADA Policy

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of 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 accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website (https://disability.unt.edu/).

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.