MATH 244: Introduction to Probability Theory
Fall 2025 Course Syllabus

NJIT Academic Integrity Code: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

COURSE INFORMATION

Course Description: Train students in elementary probability. Topics include basic probability theory in discrete and continuous sample space, conditional probability and independence, Bayes' theorem, random variables and their distributions, joint distributions, expected values and variance, moment generating functions, parametric families of distributions including binomial, multinomial geometric, hypergeometric, exponential, gamma, and normal

Number of Credits: 3

Prerequisites: MATH 112 with a grade of C or better or MATH 133 with a grade of C or better.

Course-Section and Instructors:

Course-Section	Instructor
Math 244-001	S. Subramanian

Office Hours for All Math Instructors: Fall 2025 Office Hours and Emails

Required Textbook:

Title	*Mathematical Statistics with Applications*
Author	Wackerly
Edition	7th

Publisher	Cengage Learning
ISBN #	9780495110811

University-wide Withdrawal Date: The last day to withdraw with a **M** is **Monday, November 10, 2025**. It will be strictly enforced.

COURSE GOALS

Course Outcomes: On successful completion student will be able to demonstrate understanding of

1) Discrete and continuous random variables and their cumulative distribution function.
2) Joint distributions and marginal and conditional distributions.
3) The Bayes theorem, independence, expectation, and moment generating functions.
4) Distributions such as binomial, multinomial, geometric, Poisson, normal, and gamma.

Course Assessment: Will be based on homework, two midterm exams and one final exam.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework	20%
Midterm Exam (1 and 2)	25% each
Final Exam	30%

Your final letter grade will be based on the following tentative curve.

A	90 - 100	**C**	68 - 74
B+	85 - 89	**D**	50 - 67
B	80 - 84	**F**	0 - 49
C+	75 - 79		

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

Homework Requirements: Homework assignments are due within a week unless announced otherwise by the

instructor. Late homework will not be accepted.

Exams: Two midterms and one final examination will be given as shown below. The midterm exam date is tentative and may be subject to change.

Midterm Exam 1	Thursday, October 6, 2025
Midterm Exam 2	Thursday, November 7, 2025
Final Exam Period	December 14 to 20, 2025

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the Math Department's Examination Policy. This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

Calculator Policy: Only a basic (non-programmable and non-graphing) calculator is permitted during the exams. Calculators that can perform integration or differentiation operations are not allowed during exams.

AI usage policy: AI usage is not permitted in this course for solving problems in class/ homework assignments, quizzes, and exams. Any violations will be dealt with according to the NJIT's academic integrity policy.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: Fall 2025 Hours)

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for Instructor Office Hours and Emails.

Accommodation of Disabilities: The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Scott Janz, Associate Director of Disability Support Services at 973-596-5417 or via email at scott.p.janz@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibility Resources and Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website.

Important Dates (See: Fall 2025 Academic Calendar, Registrar)

Date	Day	Event
September 1, 2025	Monday	Labor Day
September 2, 2025	Tuesday	First Day of Classes
September 8, 2025	Monday	Last Day to Add/Drop Classes
November 10, 2025	Monday	Last Day to Withdraw
November 25, 2025	Tuesday	Thursday Classes Meet
November 26, 2025	Wednesday	Friday Classes Meet
November 27 to November 30, 2025	Thursday to Sunday	Thanksgiving Recess - Closed
December 11, 2025	Thursday	Last Day of Classes
December 12, 2025	Friday	Reading Day 1
December 13, 2025	Saturday	Saturday Classes Meet
December 14 to December 20, 2025	Sunday to Saturday	Final Exam Period

Course Outline

Week	Lecture	Sections	Topic
1	9/4 (R)	2.3-2.4	Sample space, events
2	9/8 (M)	2.5	Calculating the probability of an event
2	9/11 (R)	2.6	Tools for counting sample points
3	9/15 (M)	2.7	Conditional probability and independence
3	9/18 (R)	2.8	Multiplicative and additive laws
4	9/22 (M)	2.9	Law of total probability

		2.10	Bayes Rule
4	9/25 (R)	3.2	Discrete probability distribution
5	9/29 (M)	3.3	Expected value of a random variable
5	10/2 (R)		Wellness day
6	10/6(M)	3.4	Midterm Exam 1, Thursday, October 2, 2025
6	10/9 (R)	3.5-3.6	Binomial, Geometric, and Negative Binomial distributions
7	10/13 (M)	3.7-3.8	Hypergeometric and Poisson distributions
7	10/16 (R)	3.4-3.5	Joint Probability Distributions – continued
8	10/20 (M)	3.9	Moment generating function
8	10/23 (R)	3.11	Tchebysheff's theorem
9	10/27 (M)	4.2-4.3	Continuous random variables and expected values
9	10/30 (R)	4.4	Uniform distribution
10	11/3 (M)	4.5	Normal distribution
10	11/6 (R)		Midterm Exam 2, Thursday, November 6, 2025
11	11/10 (M)	4.6	Gamma distribution
11	11/13 (R)	4.7	Beta distribution
12	11/17 (M)	5.3	Joint, marginal, and conditional distributions
12	11/20 (R)	5.4	Independent random variables

13	11/24 (M)	5.5	Expectation of a function of random variables
13	11/25 (T) R class meets	5.7-5.8	Covariance and other formulas
			Thanksgiving break (11/28(R) to 12/1(S))
14	12/01 (M)	5.9	Multinomial distribution
14	12/04 (R)	6.2-6.3	Transformations; the cdf technique
15	12/08 (M)	6.4	Continuous transformations
			12/11 (W) Last day of classes
			12/12 (R) and 12/13 (F) Reading days
			Final Exam: 12/14(S) to 12/20(S)