MATH 333 Honors: Probability and Statistics
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: Descriptive statistics and statistical inference. Topics include discrete and continuous distributions of random variables, statistical inference for the mean and variance of populations, and graphical analysis of data.

Number of Credits: 3

Prerequisites: MATH 112H with a grade of B or better or MATH 112 with a grade of A.

Course-Section and Instructors:

Course-Section	Instructor
Math 333-H01	Professor Padma Natarajan

Office Hours for All Math Instructors: Office Hours and Emails

Required Textbook:

Title	*Applied Statistics and Probability for Engineers*
Author	Montgomery and Runger
Edition	7th
Publisher	John Wiley & Sons

ISBN #	1) 978-1119758693 (Text with WileyPlus Registration Card)
	2) 978-1119498421 (Standalone WileyPlus Registration Card)

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

COURSE GOALS

Course Objective: The objective of this course is to acquaint students with probability, descriptive statistics and statistical inference and demonstrate real world applications using examples drawn from various fields.

Course Outcomes: Upon successful completion of this course, the student will be able to
1) Demonstrate understanding of various statistical terms and methods for summarizing, organizing, and presenting data
2) Compute measures of central tendency, position, and variability and interpret them.
3) Describe sample space and events and demonstrate their knowledge of various counting techniques, notions of probability, random variables and various discrete and continuous probability distributions
4) Demonstrate conceptual understanding of sampling distributions and the central limit theorem
5) Perform statistical analysis, such as estimation, hypothesis testing, regression, and draw conclusions.

Course Assessment: The assessment tools used will include online weekly homework assignments and quizzes/additional homework/mini-projects, two common mid-term exams, and a comprehensive common 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, Quizzes, Mini Projects	15%
2 Common Midterm Exams	25% each
Final Exam	35%

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

A	90 - 100	C	65 - 74
B+	85 - 89	D	55 - 64
B	80 - 84	F	0 - 54
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.

For Verification of Presence:
In the new verification of presence process, students will be self-reporting their presence.
The Canvas section for each of your courses will automatically be populated with an "Academic Engagement Assignment" on August 30th, 2025. Completion of this assignment will serve as verification of presence for the given student

Religious Observance: NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

Homework/ Quiz/Exam Requirements: Online Weekly Homework will be assigned on WileyPlus. Additional Homework/Mini-Projects and/or Quizzes would also be given. Quizzes could be on paper or using an online proctored environment (Lock down browser with Respondus).
http://www.respondus.com/lockdown/download.php?id=264548414

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.

Old exams are available at:

http://math.njit.edu/students/undergraduate/course_exams.php

Technical Support: Students may contact the IST Service Desk with any questions. Questions or problems can be submitted via web form by going to: https://servicedesk.njit.edu and clicking on the "Report your issue online" link.

You may also call the IST Service Desk with any questions at 973-596-2900.

For technical issues with WileyPlus Online Homework, students can contact WileyPlus technical support.

Exams: There will be two proctored common midterm exams during the semester and one proctored comprehensive final exam during the final exam week. Exams will be held on the following days:

Midterm Exam I	October 8, 2025
Midterm Exam II	November 19, 2025
Final Exam Period	December 14 - December 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.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times unless being used for in-class work.

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 need an accommodation due to a disability, please contact the Office of Accessibility Resources and Services at oars@njit.edu, or visit Kupfrian Hall 201 to discuss your specific needs. A Letter of Accommodation Eligibility from the office authorizing student accommodations is 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 at:

https://www.njit.edu/accessibility/

Important Dates (See: Fall 2024 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
October 2, 2025	Thursday	Wellness Day
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 and Sunday	Thanksgiving Recess - Closed
December 11, 2025	Thursday	Last Day of Classes
December 12, 2025	Friday	Reading Day
December 13, 2025	Saturday	Saturday Classes Meet

December 14 to December 20, 2025	Sunday to Saturday	Final Exam Period

Course Outline

Online Homework Assignments will be posted on WileyPlus.

Week	Class	Lecture	Section	Topic
Week 1 9/2 (T)	1	1	6.1	Descriptive statistics: Numerical Summaries of data: Sample Mean, Sample Variance, Sample Standard Deviation, Range
	2	2	6.2	Descriptive statistics: Stem and Leaf Diagram, Mean, Median, Quartiles, Interquartile Range
Week 2 9/9 (T)	3	3	6.3, 6.4	Descriptive statistics: Histograms, Boxplot
	4	4	2.1, 2.2, 2.3	Probability: Sample Spaces and Events; Interpretations and Axioms of Probability
Week 3 9/16 (T)	5	5	2.4, 2.5, 2.6, 2.7	Probability: Addition rules; Conditional Probability; Multiplication and Total Probability Rules; Independence
	6	6	2.8	Probability: Bayes' theorem
Week 4 9/23 (T)	7	7	3.1, 3.2	Discrete Random Variables and Probability Distributions: Discrete Random Variables; Probability Distributions and Probability Mass Functions; Cumulative Distribution Functions

	8	8	3.3, 3.4	Discrete Random Variables and Probability Distributions: Mean and Variance of a Discrete Random Variable; Discrete Uniform Distribution
Week 5 9/30 (T)	9	9	3.5, 3.6	Discrete Random Variables and Probability Distributions: Binomial Distribution; Geometric Distribution only from Section 3.6
10/2 (R)				WELLNESS DAY
Week 6 10/7 (T)	10			REVIEW FOR EXAM 1
				COMMON MIDTERM EXAM 1: October 8, 2025
	11	10	3.8	Discrete Random Variables and Probability Distributions: Poisson Distribution
Week 7 10/14 (T)	12	11	4.1, 4.2	Continuous Random Variables and Probability Distributions: Continuous Random Variables; Probability distributions and Probability Density Functions; Cumulative Distribution Functions
	13	12	4.3, 4.4	Continuous Random Variables and Probability Distributions: Mean and Variance of a Continuous Random Variable; Continuous Uniform Distribution
Week 8 10/21 (T)	14	13	4.7	Continuous Random Variables and Probability Distributions: Exponential Distribution
	15	14	4.5	Continuous Random Variables and Probability Distributions: Normal distribution
Week 9 10/28 (T)	16	15	4.6	Continuous Random Variables and Probability Distributions: Normal Approximation to the Binomial and Poisson Distributions

	17	16	7.1- 7.2	Point estimation of Parameters and Sampling Distributions: Point Estimation; Sampling Distributions and the Central Limit Theorem
Week 10 11/4 (T)	18	17	8.1	Statistical Intervals for a Single Sample: Confidence interval on the Mean of a Normal distribution, Variance Known
	19	18	8.2	Statistical Intervals for a Single Sample: Confidence Interval on the Mean of a Normal Distribution, Variance Unknown
	WITHDRAWAL DEADLINE: Monday, November 10, 2025			
Week 11 11/11 (T)	20	19	8.3	Statistical Intervals for a Single Sample: Confidence intervals on the Variance and Standard deviation of a Normal Distribution;
	21	20	8.4	Statistical Intervals for a Single Sample: Large-Sample Confidence Interval for a Population Proportion
Week 12 11/18 (T)	22			*REVIEW FOR EXAM #2*
				COMMON MIDTERM EXAM 2: November 19, 2025
	23	21	9.1- 9.2	Tests of Hypotheses for a Single Sample: Tests on the Mean of a Normal Distribution, Variance Known
Week 13 11/25 (T) (Thursday class)	24	22	9.1- 9.2	Tests of Hypotheses for a Single Sample: Tests on the Mean of a Normal Distribution, Variance Known
	THANKSGIVING RECESS: November 27(R) to November 30, 2025 (S)			

Week				
Week 14 12/2 (T)	25	23	9.3.1	*Tests of Hypotheses for a Single Sample: Tests on the Mean of a Normal Distribution, Variance Unknown*
	26	24	9.5.1	*Tests of Hypotheses for a Single Sample: Tests on a Population Proportion*
Week 15 12/9 (T)	27	25	10.4 10.1.1, 10.1.3	*Statistical Inference for Two Samples: Paired t-test* *Inference on the Difference in Means of Two Normal Distributions, Variances known*
	28	26	11.2	*Simple Linear Regression and Correlation: Simple Linear Regression (If time permits)* *REVIEW FOR FINAL EXAM*
	LAST DAY OF CLASSES December 11, 2025			
				Reading Day *12/12 (F)*
	FINAL EXAM WEEK: December 14 (S) to December 20, 2025 (S)			