

Summer 2023

## **MATH 333-041, 042, 141, Summer 2023: Probability and Statistics**

Mathematical Sciences Department

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### **Recommended Citation**

Mathematical Sciences Department, "MATH 333-041, 042, 141, Summer 2023: Probability and Statistics" (2023). *Mathematical Sciences Syllabi*. 262.  
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## MATH 333: Probability and Statistics

### *Summer 2023 Course Syllabus*

**NJIT Academic Integrity Code:** All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

### 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 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 333-041	Professor C. Kim
Math 333-042	Professor C. Kim
Math 333-141	Professor R. Flores

**Office Hours for All Math Instructors:** [Office Hours and Emails](#)

**Required Textbook:**

<b>Title</b>	<i>Applied Statistics and Probability for Engineers</i>
<b>Author</b>	Montgomery and Runger
<b>Edition</b>	7th
<b>Publisher</b>	John Wiley & Sons
<b>ISBN #</b>	978-1119409533 (Text) 978-1119400226 (Standalone WileyPlus Registration Card)

**University-wide Withdrawal Date:** Please see the [Summer 2023 Academic Calendar](#) for the last day to withdraw based on the summer session you are registered for.

## COURSE GOALS

**Course Objectives:** 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

- Demonstrate understanding of various statistical terms and methods for summarizing, organizing, and presenting data.
- Compute measures of central tendency, position, and variability and interpret them.
- 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.
- Demonstrate conceptual understanding of sampling distributions and the central limit theorem.
- Perform statistical analysis, such as estimation, hypothesis testing, regression, and draw conclusions.

**Course Assessment:** The assessment tools used will include weekly homework assignments/quizzes, one midterm exam and a 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 and Quizzes	25%
Common Midterm Exam	35%
Final Exam	40%

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.

**Homework and Quiz Policy:** Weekly Homework will be assigned from textbook and additional sources, and completed using WileyPlus online software. Additionally, Quizzes will be given during class.

**Exams:** There will be one common midterm exam held during the semester and one comprehensive common final exam. No class will be held on exam dates. Exams are held on the following days:

Midterm Exam	June 21, 2023 (Time, Location TBA)
Final Exam	July 17, 2023 (Time, Location TBA)

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.

**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: **Summer 2023 Hours**)

**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 at:

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

**Important Dates** (See: **Summer 2023 Academic Calendar, Registrar**)

Date	Day	Event
May 22, 2023	Monday	Full, First, and Middle Summer Session Begins
May 24, 2023	Wednesday	Last Day to Add/Drop for First Summer Session
May 26, 2023	Friday	Last Day to Add/Drop for Middle Summer Session
May 29, 2023	Monday	Last Day to Add/Drop for Full Summer Session
May 29, 2023	Monday	Memorial Day - University Closed/No Classes Scheduled

June 10, 2023	Saturday	Last Day to Withdraw from <b>First Summer Session</b>
<b>June 16, 2023</b>	<b>Friday</b>	<b>Last Day to Withdraw from Middle Summer Session</b>
June 16, 2023	Friday	Juneteenth - University Closed/No Classes Scheduled
June 26, 2023	Monday	Last Day of Classes for <b>First Summer Session</b>
June 30, 2023	Friday	Last Day to Withdraw from <b>Full Summer Session</b>
July 4, 2023	Tuesday	Independence Day - University Closed/No Classes Scheduled
July 5, 2023	Wednesday	<b>Second Summer Session Begins</b>
July 6, 2023	Thursday	Last Day to Add/Drop for <b>Second Summer Session</b>
<b>July 17, 2023</b>	<b>Monday</b>	<b>Last Day of Classes for Middle Summer Session</b>
July 20, 2023	Thursday	Last Day to Withdraw for <b>Second Summer Session</b>
August 8, 2023	Tuesday	Last Day of Classes for <b>Full and Second Summer Session</b>

## Course Outline

<b>Week</b>	<b>Section #</b>	<b>Subject Topic</b>
Week 1 (May 22)	6.1-6.4	<i>Descriptive Statistics: Stem-and-leaf, Histograms, Mean, Median, Variance and Standard Deviation, Boxplot</i>
	2.1-2.4 2.5-2.6	<i>Probability: Sample Space, Events, Interpretations of Probability, Addition Rules and Conditional Probability, Multiplication Rule</i>
Week 2 (May 31)	2.5-2.8	<i>(May 29) Memorial (No Class) Total Probability Rules, Independence, Bayes' Theorem</i>
Week 3 (June 5)	3.1-3.5	<i>Discrete Random Variables: Probability Mass Function, Cumulative Distribution Function, Mean and Variance of a Discrete Random Variable, Uniform Distribution</i>
	3.6-3.9	<i>Discrete Distributions: Binomial, Geometric, Poisson</i>
Week 4 (June 12)	4.1-4.5	<i>Continuous Random Variables: PDF and CDF Mean and Variance of a Continuous Random Variable, Continuous Uniform Distribution, Normal Distribution</i>
	4.6-4.7	<i>Normal Approximation to Binomial and Poisson, Exponential Distribution</i>

Week 5 (June 19)	Review, 7.1-7.2	<i>Review for Test, Point Estimation, Sampling Distributions and the Central Limit Theorem</i>
W, June 21	MIDTERM EXAM	
Week 6 (June 26)	8.1-8.2	<i>Confidence Interval on the Mean of a Normal Distribution, Variance Known - Variance Unknown</i>
	8.3 8.4 9.1	<i>Confidence Intervals on the Variance and Standard Deviation of a Normal Distribution Large Sample Confidence Interval for a Population Proportion; Introduction to Hypothesis Testing</i>
Week 7 (July 3)	9.2-9.4	<i>Tests on the Mean of a Normal Distribution, P- values, Type I and II error (July 4) Independence</i>
	9.3,9.5	<i>Small Sample Tests on the Mean, Test on a Population Proportion</i>
Week 8 (July 10)	10.1 10.4	<i>Tests on the Difference in the Means of Two Normal Distributions, Paired t-test</i>
	11.1-11.2	<i>Correlation and Simple Linear Regression + Review for Test</i>
M, July 17	FINAL EXAM	

*Updated by Professor C. Kim - 5/19/2023  
Department of Mathematical Sciences Course Syllabus, Summer 2023*