

MATH 244: Introduction to Probability Theory

Spring 2022 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: Train students in elementary probability. Topics include basic probability theory in discrete and continuous sample space, conditional probability and independence, Bayes' theorem and event trees, random variables and their distributions, joint distribution and notion of dependence, expected values and variance, moment generating functions, useful parametric families of distributions including binomial, geometric, hypergeometric, negative binomial, exponential, gamma, normal and their applications, simple case of central limit theorem and its uses.

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

Course-Section and Instructors:

Course-Section	Instructor
Math 244-002	Professor C. Kim

Office Hours for All Math Instructors: [Spring 2022 Office Hours and Emails](#)

Required Textbook:

Title	<i>Probability and Statistics for Engineers and Scientists, MyLab Statistics</i>
Author	Walpole
Edition	9 th
Publisher	Prentice Hall
ISBN #	9780134115856

E-book option: <https://www.pearson.com/store/en-us/pearsonplus/p/9780137273546.html>

University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, April 4, 2022**. 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/quizzes/worksheets, one midterm exam 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 & Quizzes & Worksheets	30%
Midterm Exam	30%
Final Exam	40%

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/Quiz/Worksheet Requirements: Homework assignments are due within a week unless announced otherwise by the instructor. Late homework will not be accepted. Attendance at all quizzes, worksheets, and exams is mandatory

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

Midterm Exam	Friday, March 11, 2022
Final Exam Period	Friday to Thursday, May 6 - 12, 2022

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: [Spring 2022 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](tel: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/studentssuccess/accessibility/>

Important Dates (See: [Spring 2022 Academic Calendar](#), [Registrar](#))

Date	Day	Event
January 17, 2022	Monday	Martin Luther King, Jr. Day
January 18, 2022	Tuesday	First Day of Classes
January 22, 2022	Saturday	Saturday Classes Begin
January 24, 2022	Monday	Last Day to Add/Drop Classes
March 14 to March 19, 2022	Monday to Saturday	Spring Recess Begins - No Classes
April 4, 2022	Monday	Last Day to Withdraw
April 15, 2022	Friday	Good Friday - No Classes
April 17, 2022	Sunday	Easter Sunday - No Classes
May 3, 2022	Tuesday	Last Day of Classes
May 4 and May 5, 2022	Wednesday and Thursday	Reading Days

May 6 to May 12, 2022	Friday to Thursday	Final Exam Period
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Course Outline

Week	Lecture	Sections	Topic
1	1/18 (T)	2.1-2.3	Sample space, events, Counting
1	1/21 (F)	2.1-2.3	Counting - continued
2	1/25 (T)	2.4	Probability of an Event
2	1/28 (F)	2.5	Additive Rules
3	2/1 (T)	2.6	Conditional Probability, Independence
3	2/4 (F)	2.6	Product Rules
4	2/8 (T)	2.7-2.8	Bayes Rule
4	2/11 (F)	3.1	Concept of Random Variable
5	2/15 (T)	3.2	Discrete Probability Distributions
5	2/18 (F)	3.3	Continuous Probability Distributions
6	2/22 (T)	3.3	Continuous Probability Distributions - continued
6	2/25 (F)	3.4-3.5	Joint Probability Distributions
7	3/1 (T)	3.4-3.5	Joint Probability Distributions - continued
7	3/4 (F)	4.1-4.3	Mean and Variance of Random Variable
8	3/8 (T)	4.1-4.2	Review for Midterm
8	3/11 (F)	4.3	Midterm Exam, Friday, March 11, 2022
10	3/22 (T)	5.1-5.2	Binomial Distribution

10	3/25 (F)	5.3	Hypergeometric Distribution
11	3/29 (T)	5.4	Negative Binomial Distribution
11	4/1 (F)	5.5-5.6	Poisson Distribution and Process
12	4/5 (T)	5.5-5.6	Poisson Distribution and Process - continued
12	4/8 (F)	6.1-6.3	Continuous Uniform and Normal
13	4/12 (T)	6.1-6.3	Continuous Uniform and Normal - continued
14	4/19 (T)	6.4-6.5	Normal Approximation to Binomial
14	4/22 (F)	6.6	Gamma and Exponential distributions
15	4/26 (T)	7.1-7.3	Transformations and moment generating functions
15	4/29 (F)	7.1-7.3	Transformations and moment generating functions -- continued
16	5/3 (T)		Review

*Updated by Professor Chulmin Kim - 1/6/2022
Department of Mathematical Sciences Course Syllabus, Spring 2022*