

Fall 2019

MATH 244-001: Introduction to Probability Theory

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MATH 244: Introduction to Probability Theory *Fall 2019 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 the calculus of probability. Topics include basic probability theory in discrete and continuous sample space, conditional probability and independence, Bayes' theorem, random variables and their distributions, joint distribution and notion of dependence, expected values and variance, moment generating functions, parametric families of distributions including binomial, multinomial geometric, hypergeometric, exponential, gamma, 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	Professor S. Subramanian

Office Hours for All Math Instructors: [Fall 2019 Office Hours and Emails](#)

Required Textbook:

Title	<i>Probability and Statistics for Engineers and Scientists</i>
Author	Walpole, et al.
Edition	9th
Publisher	Prentice Hall
ISBN #	0-321629116

University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, November 11, 2019**. It will be strictly enforced.

COURSE GOALS

Course Objectives: Train students in the calculus of probability. Topics include basic probability theory in

discrete and continuous sample space, conditional probability and independence, Bayes' theorem, random variables and their distributions, joint distribution and notion of dependence, expected values and variance, moment generating functions, parametric families of distributions including binomial, multinomial geometric, hypergeometric, exponential, gamma, normal.

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

- Discrete and continuous random variables and their cumulative distribution function.
- Random vectors, their joint distributions, and marginal and conditional distributions.
- The Bayes theorem, independence, expectation, and moment generating functions.
- Distributions such as binomial, multinomial, geometric, Poisson, normal, and gamma.

Course Assessment: Will be based on homework/quizzes, 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 and Quizzes	25%
Midterm Exam	40%
Final Exam	35%

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

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

Exams: There will be one midterm exam held in class during the semester and one comprehensive final exam. Exams are held on the following days:

Midterm Exam	October 28, 2019
Final Exam Period	December 14 - 20, 2019

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: [Fall 2019 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](#).

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

Accommodation of Disabilities: Disability Support Services (DSS) 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 Chantonette Lyles, Associate Director of Disability Support Services at [973-596-5417](tel:973-596-5417) or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Disability Support 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 Disability Support Services (DSS) website at:

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

Important Dates (See: [Fall 2019 Academic Calendar](#), [Registrar](#))

Date	Day	Event
September 3, 2019	T	First Day of Classes
September 13, 2019	F	Last Day to Add/Drop Classes
November 11, 2019	M	Last Day to Withdraw
November 26, 2019	T	Thursday Classes Meet
November 27, 2019	W	Friday Classes Meet
November 28-29, 2019	R-F	Thanksgiving Recess
December 11, 2019	W	Last Day of Classes
December 12, 13 2019	R & F	Reading Days
December 14-20, 2019	F - R	Final Exam Period

Course Outline

Week	Lecture	Sections	Topic
1	9/5 (R)	2.1-2.3	Sample space, events, Counting
2	9/9 (M)	2.1-2.3	Counting - continued
2	9/12 (R)	2.4	Probability of an Event
3	9/16 (M)	2.5	Additive Rules
3	9/19 (R)	2.6	Conditional Probability, Independence
4	9/23 (M)	2.6	Product Rules
4	9/26 (R)	2.7-2.8	Bayes Rule

5	9/30 (M)	3.1	Concept of Random Variable
5	10/3 (R)	3.2	Discrete Probability Distributions
6	10/7 (M)	3.3	Continuous Probability Distributions
6	10/10 (R)	3.3	Continuous Probability Distributions -- continued
7	10/14 (M)	3.4-3.5	Joint Probability Distributions
7	10/17 (R)	3.4-3.5	Joint Probability Distributions -- continued
8	10/21 (M)	4.1-4.3	Mean and Variance of Random Variable
8	10/24 (R)	4.1-4.2	Review for Midterm
9	10/28 (M)	4.3	Midterm Exam, Monday, October 28, 2019
9	10/31 (R)	5.1-5.2	Binomial Distribution
10	11/4 (M)	5.3	Hypergeometric Distribution
10	11/7 (R)	5.4	Negative Binomial Distribution
11	11/11 (M)	5.5-5.6	Poisson Distribution and Process
11	11/14 (R)	5.5-5.6	Poisson Distribution and Process -- continued
12	11/18 (M)	6.1-6.3	Continuous Uniform and Normal
13	11/21 (R)	6.1-6.3	Continuous Uniform and Normal - continued
13	11/25 (M)	6.4-6.5	Normal Approximation to Binomial
14	11/26 (T)	6.6	Gamma and Exponential distributions
14	12/2 (M)	7.1-7.3	Transformations and moment generating functions
15	12/5 (R)	7.1-7.3	Transformations and moment generating functions -- continued
15	12/9 (M)		Review

*Updated by Professor S. Subramanian - 9/1/2019
Department of Mathematical Sciences Course Syllabus, Fall 2019*
