



THE COLLEGE OF SCIENCE
AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 333: Probability and Statistics

Summer 2020 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 333-450 | Professor J. Porus |
| Math 333-451 | Professor J. Porus |

Office Hours for All Math Instructors: [Summer 2020 Office Hours and Emails](#)

Required Textbook:

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|------------------|--|
| Title | <i>Applied Statistics and Probability for Engineers</i> |
| Author | Montgomery and Runger |
| Edition | 7th |
| Publisher | John Wiley & Sons |
| ISBN # | 1. 978-1119409533 (Text) 2. 978-1119400226 (Standalone WileyPlus Registration Card) |

Withdrawal Date: Please see the [Summer 2020 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. Exams are held on the following days:

| | |
|---------------------|---------------|
| Common Midterm Exam | June 17, 2020 |
| Final Exam | July 13, 2020 |

Makeup Exam Policy: To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

- http://math.njit.edu/students/policies_exam.php

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.

There will be NO MAKE-UP EXAMS during the semester. In the event the Final Exam is not taken, under rare circumstances where the student has a legitimate reason for missing the final exam, a makeup exam will be administered by the math department. In any case the student must notify the Math Department Office and the Instructor that the exam will be missed 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.

Online Classes: Note that due to the coronavirus pandemic, all lectures and office hours will be held virtually through Webex sessions. All quizzes and exams will be administered through canvas.njit.edu (See "Technology" below for needed requirements).

Technology: Students should become comfortable with the use of technology. This course will require online exams to be proctored via a working Webcam, microphone, and lockdown browser. Additionally, handwritten work will be required to be submitted via clear photos, combined together into a single PDF. Inquire with the Dean of Students if you do not have adequate technology to complete this online course.

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, Room G11, See: ([Summer 2020 Hours](#))

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. 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: [Summer 2020 Academic Calendar](#), Registrar)

| Date | Event |
|-----------------|---|
| May 18, 2020 | First Day of Classes |
| May 18, 2020 | Last Day to Add/Drop Classes for FIRST, MIDDLE, AND FULL |
| May 25, 2020 | University Closed for Memorial Day |
| June 22, 2020 | Last Day of FIRST SUMMER SESSION |
| June 29, 2020 | First Day of FTF AND SECOND SUMMER SESSION |
| July 4, 2020 | University Closed for Independence Day |
| July 13, 2020 | Last Day of MIDDLE SUMMER SESSION |
| August 3, 2020 | Last Day of FULL AND SECOND SUMMER SESSIONS |
| August 12, 2020 | Last Day of FTF SUMMER SESSIONS |

Course Outline

| Week | Section | Topic |
|------------------------------|---------------------|---|
| WEEK 1 5/18 (M) | 6.1-6.4 | Descriptive Statistics: Stem-and-leaf, Histograms, Mean, Median, Variance and Standard Deviation, Boxplot |
| 5/20 (W) | 2.1-2.4 2.5-2.6 | Probability: Sample Space, Events, Interpretations of Probability, Addition Rules and Conditional Probability, Multiplication Rule |
| WEEK 2 5/29 (W) | 2.5-2.7 | Total Probability Rules, Independence, Bayes' Theorem |
| WEEK 3 6/1 (M) | 3.1-3.5 | Discrete Random Variables: Probability Mass Function, Cumulative Distribution Function, Mean and Variance of a Discrete Random Variable, Uniform Distribution |
| 6/3 (W) | 3.6-3.9 | Discrete Distributions: Binomial, Geometric, Poisson |
| WEEK 4 6/8 (M) | 4.1-4.3 4.4-4.5 | Continuous Random Variables: PDF and CDF Mean and Variance of a Continuous Random Variable, Continuous Uniform Distribution |
| 6/10 (W) | 4.6, 4.8 | Normal Distribution, Exponential Distribution |
| WEEK 5 6/15 (M) | 4.7, 7.1-7.2 | Normal Approximation, Point Estimation, Sampling Distributions and the Central Limit Theorem + Review for Test |
| 6/17 (W) | MIDTERM EXAM | |
| WEEK 6 6/22 (M) | 8.1-8.2 | Confidence Interval on the Mean of a Normal Distribution, Variance Known - Variance Unknown |
| 6/24 (W) | 8.3 8.4 9.1 | Confidence Intervals on the Variance and Standard Deviation of a Normal Distribution Large Sample Confidence Interval for a Population Proportion; Introduction to Hypothesis Testing |
| WEEK 7 6/29 (M) | 9.2- 9.4 | Tests on the Mean of a Normal Distribution, P- values, Type I and II error |
| 7/1 (W) | 9.3,9.5 | Small Sample Tests on the Mean, Test on a Population Proportion |
| WEEK 8 7/6 (M) | 10.1 10.4 | Tests on the Difference in the Means of Two Normal Distributions, Paired t-test |

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|-------------|-------------------|--|
| 7/8 (W) | 11.1- 11.2 | Correlation and Simple Linear Regression + Review for Test |
| 7/13 (M) | FINAL EXAM | |

*Updated by Professor J. Porus - 5/4/2020
Department of Mathematical Sciences Course Syllabus, Summer 2020*
