

MATH 105-004: Elementary Probability and Statistics *Spring 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: Consider notions of probability. Topics include the binomial and normal distributions, expected value, and variance. The notions of sampling, hypothesis testing, and confidence intervals are applied to elementary situations.

Number of Credits: 3

Prerequisites: None.

Course-Section and Instructors

| Course-Section | Instructor |
|----------------|------------------------|
| Math 105-004 | Professor P. Natarajan |

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

Required Textbook:

| | |
|-----------------------|--|
| Title | <i>Introductory Statistics v1.0</i> |
| Author | Douglas S. Shafer and Zhiyi Zhang |
| Edition | 1st |
| Publisher | --- |
| ISBN # | 978-1453344873 |
| Other Textbook | <i>Statistics Using Technology</i> by Kathryn Kozak, 2nd Ed. |

Reference Textbooks

- *Openstax: Introductory Statistics*
 - **Senior Contributing Author(s):** Barbara Illowsky and Susan Dean
 - **Digital:** ISBN-10: 1-947172-05-0
- *Inferential Statistics and Probability: A Holistic Approach*
 - **Author:** Maurice A. Geraghty
- *OpenStax CNX: Collaborative Statistics Using Spreadsheets*

- **Authors:** Susan Dean, Irene Mary Duranczyk, Barbara Illowsky, Suzanne Loch, Janet Stottlemeyer
- *OpenIntro Statistics 3rd edition*
- **Author:** David M Diez, Christopher D Barr, and Mine Cetinkaya-Rundel

Free PDF copies of the textbooks are available online. See course homepage on Canvas for details

University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, April 6, 2020**. It will be strictly enforced.

COURSE GOALS

Course Objectives

- The objective of this course is to acquaint students with basic concepts and methods in statistics and probability and demonstrate real world applications using examples drawn from various fields. Topics to be covered include sampling, descriptive statistics, correlation and regression, notions of probability, binomial and normal distributions, estimation and hypothesis testing.

Course Outcomes: Upon successful completion of this course, the student will be able to -

- Demonstrate their understanding of various statistical terms, types of data, and data collection methods
- Efficiently summarize, organize, and present data
- Effectively compute measures of central tendency, position, and variation and interpret the results
- Demonstrate their understanding of notions of probability and distributions
- Perform statistical analysis, such as estimation, hypothesis testing, correlation and regression and draw conclusions
- Apply statistical reasoning to real world problems and make informed decisions

Course Assessment: The assessment tools used will include weekly homework assignments/quizzes, two mid-term exams and a cumulative/comprehensive 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 | 15% |
| Midterm Exam I | 25% |
| Midterm Exam II | 25% |
| 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.

Homework and Quiz Policy: Homework will be assigned every week in class/on canvas. In addition, quiz would be given in class.

Software: Minitab/Excel will be used in the course for activities/assignments/demonstration in class lectures. Smartphone/laptop will be needed for in-class practice problems and activities.

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

| | |
|-------------------|------------------|
| Midterm Exam I | March 9, 2020 |
| Midterm Exam II | April 13, 2020 |
| Final Exam Period | May 8 - 14, 2020 |

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 2020 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** or via email at **lyles@njit.edu**. The office is located in Kupfrian Hall, Room 201. 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: **Spring 2020 Academic Calendar, Registrar**)

| Date | Day | Event |
|------------------|-----|----------------------|
| January 21, 2020 | T | First Day of Classes |

| | | |
|---------------------|-------|--|
| January 31, 2020 | F | Last Day to Add/Drop Classes |
| March 15 - 22, 2020 | Su-Su | Spring Recess: No Classes/ University Open |
| April 6, 2020 | M | Last Day to Withdraw |
| April 10, 2020 | F | Good Friday - University Closed |
| May 5, 2020 | T | Friday Classes Meet - Last Day of Classes |
| May 6 & 7, 2020 | W & R | Reading Days |
| May 8 - 14, 2020 | F - R | Final Exam Period |

Course Outline

Please note: Assignments will be assigned in class/canvas.

- ST: Statistics using Technology by Kathryn Kozak
- IS : Introductory Statistics v1.0 by Douglas S. Shafer and Zhiyi Zhang

| Week # | Textbook and Chapter # | Topic |
|-----------------------|------------------------|---|
| WEEK 1 1/23 [R] | ST Chapter 1 | Introduction: Statistics and Sampling |
| | ST Chapter 1 | Introduction: Statistics and Sampling |
| WEEK 2 1/30 [R] | ST Chapter 2 | Descriptive Statistics: Frequency Distribution, Histogram, Bar Graph, Pie chart, Pareto chart, Dot plot, and related topics |
| | IS Chapter 2 | |
| | IS Chapter 2 | Descriptive Statistics: Stem and Leaf Display |
| WEEK 3 2/6 [R] | IS Chapter 2 | Descriptive Statistics: Measures of central tendency, Measures of variability, Measures of relative position |
| | IS Chapter 2 | Descriptive Statistics: Box-and Whisker Plot |
| WEEK 4 2/13 [R] | IS Chapter 10 | Correlation and Regression: Scatter Diagram and Linear Correlation |
| | IS Chapter 10 | Correlation and Regression: Linear Regression |
| WEEK 5 2/20 [R] | IS Chapter 3 | Basic concepts of probability |
| | IS Chapter 3 | Basic concepts of probability |
| WEEK 6 2/27 [R] | IS Chapter 4 | Discrete random variable: Introduction to Random Variables and Probability Distributions |
| | IS Chapter 4 | Discrete random variable: Binomial Probabilities |
| WEEK 7 | IS Chapter 4 | Discrete random variable: Additional Properties of the Binomial Distribution |

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|----------------------|--------------|--|
| 3/5 [R] | | <i>REVIEW FOR EXAM #1</i> |
| WEEK 8 | | MIDTERM EXAM I: MONDAY - MARCH 9, 2020 |
| 3/12 [R] | IS Chapter 5 | Continuous random variable: Normal Probability Distribution |
| 3/15 [S] to 3/22 [S] | | SPRING RECESS (NO CLASSES) |
| WEEK 9 | IS Chapter 5 | Continuous random variable: Areas under Standard Normal Distribution, Areas under any Normal Curve |
| 3/26 [R] | IS Chapter 6 | Sampling Distributions: Introduction |
| WEEK 10 | IS Chapter 6 | Sampling Distributions: Sampling Distribution continued, The Central Limit Theorem |
| 4/2 [R] | | (WITHDRAWAL DEADLINE Monday, April 6, 2020) |
| WEEK 11 | IS Chapter 7 | Estimation: Large sample and small sample estimation of the population mean |
| 4/9 [R] | | <i>REVIEW FOR EXAM #2</i> |
| WEEK 12 | | MIDTERM EXAM II: MONDAY - APRIL 13, 2020 |
| 4/16 [R] | IS Chapter 7 | Estimation: Estimation of population proportion; sample size considerations |
| WEEK 13 | IS Chapter 8 | Testing Hypotheses: Elements of hypothesis testing, Large sample tests for a population mean |
| 4/23 [R] | IS Chapter 8 | Testing Hypotheses: Small sample tests for a population mean |
| WEEK 14 | IS Chapter 8 | Testing Hypotheses: Large sample tests for a population proportion |
| 4/30 [R] | | REVIEW FOR FINAL EXAM |
| | | READING DAY 5/6 AND 5/7 (W & R) |
| 5/8 - 5/14 | | FINAL EXAM WEEK |

*Updated by Professor P. Natarajan - 1/20/2020
Department of Mathematical Sciences Course Syllabus, Spring 2020*
