MATH 661: Applied Statistics
Fall 2025 Course Syllabus

NJIT Academic Integrity Code: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

COURSE INFORMATION

Course Description: Role and purpose of statistical methods in understanding information. Data visualization and use of statistical software used in course. Descriptive statistics, summary measures for quantitative and categorical data, elementary probability and common probability distribution models. Computational statistical inference: confidence intervals and tests for means, variances, and proportions. Linear regression analysis and inference. Introduction to design of experiments and ANOVA, ANCOVA and their analysis. MATH 661 and MATH 663 cannot both be used toward degree credits at NJIT.

Number of Credits: 3

Prerequisites: MATH 112

Course-Section and Instructors:

Course-Section	Instructor
Math 661-105	Professor T. Falconer

Office Hours for All Math Instructors: Fall 2025 Office Hours and Emails

Required Textbook:

Title	*Introduction to the Practice of Statistics*
Author	Moore, McCabe, and Craig
Edition	10th
Publisher	MacMillan Learning

ISBN #	1. E-book ISBN: 978-1319377656 2. Loose-Leaf ISBN: 978-1319383985 3. Paperback ISBN: 978-1319244446

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, November 10, 2025**. It will be strictly enforced.

COURSE GOALS

Course Objectives:

- This course will acquaint students with fundamental statistical techniques and statistical reasoning that can be applied to many real world contexts.

Course Outcomes

On successful completion of this course, the student will be able to:

- Explain and apply statistical methods for displaying, summarizing and describing data
- Explain and perform basic probability calculations
- Define and explain sampling distributions and the central limit theorem
- Perform statistical analysis including estimation, hypothesis testing, and analysis of variance
- Understanding how to interpret estimates of common regression methods
- Exposed to scientific literature to understand how statistics is used in research

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:

Homeworks	20%
Class attendance and participation (including journal club)	20%
Mid-term Exam	30%
Final Exam	30%

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

A	90 - 100	**C+**	60 - 69
B+	80 - 89	**C**	50 - 59

B	70 - 79	**F**	0 - 49

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.

Religious Observance: NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

Exams: There will be one exam during the semester and a cumulative final exam:

Midterm Exam	TBD
Final Exam	December 14 - December 20, 2025

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.

ADDITIONAL RESOURCES

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 need an accommodation due to a disability, please contact the Office of Accessibility Resources and Services at oars@njit.edu, or visit Kupfrian Hall 201 to discuss your specific needs. A Letter of Accommodation Eligibility from the office authorizing student accommodations is 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: Fall 2025 Academic Calendar, Registrar)

Date	Day	Event
September 1, 2025	Monday	Labor Day
September 2, 2025	Tuesday	First Day of Classes
September 8, 2025	Monday	Last Day to Add/Drop Classes

November 10, 2025	Monday	Last Day to Withdraw
November 25, 2025	Tuesday	Thursday Classes Meet
November 26, 2025	Wednesday	Friday Classes Meet
November 27 to November 30, 2025	Thursday to Sunday	Thanksgiving Recess - Closed
December 11, 2025	Thursday	Last Day of Classes
December 12, 2025	Friday	Reading Day 1
December 13, 2025	Saturday	Saturday Classes Meet
December 14 to December 20, 2025	Sunday to Saturday	Final Exam Period

Course Outline

Week	Subject Topic
Week 1	*Class introductions; R set-up; introduction to basic probability theory*
Week 2	*Continuation of probability theory: elements and sets; probability mass functions and probability density functions*
Week 3	*Introduction to statistical inference: brief history of experimentation; introduction to the Potential Outcomes Framework*
Week 4	*Introduction to Central Limit Theorem, common probability distributions and their attributes*
Week 5	*Correlations and introduction to NHST (section 2.3, chapter 4, chapter 6)*
Week 6	*Continuation of statistical testing of hypotheses (chapter 7,chapter 8)*
Week 7	*Continuation of statistical testing of hypotheses (chapter 9, chapter 12, chapter 13)*
Week 8	*Mid-term examination (conducted during class time)*
Week 9	*Continuation of statistical testing of hypotheses, ANOVA*
Week 10	*ANCOVA, Univariate linear regression: fundamentals of regression analysis (chapter 10)*
Week 11	*Univariate linear regression: fundamentals of regression analysis (chapter*

	10)
Week 12	*Multivariable linear regression (chapter 11)*
Week 13	*Multivariable linear regression (chapter 11)*
Week 14	*Logistic regression (chapter 14)*
Final Exam	*Final exam schedule to be set by Registrar*

Updated by Professor Thomas Falconer - 2025
Department of Mathematical Sciences Course Syllabus, Fall 2025