MATH 678: Stat Methods in Data Science
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: This course introduces students to concepts in statistical methods used in data science, including data collection, data visualization and data analysis. Emphasis is on model building and statistical concepts related to data analysis methods. The course provides the basic foundational tools on which to pursue statistics, data analysis and data science in greater depth. Topics include sampling and experimental design, understanding the aims of a study, principles of data analysis, linear and logistic regression, resampling methods, and statistical learning methods. Students will use the R statistical software.

Number of Credits: 3

Prerequisites: MATH 661 or MATH 663, or permission by instructor.

Course-Section and Instructors:

Course-Section	Instructor
Math 678-101	Professor W. Guo

Office Hours for All Math Instructors: Office Hours and Emails

Required Textbook:

Title	*An Introduction to Statistical Learning: with Applications in R*
Author	Gareth James, et al
Edition	2nd (2021 ed.)

Publisher	Springer
ISBN #	978-1071614174

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

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	30%
Midterm Exam	30%
Final Exam	40%

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

A	90 - 100	**D**	60 - 70
B+	80 - 90	**F**	0 - 60
B	70 - 80		

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.

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.

Cheating in Exams: Once caught, the exam will be assigned zero points. To prevent cheating, please leave at least one seat empty between you and your neighbors.

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

Midterm Exam	October 22, 2025
Final Exam Period	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 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

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 If you need an accommodation due to a disability please contact the Office of Accessibility Resources and Services at oars@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/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 Outlines

Weeks	Chapters	Topics	Assignments
Week 1 (9/3)	Chapter 1	Introduction to Data Science	
Week 2 (9/10)	Chapter 2	Statistical Learning; kNN	Homework 1
Week 3 (9/17)	Chapter 3	Linear Regression	
Week 4 (9/24)	Chapter 4	Logistic Regression	Homework 2
Week 5 (10/1)	Chapter 4	LDA; QDA; Naive Bayes; Generalized Linear Models	
Week 6 (10/8)	Chapter 5	Cross-Validation and Bootstrap	
Week 7 (10/15)	Chapter 6	Linear Model Selection Shrinkage Methods and Dimension Reduction Methods	Homework 3
Week 8 (10/22)		**Midterm Exam:** Wednesday ~ Oct. 22, 2025	
Week 9 (10/29)	Chapter 7	Nonlinear Modeling	Homework 4
Week 10 (11/5)	Chapter 8	Tree-Based Methods Bagging, Random Forests, Boosting	
Week 11 (11/12)	Chapter 9	Support Vector Machines	Homework 5
Week 12 (11/19)	Chapter 12	Unsupervised Learning	
Week 13 (11/26)		**No Class** Friday Classes Meet	
Week 14 (12/3)	Chapter 12	Unsupervised Learning (Cont.)	Homework 6
Week 15 (12/10)	Chapter 10	Deep Learning (If time permits) REVIEW FOR FINAL EXAM	
Week 16 (12/17)		**FINAL EXAM:** Wednesday ~ Dec. 17, 2025	