

THE DEPARTMENT OF MATHEMATICAL SCIENCES

**Math 478: Statistical 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 to students 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 333](#) with a grade of C or better or [Math 341](#) with a grade of C or better.

**Course-Section and Instructors:**

Course-Section	Instructor
Math 478-001	Professor C. Shi

**Office Hours for All Math Instructors:** [Fall 2025 Office Hours and Emails](#)

**Required Textbook:**

<b>Title</b>	<i>An Introduction to Statistical Learning: with Applications in R</i>
<b>Author</b>	Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani
<b>Edition</b>	2nd ed. 2021 edition

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.

**Homework:** There will be five or six homework assignments. Late homework is not accepted. For homework problems that require the use of R, please submit the code and figures in addition to the answers.

**Midterm Exam:** There will be an in-class midterm exams during the semester, which will be held on the following days:

Midterm Exam	Oct 24, 2025
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**Final Exam:** There will be a final exam, which will be held during the Finals week:

Final Exam Period	Dec 14 - 20, 2025
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More introductions will be given in due time.

## 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%
Class Participation	5%
Midterm Exam	30%
Final Exam	35%

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

A	90 - 100	D	60 - 70
B	80 - 90	F	0 - 60
C	70 - 80		

**Attendance Policy:** Attendance at all classes will be recorded and is **mandatory and will affect one's grade as**

**class participation is 5% of the grade.** Please make sure you read and fully understand the [Math Department's Attendance Policy](#).

**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.

**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

**Math Tutoring Center:** Located in the Central King Building, Lower Level, Rm. G11 (See: [Fall 2025 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](#).

**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](mailto: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/>

**Generative AI:** Students may utilize generative AI tools (e.g., ChatGPT, Bard, DALL.E, etc.) in this course for certain assignments and activities. It is not permitted to be used in assignments including but not limited to homework and course projects, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as shown within the [NJIT Library AI citation page](#) for AI. If you have any questions or concerns about AI technology use in this class, please reach out to the instructor prior to submitting any assignments.

**Student Absences for 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. For questions or additional guidance, please [review the policy](#) or contact the Office of Inclusive Excellence at [inclusiveexcellence@njit.edu](mailto:inclusiveexcellence@njit.edu).

**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
<b>Week 1</b> (09/02)	Chapter 1	Introduction to Data Science
<b>Week 2</b> (09/09)	Chapter 2	Statistical Learning; kNN
<b>Week 3</b> (09/16)	Chapter 3	Linear Regression
<b>Week 4</b> (09/23)	Chapter 4	Logistic Regression
<b>Week 5</b> (09/30)	Chapter 4	LDA; QDA; Naive Bayes; Generalized Linear Models
<b>Week 6</b> (10/07)	Chapter 5	Cross-Validation and Bootstrap
<b>Week 7</b> (10/14)	Chapter 6	Linear Model Selection
<b>Week 8</b> (10/21)	Chapter 6	Shrinkage Methods and Dimension Reduction Methods Review for Midterm Exam <b>Midterm Exam:</b> 10/24
<b>Week 9</b>	Chapter 7	Nonlinear Modeling

(10/28)		
<b>Week 10</b> (11/04)	Chapter 7	Smoothing Splines, Generalized Additive models
<b>Week 11</b> (11/11)	Chapter 8	Tree-Based Methods
<b>Week 12</b> (11/18)	Chapter 8	Bagging, Random Forests, Boosting
<b>Week 13</b> (11/25)	Chapter 9	Maximal Vector Classifier and Support Vector Classifiers
<b>Week 14</b> (12/02)	Chapter 9	Support Vector Machines
<b>Week 15</b> (12/09)	Chapter 10	Deep Learning (If time permits)

*Updated by Professor C. Shi - 2025  
 Department of Mathematical Sciences Course Syllabus, Fall 2025*