

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 678: Stat Methods in Data Science

Spring 2025 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.

Please be sure you read and fully understand our [DMS Online Exam Policy](#).

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 678-102	Professor A. Wang

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

Required Textbook:

Title	<i>An Introduction to Statistical Learning: with Applications in R</i>
Author	Gareth James, et al
Edition	2nd (2021 ed.)
Publisher	Springer

ISBN #	ISBN-13: 9781071614174 (Hardcover) ISBN-13: 9781071614181 (Digital)
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University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, April 7, 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:

Homework	25%
Project	20%
Midterm Exam	25%
Final Exam	30%

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

A	90 - 100	C+	75 - 79
B+	85 - 89	C	70 - 74
B	80 - 84	F	0 - 69

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	March 26, 2025
Final Exam Period	May 10 - May 16, 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.

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: [Spring 2025 Academic Calendar, Registrar](#))

Date	Day	Event
January 21, 2025	Tuesday	First Day of Classes
January 27, 2025	Monday	Last Day to Add/Drop Classes
March 16, 2025	Sunday	Spring Recess Begins
March 22, 2025	Saturday	Spring Recess Ends
April 3, 2025	Thursday	Wellness day
April 7, 2025	Monday	Last Day to Withdraw
April 18, 2025	Friday	Good Friday - No Classes
April 20, 2025	Sunday	Easter Sunday - No Classes Scheduled

May 6, 2025	Tuesday	Thursday Classes Meet
May 7, 2025	Wednesday	Friday Classes Meet
May 7, 2025	Wednesday	Last Day of Classes
May 8, 2025	Thursday	Reading Day 1
May 9, 2025	Friday	Reading Day 2
May 10 - May 16, 2025	Friday to Thursday	Final Exam Period

Course Outline

Date	Lecture	Sections	Topic	Assignment
Week 1 1/22	1	Chapter 1	Introduction to Data Science	
Week 2 1/29	2	Chapter 2	Statistical Learning; KNN	Homework 1
Week 3 2/5	3	Chapter 3	Linear Regression; R Lab	
Week 4 2/12	4	Chapter 4	Logistic Regression	Homework 2
Week 5 2/19	5	Chapter 4	LDA, QDA; R Lab	
Week 6 2/26	6	Chapter 5	Cross-Validation and Bootstrap	Homework 3
Week 7 3/5	7	Chapter 6	Linear Model Selection; R Lab	
Week 8 3/12	8	Chapter 6	Shrinkage Methods and Dimension Reduction Methods	Homework 4
Week 9 3/19			SPRING RECESS (NO CLASSES)	
Week 10 3/26			MIDTERM EXAM: Wednesday ~ March 26, 2025	
Week 11 4/2	9	Chapter 7	Nonlinear Modeling; R Lab	Course Project
Week 12 4/9	10	Chapter 8	Tree-Based Methods: Bagging, Random Forests, Boosting	Homework 5
Week 13 4/16	11	Chapter 9	Support Vector Machines	
Week 14 4/23	12	Chapter 10	Unsupervised Learning	Homework 6

Week 15 4/30			Unsupervised Learning	
Week 16 5/7			Student Project Presentation	
Week 17 5/11			FINAL EXAM: Wednesday ~ May 10, 2025	

*Updated by Professor A. Wang - 2025
Department of Mathematical Sciences Course Syllabus, Spring 2025*