

MATH 478: Introduction to Statistical Methods in Data Science

Spring 2021 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: 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 478-002	Professor J. M. Loh

Office Hours for All Math Instructors: [Spring 2021 Office Hours and Emails](#)

Required Textbook:

Title	<i>The Hundred-Page Machine Learning Book</i>
Author	Andrly Burkov
Edition	2019
Publisher	*****
ISBN #	978-1999579500
Reference	An Introduction to Statistical Learning: with Applications in R James et al 1st edition (7th printing)

University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, April 5, 2021**. 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/Quizzes	15%
Exam 1 and 2	22.5% each
Final Exam	30%
Group Project	10%

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.

Exams: For any take-home exams, students must abide by the rules of the exam regarding the resources they can use for the exams. For proctored exams, proctoring will be done via a combination of a WebEx meeting and the Respondus LockDown Browser and Monitor. Students' cameras have to be turned on, and the WebEx session will be recorded. Students must follow all instructions related to environment checks and camera positioning. Students are responsible for obtaining the necessary equipment for the exams.

Equipment for Exams: Smartphone with WebEx meeting installed, Mac or Windows PC with webcam and LockDown browser installed, a scanner or scanning app

Homework Policy: No late homework will be accepted.

Discussing homework with classmates and the instructor is allowed. However, all homework are to be completed individually.

Attendance: Regular attendance is expected.

Note: The grading scale is tentative and serves only as a guide. The actual grades will be based on curved scores.

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

Exam 1	Week 7
Exam 2	Week 11
Final Exam Period	May 7 - 13, 2021

The exams 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 2021 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: 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 contact Chantonette Lyles, Associate Director of the Office of Accessibility Resources and 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 Office of Accessibility Resources and Services 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/studentssuccess/accessibility/>

Important Dates (See: **Spring 2021 Academic Calendar, Registrar**)

Date	Day	Event
January 19, 2021	T	First Day of Classes
January 23, 2021	S	Saturday Classes Begin
January 25, 2021	M	Last Day to Add/Drop Classes
March 14 - March 21, 2021	Su - Su	Spring Recess - No Classes
April, 2, 2021	F	Good Friday - No Classes
April 5, 2021	M	Last Day to Withdraw
May 4, 2021	T	Friday Classes Meet
May 4, 2021	T	Last Day of Classes
May 5 & May 6, 2021	W & R	Reading Days
May 7 - May 13, 2021	F - R	Final Exam Period

Course Outline

Week	Topic	
1	Introduction to Data Science	
2	Statistical Learning	
3	Linear Regression	
4	Logistic Regression	
5	kNN	
6	Linear Discriminant Analysis	
7	Cross-Validation	Exam 1
8	Bootstrap	
9	Variable selection/Regularization	
10	Non-linear modeling	
11	Classification and Regression Trees	Exam 2
12	Support Vector Machines	
13	Unsupervised learning	
14	Review	

*Updated by Professor J. M. Loh - 2/16/2021
Department of Mathematical Sciences Course Syllabus, Spring 2021*
