

THE DEPARTMENT OF MATHEMATICAL SCIENCES

## MATH 660: Introduction to Statistical Computing with SAS and R

### *Fall 2023 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 will study SAS and R programming and emphasize the SAS and R data steps including getting data into the SAS and R environments, working and combining data using control flows, merge and subsets, etc. as well as learning to export data and to generate high resolution graphics. Several SAS and R statistical procedures or functions will also be discussed and illustrated. Finally, interactive statistical software JMP and Minitab are briefly introduced.

**Number of Credits:** 3

**Prerequisites:** Math 661 or instructor approval.

**Course-Section and Instructors:**

Course-Section	Instructor
Math 660-101	Professor J. M. Loh

**Office Hours for All Math Instructors:** [Fall 2023 Office Hours and Emails](#)

**Recommended Textbook:**

Title	<i>The R Book</i>
Author	M.J. Crawley
Edition	2nd
Publisher	Prentice Hall
ISBN #	9780470973929

**University-wide Withdrawal Date:** The last day to withdraw with a W is **Monday, November 13, 2023**. 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/Quizzes	25%
Midterm Exam	30%
Final Exam	40%
Class Attendance/Participation	5%

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. Class attendance and participation can contribute up to 5% of the grade at the instructor's discretion.

**Homework policy:** No late homework will be accepted.

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

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

Midterm Exam	Week 8
Final Exam Period	December 17 - December 23, 2023

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 need an accommodation due to a disability, please contact the Office of Accessibility Resources and Services at [oars@njit.edu](mailto: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 2023 Academic Calendar](#), [Registrar](#))

Date	Day	Event
September 4, 2023	Monday	Labor Day
September 5, 2023	Tuesday	First Day of Classes
September 11, 2023	Monday	Last Day to Add/Drop Classes
November 13, 2023	Monday	Last Day to Withdraw
November 21, 2023	Tuesday	Thursday Classes Meet
November 22, 2023	Wednesday	Friday Classes Meet
November 23 to November 26, 2023	Thursday and Saturday	Thanksgiving Recess - Closed
December 13, 2023	Wednesday	Last Day of Classes
December 14, 2023	Thursday	Reading Day 1
December 15, 2023	Friday	Reading Day 2
December 17 to December 23, 2023	Sunday to Saturday	Final Exam Period

## Course Outline

Week	Topic
1	Introduction to R
2	R basics and EDA
3	Data visualization with ggplot2

4	Objects in R: vectors, matrices, lists, dat frames, factors
5	Manipulating data - tidy, tidyverse, dplyr
6	R programming - functions, conditional statements; loops
7	Probability distributions and simulation
8	<b>Midterm Exam</b>
9	Simple statistical procedures
10	Regression models and Analysis of variance
11	Regression models and Analysis of variance (cont)
12	Categorical data analysis
13	Data mining and Machine learning basics
14	Review

*Updated by Professor J. M. Loh - 8/11/2023*  
*Department of Mathematical Sciences Course Syllabus, Fall 2023*