

## MATH 461: Introduction to Statistical Computing with SAS and R

### *Fall 2020 Graduate 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 461-101	Professor J. M. Loh

**Office Hours for All Math Instructors:** [Fall 2020 Office Hours and Emails](#)

**Recommended Textbooks:**

	BOOK 1	BOOK 2
<b>Title</b>	<i>The R book</i>	<i>The Little SAS Book: A Primer</i>
<b>Author</b>	M.J. Crawley	Delwiche & Slaughter
<b>Edition</b>	2nd	5th
<b>Publisher</b>	Prentice Hall	SAS Institute Inc.
<b>ISBN #</b>	9780470973929	978-1612903439

**University-wide Withdrawal Date:** The last day to withdraw with a W is **Monday, November 9, 2020**. 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	25%
Midterm Exam	30-35%
Final Exam	40%
Class Attendance/Participation	Up to 5%

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

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

**Academic Integrity:** Students are expected to adhere to NJIT's honor code for this course. This covers all exams and assignments.

**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.**

**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

Exams are held on the following days:

Midterm Exam	Week 8
Final Exam Period	December 15 - 21, 2020

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:** To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

- [http://math.njit.edu/students/policies\\_exam.php](http://math.njit.edu/students/policies_exam.php)

**Cellular Phones:** All cellular phones and other electronic devices must be switched off during all class times.

## ADDITIONAL RESOURCES

**Accommodation of Disabilities:** Disability Support Services (DSS) 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 Disability Support Services at [973-596-5417](tel:973-596-5417) or via email at [lyles@njit.edu](mailto:lyles@njit.edu). The office is located in Fenster Hall, Room 260. A Letter of Accommodation Eligibility from the Disability Support 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 Disability Support Services (DSS) website at:

- <https://www.njit.edu/studentsuccess/accessibility/>

**Important Dates** (See: [Fall 2020 Academic Calendar](#), [Registrar](#))

Date	Day	Event
September 1, 2020	T	First Day of Classes
September 5, 2020	S	Saturday Classes Begin
September 7, 2020	M	Labor Day
September 8, 2020	T	Monday Classes Meet
September 8, 2020	T	Last Day to Add/Drop Classes
November 9, 2020	M	Last Day to Withdraw
November 25, 2020	W	Thursday Classes Meet
November 26-29, 2020	R - Su	Thanksgiving Recess
December 10, 2020	R	Last Day of Classes
December 11 & 14 2020	F & M	Reading Days
December 15 - 21, 2020	T - M	Final Exam Period

## Course Outline

Lecture	Topic
1	Introduction to SAS and R
2	R basics and EDA; basic SAS
3	Data visualization with ggplot2
4	Objects in R: vectors, matrices, lists, data.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
1	Data mining and Machine learning basics
14	<b>REVIEW</b>

*Updated by Professor J. M. Loh - 8/25/2020*  
*Department of Mathematical Sciences Course Syllabus, Fall 2020*

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