MATH 664: Methods for Statistical Consulting
Spring 2024 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: Communicating with scientists in other disciplines. Statistical tools for consulting. Using statistical software such as JMP, SAS, and S-plus. Case studies which illustrate using statistical methodology and tools are presented by the instructor and guest speakers from academia and industry. Assignments based on case studies with use of statistical software is required.

Number of Credits: 3

Prerequisites: MATH 661 or departmental approval.

Course-Section and Instructors:

Course-Section	Instructor
Math 664-102	Professor J. M. Loh

Office Hours for All Math Instructors: Spring 2024 Office Hours and Emails

Recommended Textbooks:

	Book 1	Book 2
Title	*Applied Statistics - Principles and Examples*	*Statistics and Scientific Method*
Author	D.R. Cox, E. J. Snell	Diggle and Chetwynd
Edition	1st	1st
Publisher	Chapman and Hall/CRC	Chapman and Hall/CRC
ISBN #	9780412165702	9780199543199

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 1, 2024**. It will be

strictly enforced.

COURSE GOALS

Course Objectives - Provide overview of statistical methods for data analysis, including regression, generalized linear models, analysis of variance, random effects, variable and model selection, clustering, and decision trees, through lectures and case studies.

Course Outcomes - Students will learn to use R for statistical analysis, and apply statistical methods introduced in class to data assignments.

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	10%
Group Presentation/Report	25%
Midterm Exam	30%
Final Exam	35%

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

A	90 - 100	**C+**	55 - 64
B+	75 - 89	**C**	40 - 54
B	65 - 74	**F**	0 - 39

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.

Homework: Discussing homework with classmates and the instructor is encouraged. However, all homework are to be written and completed individually. There should be NO sharing of code. Please refer to the university honor code (http://integrity.njit.edu/) if there are any ambiguities. Late homeworks will receive an automatic 20% penalty. No homeworks will be accepted beyond 2 days of the due date.

Exams: There will be three exams during the semester and a cumulative final exam during the final exam week:

Midterm Exam	
Final Exam Period	May 3 - May 9, 2024

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 2024 Academic Calendar, Registrar)

Date	Day	Event
January 16, 2024	Tuesday	First Day of Classes
January 22, 2024	Monday	Last Day to Add/Drop Classes
March 10, 2024	Sunday	Spring Recess Begins
March 16, 2024	Saturday	Spring Recess Ends
March 29, 2024	Friday	Good Friday - No Classes
April 1, 2024	Monday	Last Day to Withdraw
April 30, 2024	Tuesday	Friday Classes Meet
April 30, 2024	Tuesday	Last Day of Classes
May 1, 2024	Wednesday	Reading Day 1
May 2, 2024	Thursday	Reading Day 2
May 3 - May 9, 2024	Friday to	Final Exam Period

	Thursday	

Course Outline

Lecture	Topic
1	Overview of Statistical Consulting; Introduction to R
2	Regression review; Phases of an analysis; Data structures in R
3	Variation and inference; Data frames in R
4	Exploratory data analysis; data cleaning and visualization
5	Experimental design and sampling; sample size calculations
6	Measurement error models; fixed and random effects; model choice
7	Prospective and retrospective analyses; case-control studies
8	Statistical models; logistic and ordinal regression
9	**Midterm Exam**
10	Multiple testing; variable selection; dimension reduction
11	Decision trees; Clustering analysis
12	Longitudinal data analysis and Generalized Estimating Equations
13	Working with spatial data/big data
14	Student presentations
15	Reading day (no class)

Updated by Professor J. M. Loh - 12/8/2023
Department of Mathematical Sciences Course Syllabus, Spring 2024