

## MATH 699: Design and Analysis of Experiments 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.

## **COURSE INFORMATION**

**Course Description**: Statistically designed experiments and their importance in data analysis, industrial experiments. Role of randomization. Fixed and random effect models and ANOVA, block design, Latin square design, factorial and fractional factorial designs and their analysis. Effective From: Spring 2006

Number of Credits: 3

Prerequisites: MATH 662

**Course-Section and Instructors:** 

Course-Section	Instructor
Math 699-102	Professor C. Shi

Office Hours for All Math Instructors: Spring 2025 Office Hours and Emails

**Required Textbook:** 

Title	Design and Analysis of Experiments
Author	Montgomery
Edition	10th
Publisher	John Wiley & Sons
ISBN #	9781119492443 (eBook) 9781119722106 (Paper)

University-wide Withdrawal Date: The last day to withdraw with a W is Monday, April 7, 2025. It will be strictly enforced.

## **COURSE GOALS**

#### **Course Objectives**

Statistically designed experiments and their importance in data analysis, industrial experiments. Role of randomization. Fixed and random effect models and ANOVA, block design, Latin square design, factorial and fractional factorial designs and their analysis.

#### **Course Outcomes**

- Read and recall Design of Experiment methods.
- Solve and analyze Design of Experiments statistical problems
- Collect ideas to do Design of Experiments statistical computations.
- Compare and contrast the best method (when to use the appropriate design) for setting up a design for an experiment, conduct (randomization) and analysis.

Course Assessment: Understand topics to be able to design, conduct, and analyze statistical data.

### 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.

Homework	25%
Class Participation	10%
Midterm Exam	30%
Final Exam	35%

Grading Policy: The final grade in this course will be determined as follows:

Your final letter grade is on a tentative curve so that there are A's in the class.

Attendance Policy: Attendance at all classes will be recorded and is mandatory and will affect one's grade as class participation is 10% of the grade. Please make sure you read and fully understand the <u>Math Department's</u> <u>Attendance Policy</u>.

Canvas: Download Canvas app on your phone it will help.

Exams: There will be two exams: a midterm exam and a final exam. Exam schedule:

Midterm Exam	Wednesday, April 2, 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 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.

**Calculators:** Calculators are allowed but should be basic, without graphing capabilities, algebraic simplification capabilities, formula-storing capabilities and without other such capabilities.

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/

**Academic Integrity:** Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

**Generative AI:** Students may utilize generative AI tools (e.g., ChatGPT, Bard, DALL·E, etc.) in this course for certain assignments and activities. It is not permitted to be used in assignments including but not limited to homework and course projects, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as shown within the NJIT Library AI citation page for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

**Student Absences for 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. For questions or additional guidance, please review the policy or contact the Office of Inclusive Excellence at inclussiveexcellence@njit.edu.

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

# **Tentative Course Outline**

Lecture #	Day	Topics
1	1/22	Introduction and Review
2	1/29	Simple Comparative Experiments
3	2/05	Experiments with a Single Factor: ANOVA - Part I
4	2/12	Experiments with a Single Factor: ANOVA - Part II
5	2/19	Randomized Block Designs
6	2/26	Latin Square Design, Greco-Latin Square

7	3/05	Balanced Incomplete Block Designs
8	3/12	Factorial Designs
9	3/19	No Class (Spring Break)
10	3/26	Two-power-k Factorial Designs
11	4/02	MIDTERM EXAM
12	4/09	Blocking and Confounding in Two-power-k Factorial Designs
13	4/16	Two-Level Fractional Factorial Designs
14	4/23	Response Surface Methodology
15	4/30	Project Presentations
16	5/07	Course Review
		FINAL EXAM

Updated by Professor C. Shi - 2025 Department of Mathematical Sciences Course Syllabus, Spring 2025