

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 227: Mathematical Modeling

Fall 2025 Course Syllabus

NJIT Academic Integrity Code: 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

COURSE INFORMATION

Course Description: An introduction to the theory and practice of mathematical modeling. Techniques include scaling and dimension, fitting of data, linear and exponential models, elementary dynamical systems, probability, optimization, Markov chain modeling. Models are drawn from applications including biology, physics, economics, finance, and chemistry.

Number of Credits: 3

Prerequisites: MATH 112 with a grade of C or better or MATH 133 with a grade of C or better and CS 115 with a grade of C or better or CS 113 with a grade of C or better or CS 100 with a grade of C or better or CS 101 with a grade of C or better.

Course-Section and Instructors:

Course-Section	Instructor
Math 227-001	Professor C. Diekman

Office Hours for All Math Instructors: [Fall 2025 Office Hours and Emails](#)

Required Textbook:

No Book Required

University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, November 10, 2025**. It will be strictly enforced.

COURSE GOALS

Course Objectives

- Students should learn how to create a mathematical model.
- Students should learn various mathematical techniques to analyze models.
- Students should be able to interpret mathematical results in terms of the model.
- Students should be able to use MATLAB and Python to do computer simulations.

Course Outcomes

- Students have improved logical thinking, problem-solving, and teamwork skills.
- Students are prepared for further study in mathematics as well as science, engineering, computing, and other areas.

Course Assessment: The assessment of objectives is achieved through in-class participation, homework, labs, exams, and projects.

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:

Attendance and In-Class Participation	5%
Homework and Labs	30%
Midterm Exam 1	15%
Midterm Exam 2	15%
Midterm Project	15%
Final Project	20%

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

A	90 - 100	C	60 - 69
B+	85 - 89	D	50 - 59
B	75 - 84	F	0 - 49
C+	70 - 74		

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.

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.

MATLAB: MATLAB is a mathematical software program that is used throughout the science and engineering curricula. Students should download it to their computers from the IST software downloads page. For this class, you are required to write code using this software.

Exams: There will be 2 midterm exams, a midterm project, and a final project. The final project will consist of a written project report and an oral project presentation during the Final Exam Period.

Midterm Exam 1	mid-October
Midterm Project	late October
Midterm Exam 2	mid-November
Final Project Due	December 14 - 20, 2025

The final project 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.

Generative AI: Students are expected to work without artificial intelligence (AI) assistance in order to better develop their skills in this content area. As such, AI usage is not permitted throughout this course under any circumstance.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: [Fall 2025 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](#).

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, 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 2025 Academic Calendar, Registrar](#))

Date	Day	Event
September 1, 2025	Monday	Labor Day
September 2, 2025	Tuesday	First Day of Classes
September 8, 2025	Monday	Last Day to Add/Drop Classes
November 10, 2025	Monday	Last Day to Withdraw
November 25, 2025	Tuesday	Thursday Classes Meet
November 26, 2025	Wednesday	Friday Classes Meet
November 27 to November 30, 2025	Thursday to Sunday	Thanksgiving Recess - Closed
December 11, 2025	Thursday	Last Day of Classes
December 12, 2025	Friday	Reading Day 1
December 13, 2025	Saturday	Saturday Classes Meet
December 14 to December 20, 2025	Sunday to Saturday	Final Exam Period

Course Outline

Week	Topic
1	Introduction to the Mathematical Modeling Process
2 - 4	Discrete-Time Dynamical Models
5 - 7	Continuous-Time Dynamical Models
8 - 12	Stochastic and Statistical Models
13 - 15	Optimization and Agent-based Models

*Updated by Professor C. Diekman - 2025
Department of Mathematical Sciences Course Syllabus, Fall 2025*