MATH 227: Mathematical Modeling
Fall 2018 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: 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: 4

Prerequisites: MATH 112 with a grade of C or better or MATH 133 with a grade of C or better and CS 115with 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
Math 227-003	Professor C. Diekman

Office Hours for All Math Instructors: Fall 2018 Office Hours and Emails

Required Textbook:

Title	No Book
Author	---
Edition	---
Publisher	---
ISBN #	---

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, November 12, 2018**. 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 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 a project.

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, Labs, and In-Class Participation	30%
Midterm Exam I	20%
Midterm Exam II	20%
Final Exam (Project)	30%

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.

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 two midterm exams held in class during the semester and one comprehensive final exam. The final exam will be held during the following week:

Midterm Exam I	October 5, 2018
Midterm Exam II	November 9, 2018
Final Exam Week	December 15 - 21, 2018

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

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: Fall 2017 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.

All students must familiarize themselves with and adhere to the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. The Department of Mathematical Sciences takes these policies very seriously and enforces them strictly.

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 or via email at 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:

- http://www5.njit.edu/studentsuccess/disability-support-services/

Important Dates (See: Fall 2018 Academic Calendar, Registrar)

Date	Day	Event
September 4, 2018	T	First Day of Classes
September 10, 2018	M	Last Day to Add/Drop Classes
November 12, 2018	M	Last Day to Withdraw
November 20, 2018	T	Thursday Classes Meet
November 21, 2018	W	Friday Classes Meet
November 22 - 25, 2018	R - Su	Thanksgiving Recess
December 12, 2018	W	Last Day of Classes
December 13 & 14, 2018	R & F	Reading Days
December 15 - 21, 2018	Sa - F	Final Exam Period

Course Outline

Week	Topic
Weeks 1	Introduction to Mathematical Modeling
Weeks 2 - 5	Discrete Dynamical Systems **(MIDTERM EXAM I – OCTOBER 5)**
Weeks 6	Probability Theory
Weeks 7 - 10	Markov Chains **(MIDTERM EXAM II – NOVEMBER 9)**
Weeks 11 - 15	Continuous Dynamical Systems, Regression Modeling, Linear Programming, Agent-based Modeling