MATH 322: Differential Equations for Applications
Fall 2026 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 Code of Student Conduct and Academic Integrity Policy that is found at: Code of Student Conduct and Academic Integrity Policy.

Please note that I am required to report any suspected academic misconduct to the Office of the Dean of Students. Academic misconduct includes, but is not limited to, cheating, plagiarism, and the inappropriate use of online tools or software. Students who are found responsible for violating the Academic Integrity Code may be subject to disciplinary action. Possible outcomes can include a failing grade on an assignment or in the course, as well as additional sanctions up to and including suspension or dismissal from the university. If you have questions about the Code of Student Conduct and Academic Integrity or the student conduct process, you may contact communitystandards@njit.edu.

COURSE INFORMATION

Course Description: An applied science study using differential equations as the vehicle for comprehension of the unknown. Introduction to first-order differential equations and their applications to motion, cooling and electromechanical systems followed by higher order differential equations and their solutions. And includes Laplace transforms and numerical methods.

Number of Credits: 3

Prerequisites: MATH 112 with a grade of C or better, or MATH 133 with a grade of C or better or MATH 238 with a grade of C or better.

Course-Section and Instructors:

Course-Section	Instructor
Math 322-003	Professor M. Potocki-Dul
Math 322-101	Professor M. Potocki-Dul

Office Hours for All Math Instructors: Fall 2026 Office Hours and Emails

Required Textbook:

Title	*Differential Equations w/ Boundary-Value Problems (Bundle w/ WebAssign)* ***Buy through WebAssign login page***

Author	Dennis G. Zill and Warren S. Wright
Edition	9th
Publisher	Cengage
ISBN #	978-1337604901
Technology	Laptop Computer

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Tuesday, November 10, 2026**. It will be strictly enforced.

COURSE GOALS

Course Objectives

- Derive solutions of separable and linear first-order differential equations.
- Interpret solutions of differential equation models in mechanics, circuits, &c.
- Derive solutions of linear second order equations or systems that have constant coefficients.
- Apply the Laplace transform to solve forced linear differential equations.

Course Outcomes

- Prepare students for further study in technological disciplines and more advanced mathematics courses.
- Students have an understanding of the importance of differential equations in the sciences and engineering.

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	15%
Midterm Exam I	25%
Midterm Exam II	25%
Final Cumulative Exam	35%

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

A	90 - 100	**C**	70 - 74
B+	85 - 89	**D**	60 - 69
B	80 - 84	**F**	0 - 59
C+	75 - 79		

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.

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

Midterm Exam I	Week 5
Midterm Exam II	Week 10
Final Exam	December 16 - December 22, 2026

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 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 2026 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 2026 Academic Calendar, Registrar)

Date	Day	Event
September 1, 2026	Tuesday	First Day of Classes
September 5, 2026	Saturday	Saturday Classes Begin
September 7, 2026	Monday	Labor Day. University Closed
September 8, 2026	Tuesday	Last Day to Add/Drop Classes
September 8, 2026	Tuesday	Conversion Day - Monday Classes Meet
October 2, 2026	Friday	Wellness Day
November 10, 2026	Tuesday	Last Day to Withdraw
November 25, 2026	Wednesday	Conversion Day - Friday Classes Meet
November 26 to November 29, 2026	Thursday and Sunday	Thanksgiving Recess - Closed
December 11, 2026	Friday	Friday Classes Meet - Make up day for Wellness Day
December 12, 2026	Saturday	Saturday Classes Meet
December 13, 2026	Sunday	Last Day of Classes
December 14, 2026	Monday	Reading Day 1
December 15, 2026	Tuesday	Reading Day 2
December 16 to December 22, 2026	Wednesday to Tuesday	Final Exam Period

Tentative Course Outline

Week	Section	Topic	Homework (HW) Assignment
1	1.1, 1.2, 1.3	Introduction to Differential Equations	1.1: 21, 23 1.2: 7, 11 1.3: 9
2	2.1, 2.2, 2.3	Autonomous Diff. Eq., Separable Equations, Linear Equations,	2.1: 23, 25 2.2: 1, 3, 5, 7, 11, 23, 27 2.3: 1, 3, 5, 7, 9, 11, 17, 23, 25, 27, 35
3	2.6, 3.1	Euler's Method, Applications of Linear Equations	2.6: 5, 7, 9 (Use Euler's Method up to y2 only)
4	3.1	More Applications Review for Exam I	3.1: 1, 3, 5, 9, 13, 21, 23
5	**MIDTERM EXAM I**		

6	4.1, 4.2, 4.3	Linear DE, Independence, Reduction of Order, Homogeneous Linear DE,	4.1: 15, 18, 27 4.3: 3, 5, 9, 11, 15, 21, 24, 29 4.2: 1, 3, 9
7	4.4, 4.6	Method of Undetermined Coefficients, Variations of Parameters	4.4: 5, 9, 12, 13, 29, 35 4.6: 1, 4, 6, 11, 19, 21
8	5.1, 5.2	Linear Models: IVP & BVP - Spring Mass Systems/Beams	5.1: 3, 6, 27, 29a
9	8.1, 8.2 8.3	Systems of Linear Differential Equations, Nonhomogeneous Linear Systems, Review for Exam II	8.1: 1, 3, 7, 11 8.2: 1, 3, 5, 13
10	**REVIEW**		
	MIDTERM EXAM 2		
11-12	7.1 7.2	Laplace Transform, Inverse Laplace Transform	7.1: 1, 3, 19, 23, 27, 31, 32, 33 7.2: 1, 3, 7, 9, 11, 13, 35, 37
12-13	9.1 9.2	Numerical Solutions, Euler Methods , Runga-Kutta Methods	9.1: 1, 3, 5 9.2: 3, 5
13-14	Review	REVIEW AND FINAL EXAM	
FINALS		December 16 - December 22, 2026	

Updated by Professor M. Potocki-Dul- 2026
Department of Mathematical Sciences Course Syllabus, Fall 2026