

Summer 2023

## **MATH 111-031, 131, Summer 2023: Calculus I**

Mathematical Sciences Department

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## MATH 111: Calculus I

### *Summer 2023 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:** Topics include limits, differentiation, applications of differentiation, and integration.

**Number of Credits:** 4

**Prerequisites:** MATH 110 or placement by performance on standardized entrance examinations.

**Course-Section and Instructors:**

Course-Section	Instructor
Math 111-031	Professor M. Potocki-Dul
Math 111-131	Professor S. Alptekin

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

**Required Textbook:**

<b>Title</b>	<i>Thomas' Calculus: Early Transcendentals</i>
<b>Author</b>	Hass, Heil, and Weir
<b>Edition</b>	15th
<b>Publisher</b>	Pearson
<b>ISBN #</b>	9780137559893 9780137560042

**University-wide Withdrawal Date:** Please see the [Summer 2023 Academic Calendar](#) for the last day to withdraw based on the summer session you are registered for.

### COURSE GOALS

Course Objectives

- Students should (a) learn about limits and their central role in calculus, (b) learn about derivatives and their relationship to instantaneous rates of change, (c) understand many practical applications of derivatives, (d) gain experience in the use of approximation in studying mathematical and scientific problems, (e) learn about integrals: their origin in the area problem and their relationship to derivatives.
- Students should gain an appreciation for the importance of calculus in scientific, engineering, computer, and other applications.
- Students should gain experience in the use of technology to facilitate visualization and problem solving.

**Course Outcomes**

- Students have improved logical thinking and problem-solving skills.
- Students have a greater understanding of the importance of calculus in science and technology.
- 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 homeworks, quizzes, and common examinations with common grading.

**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%
Quizzes	10%
Midterm Exam I	25%
Midterm Exam II	25%
Final Exam	30%

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

A	88 - 100	C	65 - 71
B+	83 - 87	D	60 - 64
B	77 - 82	F	0 - 59
C+	72 - 76		

**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.

**Office Policy:** Office hours will be offered online using WebEx.

**Homework:** Homework is a requirement for this class. Online homework will be completed with MyMathLab, which comes with a new copy of the textbook. Access to it can also be purchased directly from the website.

**Quizzes:** Quizzes will be given approximately once a week throughout the semester. They will be based on the lecture, homework and the in-class discussions.

**Exams:** There will be three common midterm exams held during the semester and one comprehensive common final exam. Common Midterm Exams will be held on the following days:

Midterm Exam 1	June 14, 2023
Midterm Exam 2	July 19, 2023
Final Exam	August 7, 2023

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. To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

[http://math.njit.edu/students/policies\\_exam.php](http://math.njit.edu/students/policies_exam.php)

**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: [Summer 2023 Hours](#))

**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 contact Scott Janz, Associate Director of Disability Support Services at [973-596-5417](tel:973-596-5417) or via email at [scott.p.janz@njit.edu](mailto:scott.p.janz@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: [Summer 2023 Academic Calendar](#), Registrar)

Date	Day	Event
May 22, 2023	Monday	Full, First, and Middle Summer Session Begins
May 24, 2023	Wednesday	Last Day to Add/Drop for First Summer

		Session
May 26, 2023	Friday	Last Day to Add/Drop for <b>Middle Summer</b> Session
May 29, 2023	Monday	Last Day to Add/Drop for <b>Full Summer</b> Session
May 29, 2023	Monday	Memorial Day - University Closed/No Classes Scheduled
June 10, 2023	Saturday	Last Day to Withdraw from <b>First Summer</b> Session
June 16, 2023	Friday	Last Day to Withdraw from <b>Middle Summer</b> Session
June 16, 2023	Friday	Juneteenth - University Closed/No Classes Scheduled
June 26, 2023	Monday	Last Day of Classes for <b>First Summer</b> Session
June 30, 2023	Friday	Last Day to Withdraw from <b>Full Summer</b> Session
July 4, 2023	Tuesday	Independence Day - University Closed/No Classes Scheduled
July 5, 2023	Wednesday	<b>Second Summer</b> Session Begins
July 6, 2023	Thursday	Last Day to Add/Drop for <b>Second Summer</b> Session
July 17, 2023	Monday	Last Day of Classes for <b>Middle Summer</b> Session
July 20, 2023	Thursday	Last Day to Withdraw for <b>Second Summer</b> Session
August 8, 2023	Tuesday	Last Day of Classes for <b>Full and Second Summer</b> Session

## Course Outline

Lecture	Section #	Subject Topic	Assignment in MyMathLab
1	2.1	<i>Rates of Change and Tangents to Curves</i>	1,5,9,13,25
2	2.2	<i>Limit of a Function and Limit Laws</i>	1,2,13,19,22,25,31,33,35,41,47,49,53,57,63,79,81
2	2.4	<i>One-Sided Limits</i>	3,5,9,13,15,17,27,29,31,37,41,

3	2.5	<i>Continuity</i>	3,5,7,15,17,21,25,27,29, 35,37,39,45,47,49,53,59,65
3-4	2.6	<i>Limits Involving Infinity; Asymptotes of Graphs</i>	7,9,11,23,25,27,31,33,43,45,49,53,63, 67,89,91,105,107
		<i>Memorial Day Holiday - School Closed</i>	
4	3.1	<i>Tangents and the Derivative at a Point</i>	11,13,15,17,21
5	3.2	<i>The Derivative as a Function</i>	1,3.5,13,26,33,39,41
5	3.3	<i>Differentiation Rules</i>	5,7,19,25,31,39,41,43,45, 47,53,55,57,59,62,63,74
6	3.4	<i>The Derivative as a Rate of Change</i>	1,5,7,10,13,17,21,23,29
7	3.5	<i>Derivatives of Trigonometric Functions</i>	2,12,15,16,19,26,29,33,35,55
9		<i>REVIEW FOR MIDTERM EXAM I</i>	
		<i>MIDTERM EXAM I: June 14</i>	
8	3.6	<i>The Chain Rule</i>	5,17,23,25,29,33,35,39,43,47,49,51,61,63,65,67 71,77,81,83,85,89,97,101
10	3.7	<i>Implicit Differentiation</i>	1,7,11,15,16,17,19,23,33,39,41
11	3.8	<i>Derivatives of Inverse Functions and Logarithms</i>	7,9,17,25,28,33,35,39,43,47,61,65,67,69,73,87, 93,99
12	3.9	<i>Inverse Trigonometric Functions</i>	5,11,21,23,31,33,34,37,41
13	3.10	<i>Related Rates</i>	7,11,15,17,21,23,25, 27,31,33,37,40,41
14	3.11	<i>Linearization and Differentials</i>	5,11,13,19,31,35,41,51,53,59
15	4.1	<i>Extreme Values of Function</i>	7,25,29,33,35,41,47,49,50,51,70
16	4.2	<i>The Mean Value Theorem</i>	3,4,5,6,11,13,16,21
	4.2	<i>The Mean Value Theorem (Cont'd)</i>	31,35,37,41,45,47,49,51,56
17	4.3	<i>Monotone Functions and the First Derivative Test</i>	11,13,21,29,37,41,43,51,63,77,79
18	4.4	<i>Concavity and Curve Sketching</i>	7,13,19,23,37,43,46,51,55,59,61,113,123
19	4.5	<i>Indeterminate Forms and L'Hopital's Rule</i>	7,9,11,15,21,23,25,31,35,39,43,46,48,51, 53,57,59,60,65,67,69,73,81
20	4.6	<i>Applied Optimization</i>	4,7,9,11,12,14,23,31,46,47,59,64
21	4.7	<i>Newton's Method</i>	1,2,5,23
22		<i>REVIEW FOR MIDTERM EXAM II</i>	
		<i>MIDTERM EXAM II: July 19, 2022</i>	

23	4.8	<i>Antiderivatives</i>	5,11,19,35,37,39,41,45,47,54,59,61,69,97,101,104,107,113,127
24	5.1 5.2	<i>Area and Estimating with Finite Sums Sigma Notation and Limits of Finite Sums</i>	5.1: 1,5,8,9,11 5.2: 7,9,17,25,29,37,42,43,47
25	5.3	<i>The Definite Integral</i>	1,9,13,21,22,33,42,45,57,59,61,71,79,88
26	5.4	<i>The Fundamental Theorem of Calculus</i>	7,9,13,15,21,23,27,30,41,47,53,55,57,60,61,63,77,79
27	5.5	<i>Indefinite Integrals and the Substitution Method</i>	11,15,18,20,21,23,25,26,27,29,33,37,43,47,53,55,59,63,65,79
28	5.6	<i>Substitution and Area Between Curves</i>	3,12,17,19,27,29,33,39,53,66,71,77,83,87,93,97,99, 102,119
29		<i>Review</i>	
31		<i>FINAL EXAM August 7, 2022</i>	

*Updated by Professor M. Potocki-Dul - 04/28/2023  
Department of Mathematical Sciences Course Syllabus, Summer 2023*