

## MATH 111: Calculus I

### *Fall 2019 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 111-001   | Professor J. H. Ro    |
| Math 111-003   | Professor S. Alptekin |
| Math 111-005   | Professor J. H. Ro    |
| Math 111-007   | Professor J. Davis    |
| Math 111-009   | Professor D. Schmidt  |
| Math 111-011   | Professor S. Alptekin |
| Math 111-013   | Professor J. Davis    |
| Math 111-015   | Professor R. Dandan   |
| Math 111-017   | Professor E. Gulistan |
| Math 111-019   | Professor K. Minkyun  |
| Math 111-021   | Professor E. Dupay    |
| Math 111-023   | Professor E. Dupay    |
| Math 111-025   | Professor I. Peltekov |
| Math 111-027   | Professor B. Patiak   |
| Math 111-029   | Professor R. Allaire  |
| Math 111-031   | Professor D. Schmidt  |
| Math 111-103   | Professor M. Aytas    |

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Office Hours for All Math Instructors: [Fall 2019 Office Hours and Emails](#)

Required Textbook:

|           |  |
|-----------|--|
| Title     | <i>Thomas' Calculus: Early Transcendentals</i> |
| Author    | Hass, Heil, and Weir                           |
| Edition   | 14th   |
| Publisher | Pearson  |
| ISBN #    | 978-0134768496                                 |

University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, November 11, 2019**. It will be strictly enforced.

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## 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.

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## 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:

|                         |     |
|-------------------------|-----|
| Quizzes and HW          | 17% |
| Common Midterm Exam I   | 17% |
| Common Midterm Exam II  | 17% |
| Common Midterm Exam III | 17% |
| Final Exam              | 32% |

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

|   |          |   |         |
|---|----------|---|---------|
| A | 88 - 100 | C | 66 - 71 |
|---|----------|---|---------|

|    |         |   |         |
|----|---------|---|---------|
| B+ | 83 - 87 | D | 60 - 65 |
| 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. Students are expected to attend class. Each class is a learning experience that cannot be replicated through simply "getting the notes."

**Homework Policy:** 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.

**MATLAB Assignments:** MATLAB is a mathematical software program that is used throughout the science and engineering curricula. Tutors are available to help students having difficulties in accordance with a posted **schedule**.

**Quiz Policy:** Quizzes will be given approximately once a week throughout the semester. They will be based on the lecture, homework and the in-class discussions. There will be 8-12 assessments given throughout the semester.

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

|                         |                        |
|-------------------------|------------------------|
| Common Midterm Exam I   | September 25, 2019     |
| Common Midterm Exam II  | October 23, 2019       |
| Common Midterm Exam III | November 20, 2019      |
| Final Exam Period       | December 14 - 20, 2019 |

The time of the midterm exams is **4:15-5:40 PM** for daytime students and **5:45-7:10 PM** for evening students. 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.

**Missed Exam Policy:** If one common exam is missed with an excused absence from the Dean of Students, then the final exam score will count in the place of the missed exam.

**Makeup Exam Policy:** 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)

**Diagnostic Assessment:** Having a solid background in pre-calculus is a prerequisite for success in calculus. Accordingly, during the first week of the semester, every student will complete a diagnostic assessment of pre-calculus. Students whose outcomes indicate gaps in this material will be assigned additional activities in order to assist in filling these gaps. Students who do not complete the diagnostic assessment and all assigned follow-up activities will have two points deducted from their course average.

**Mandatory Tutoring Policy:** Based upon academic performance indicating a significant gap in understanding of the course material, students may receive a notice of being assigned to mandatory tutoring to assist in filling the gap. A student will have 2 points deducted from the course average for each instance in which the required tutoring is not completed by the stated deadline.

**Cellular Phones:** All cellular phones and other electronic devices must be switched off and put away during all class times.

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## ADDITIONAL RESOURCES

**Math Tutoring Center:** Located in the Central King Building, Lower Level, Rm. G11 (See: [Fall 2019 Hours](#))

**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](tel:973-596-5417) or via email at [lyles@njit.edu](mailto: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:

- <https://www.njit.edu/studentsuccess/accessibility/>

**Important Dates** (See: [Fall 2019 Academic Calendar](#), [Registrar](#))

| Date                           | Day    | Event                        |
|--------------------------------|--------|------------------------------|
| September 3, 2019              | T      | First Day of Classes         |
| September 13, 2019             | M      | Last Day to Add/Drop Classes |
| November 11, 2019              | M      | Last Day to Withdraw         |
| November 26, 2019              | T      | Thursday Classes Meet        |
| November 27, 2019              | W      | Friday Classes Meet          |
| November 28 - December 1, 2019 | R - Su | Thanksgiving Recess          |
| December 11, 2019              | W      | Last Day of Classes          |
| December 12 & 13, 2019         | R & F  | Reading Days                 |
| December 14 - 20, 2019         | Sa - F | Final Exam Period            |

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## Course Outline

| Lecture | Section | Topic                                      | Assignment in MyMathLab  | Assignment to Hand-in   |
|---------|---------|--|--|---|
| 1       | 2.1     | Rates of Change and tangents to Curves     | 1, 3, 5, 9, 13, 21   |   |
| 2       | 2.2     | Limit of a Function and Limit Laws         | 1, 2, 13, 19, 22, 25, 31, 33, 35, 41, 47, 49, 53, 57, 63, 79, 81 | Section 2.2 #s: 3 (also write the function $f(x)$ that is graphed here), 32, 80 |
| 3       | 2.4     | One Sided Limits                           | 1, 3, 5, 9, 13, 15, 17, 27, 29, 39, 41                           |   |
| 4       | 2.5     | Continuity                                 | 3, 5, 7, 15, 17, 19, 21, 25, 27, 29                              |   |
| 5       | 2.5/2.6 | Continue Continuity; Start Infinite limits | Section 2.5: 35, 37, 39, 45, 47, 49, 55, 57, 61                  |   |
| 6       | 2.6     | Limits Involving Infinity;                 | 9, 11, 23, 25, 27, 31,   | Section 2.6: #s 63, 67, 76, 80, 81, 109, 110                                    |

|    |          |  |  |  |
|----|----------|--|--|--|
|    |          | Asymptotes   | 33, 43, 45, 49, 53, 87   | Practice Exercises (Page 116): #s 1, 2   |
| 7  | 3.1      | Tangents and Derivatives at a Point  | 11, 13, 15, 17, 21, 35   |  |
| 8  | 3.2      | The Derivative as a Function   | No online homework   | Section 3.2 #s (you must find derivatives using the definition of the derivative): 1, 3, 5, 13, 27, 28, 29, 30, 32, 33, 41, 48, 58 |
| 9  | 3.3      | Differentiation Rules  | 3, 5, 7, 17, 19, 25, 31, 33, 35, 39, 43, 45, 71, 73                          |  |
| 10 |          | <b>REVIEW FOR EXAM #1</b>  |  |  |
| 11 | 3.3      | Differentiation Rules  | 53, 55, 57, 59, 61, 63   | Section 3.3 #s: 47, 72, 74   |
| 12 | 3.4      | Derivatives as a Rate of Change  | 1, 5, 7, 10, 13, 17, 18, 23, 25, 31  |  |
| 13 | 3.5      | Derivatives of Trig Functions  | 2, 12, 15, 16, 19, 26, 29, 33, 51, 61, 63                                    | Section 3.5 #s: 35, 46   |
| 14 | 3.6      | The Chain Rule   | 17, 23, 25, 29, 35, 39, 43, 47, 49, 51, 65                                   |  |
| 15 | 3.6/3.7  | Continue Chain Rule and start Implicit Differentiation                       | Section 3.6: 71, 77, 81, 83, 89, 97, 101                                     |  |
| 16 | 3.7/3.8  | Continue Implicit Differentiation and start Derivatives of Inverses and Logs | Section 3.7: 1, 7, 11, 15, 17, 19, 23, 33, 39, 41, 49                        |  |
| 17 | 3.8      | Continue Derivatives of Inverse and Log Functions                            | 7, 9, 13, 19, 21, 24, 29, 31, 35, 39, 43, 57, 61, 63, 65, 69, 83, 89, 93, 95 |  |
| 18 | 3.9      | Inverse Trig Functions   | 3, 5, 11, 21, 23, 25, 33, 34, 35, 41, 51                                     |  |
| 19 | 3.1      | Related Rates  | 7, 11, 15, 17, 20, 21, 23, 25  |  |
| 20 | 3.1      | Related Rates  | 27, 31, 32, 33, 37, 40, 41   |  |
| 21 | 3.11     | Linearization and Differentials  | 5, 11, 13, 19, 31, 35, 41, 51, 53, 59  | Section 3.11 #s: 18, 54, 65ab  |
| 22 |          | <b>REVIEW FOR EXAM #2</b>  |  |  |
| 23 | 4.1      | Extreme Values of Functions  | 23, 25, 29, 33, 39, 47, 49, 51, 78   | Section 4.1 #s: 15, 17, 18, 20, 57, 59   |
| 24 | 4.2      | The Mean Value Theorem   | 3, 4, 6, 11, 13, 16, 21, 31, 35, 37, 41, 51                                  |  |
| 25 | 4.3      | Monotone Functions and the First Derivative Test                             | 1, 11, 21, 29, 37, 43, 49, 75, 77  |  |
| 26 | 4.4      | Concavity and Curve Sketching  | No online homework   | Section 4.4 #s: 9, 13, 19, 25, 28, 31, 35, 39, 43, 52, 58, 90, 94, 99, 127   |
| 27 | 4.4 /4.5 | Continue Curve Sketching   | No online homework   | Continue above assignment  |

|    |         |   |  |   |
|----|---------|---|--|---|
| 28 | 4.5     | Indeterminate Forms & L'Hopitals Rule                           | 7, 9, 11, 15, 19, 21, 23, 29, 33, 37, 41, 44, 46, 49                       |   |
| 29 | 4.5/4.6 | Finish L'Hopitals; Start Applied Optimization                   | Section 4.5: 51, 55, 57, 58, 63, 65, 67, 71, 79                            |   |
| 30 | 4.6     | Applied Optimization  | 4, 7, 9, 11, 12, 14, 23, 24, 29, 31, 44, 45, 57, 62                        |   |
| 31 | 4.7     | Newton's Method   | 1, 2, 4, 5, 23   |   |
| 32 | 4.8     | Antiderivatives   | 5, 11, 19, 35, 37, 39, 41, 45, 47, 59, 61, 69, 97, 101, 104, 107, 113, 127 |   |
| 33 | 5.1     | Area and Estimating with Finite Sums                            | No online homework   | Section 5.1 #s: 1-7 odd (for each of these problems, sketch the curve and the rectangles). Also #11 |
| 34 | 5.2     | Sigma Notation and Limits of Finite Sums                        | 7, 9, 17, 25, 29   | Section 5.2 #s: 37,43,44,47,49  |
| 35 | 5.3     | Definite Integral   | 9, 13, 19, 23, 33, 42, 45, 47, 49  |   |
| 36 |         | <b>REVIEW FOR EXAM #3</b>                                       |  |   |
| 37 | 5.3/5.4 | Continue Definite Integrals & Start Fundamental Thm of Calculus | Section 5.3: 57, 59, 61, 71, 79, 88  |   |
| 38 | 5.4     | Fundamental Theorem of Calculus                                 | 7, 9, 13, 15, 21, 23, 27, 30, 41, 47, 53, 55, 57, 60, 61, 63, 77, 79       |   |
| 39 | 5.5     | Indefinite Integrals and Substitution Method                    | 11, 15, 18, 20, 21, 23, 25, 27, 29, 33                                     |   |
| 40 | 5.5     | Indefinite Integrals and Substitution Method                    | No online homework   | Section 5.5 #s: 35,37,43,46,47,55,56,59,61,65,79  |
| 41 | 5.6     | Area Between Curves   | 3, 11, 17, 19, 27, 29, 33, 39, 53, 66, 77, 83, 87, 93, 97, 99, 102, 115    |   |
| 42 |         | <b>CATCH UP AND REVIEW</b>                                      |  |   |
|    |         | <b>FINAL EXAM</b>   |  |   |

*Updated by Professor J. Bechtold - 9/5/2019  
Department of Mathematical Sciences Course Syllabus, Fall 2019*

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