

## MATH 111: Calculus I

### *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, continuity, differentiation, optimization, approximation, and integration. Applications are drawn from engineering, physics, biology, economics, and design. Effective From: Fall 2014.

**Number of Credits:** 4

**Prerequisites:** Math 139 with a grade of B or better, or placement by performance on standardized entrance examinations.

#### Course-Section and Instructors

Course-Section	Instructor
Math 111-002	Professor P. Natarajan
Math 111-004	Professor R. Kelly
Math 111-006	Professor P. Ward
Math 111-008	Professor D. Blackmore
Math 111-010	Professor J. Ratnaswamy
Math 111-012	Professor J. Daniel
Math 111-102	Professor J. Hayes

#### Required Textbook:

Title	<i>Thomas' Calculus: Early Transcendentals</i>
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Author	Thomas
Edition	13th
Publisher	Pearson
ISBN #	978-0321981677
Notes	w/ MyMathLab

University-wide Withdrawal Date: Please note that the last day to withdraw with a W is **March 30, 2015**. It will be strictly enforced.

## 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, Quizzes, and Matlab	15%
Common Midterm Exam I	15%
Common Midterm Exam II	20%
Common Midterm Exam III	20%
Final Exam	30%

Your final letter grade will be based on the following tentative curve. **NOTE:** This course needs to be passed with a grade of C or better in order to proceed to subsequent courses such as MATH 112.

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. Day sections of Math 111 meet four times a week; there are three lectures and one recitation. Recitation classes provide an additional opportunity for you to seek help with homework and concepts taught in class.

**Homework Policy:** Calculus is learned by solving problems. In Math 111, there are two kinds of homework assignments: 1) assignments which are written out by hand and turned in, and 2) assignments which are completed online. The homework assignments are listed on the syllabus; the \* superscript denotes those problems which constitute the hand-in assignments while the remaining problems constitute the online assignments.

The online assignments can be completed at **WWW.MYMATHLAB.COM** or **WWW.COURSECOMPASS.COM**. In order access the online assignments you need to have a student access code. Access codes are included with new book that is bundled with MyMathLab; codes can be purchased separately from the textbook at the campus bookstore or online at the course website. If you buy a new book from another source **make sure it is bundled with MyMathLab**. In addition, on the first day of class your course instructor will give you an additional code needed to access the online assignments. **NOTE: Homework Assignments are DUE frequently (at least weekly) at the dates and times specified online and by your instructor.**

**How to Get Started with MyMathLab:**

- **Getting Started**
- **Technology Tips**

**MATLAB Assignments:** MATLAB is a mathematical software program that is used throughout the science and engineering curricula. Two MATLAB assignments will be given during the semester; tutors are available to help students having difficulties in accordance with a posted **schedule**.

**Quiz Policy:** Quizzes are given in class on a frequent basis (at least weekly). All of the quizzes will be graded. The homework and quizzes are intended to develop your problem-solving skills and to help you prepare for the exams.

**Exams:** There will be three midterm exams held during the semester and one comprehensive

final exam. Exams are held on the following days:

Common Midterm Exam I	February 11, 2015
Common Midterm Exam II	March 11, 2015
Common Midterm Exam III	April 22, 2015
Final Exam	May 8 - 14, 2015

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

Please note that electronic devices (such as calculators, cell phones, CD players, etc.) are not allowed during any exam.

**Makeup Exam Policy:** There will be NO MAKE-UP EXAMS during the semester. In the event the Final Exam is not taken, under rare circumstances where the student has a legitimate reason for missing the final exam, a makeup exam will be administered by the math department. In any case the student must notify the Math Department Office and the Instructor that the exam will be missed and present written verifiable proof of the reason for missing the exam, e.g., a doctors note, police report, court notice, etc., clearly stating the date AND time of the mitigating problem.

**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.

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## ADDITIONAL RESOURCES

**Math Tutoring Center:** Located in Cullimore, Room 214 (See: [Spring 2015 Hours](#))

**Important Dates** (See: [Spring 2015 Academic Calendar](#), Registrar)

Date	Day	Event
January 20, 2015	T	First Day of Classes
January 26, 2015	M	End of Add/Drop Period
March 15 - 22, 2015	S - S	Spring Recess
March 30, 2015	M	Last Day to Withdraw
April 3, 2015	F	Good Friday - University Closed
May 5, 2015	T	Last Day of Classes

May 6 & 7, 2015	W & R	Reading Days
May 8 - 14, 2015	F - R	Final Exam Period

## Course Outline

<u>Week</u> Dates	Section # + Topic		Lecture # + HW Assignment		
1 1/20 - 1/23	2.1:	Rates of Change and Tangents to Curves	1	p.64:	1,3*,5,9,13,21
	2.2:	Limit of a Function and Limit Laws	2	p.74:	1,13,19,22,25,31,32*,33,35,41,47,49,50*,53,57,63,79,80*,81
	2.4:	One-Sided Limits	3	p.91:	3,5,9,13,15,17,25,27,29,30*,32*,35,39,45*
2 1/26 - 1/30	2.5:	Continuity	4	p.102:	3,5,7,15,17,18*,20*,21,25,27,29,30*
	»	<b>MATLAB 1</b>	»	<b>DUE ON 2/4/15</b>	
	2.5, 2.6:	Continuity (cont.) and Limits Involving Infinity; Asymptotes of Graphs	5	p.102:	33,35,37,39,41,43,47,53,54*,55*,59
	2.6:	Limits Involving Infinity; Asymptotes of Graphs (cont.)	6	p.115:	7,9,11,23,25,27,30*,31,33,43,45,49,53,61,63,67,82*,86*,99,103*
3 2/2 - 2/6	3.1:	Tangents and the Derivative at a Point	7	p.126:	11,13,15,17,21,34*,35
	3.2:	The Derivative as a Function	8	p.133:	1,3,5,13,26,32*,33,39,41,46*.56*, <b>AND MATLAB 1 IS DUE</b>
	3.3:	Differentiation Rules	9	p.144:	5,7,19,25,31,38*,39,40*,41,43,45
4 2/9 - 2/13	»	<b>REVIEW FOR EXAM I ~ 2/11/2015</b>	10	»	<b>STUDY FOR EXAM I</b>
<b>COMMON EXAM 1: WEDNESDAY, FEBRUARY 11,2015</b>					
	3.3:	Differentiation Rules (cont.)	11	p.144:	47,52*,53,55,57,60*,62,63,65,70*,72
	»	<b>GO OVER EXAM 1</b>			
	3.4:	The Derivative as a Rate of Change	12	p.153:	1,5,7,10,13,17,18*,22*,23,25,31
5 2/16 -	3.5:	Derivatives of Trigonometric	13	p.160:	2,12,15,16,19,26,29,33,35,44*,49,53,59,61

2/20		Functions			
	3.6:	The Chain Rule	14	p.168:	3,5,17,23,25,29,33,35,39,43,46*, 47,49, 50*,51,61,62*,63,65,66*,67
	3.6, 3.7:	The Chain Rule (cont.) and Implicit Differentiation	15	p.168:	71,77,79,81,83,86*,88*,89,95,99
<b>6</b> 2/23 - 2/27	3.7, 3.8:	Implicit Differentiation (cont.) and Derivatives of Inverse Functions and Logarithms	16	p.175:	1,7,11,15,16,17,19,23,26*,31,37,38*,39
	3.8:	Derivatives of Inverse Functions and Logarithms (cont.)	17	p.185:	7,9,13,21,24,29,31,35,36*,39,43,56*, 61, 63,65,69,74*,83,89,92*,95
	3.9:	Inverse Trigonometric Functions	18	p.192:	5,11,21,23,31,33,34,36*,37,41,42*,61
<b>7</b> 3/2 - 3/6	3.10:	Related Rates	19	p.198:	7,11,15,17,21,23,25,26*
	3.10, 3.11:	Related Rates (cont.) and Linearization and Differentials	20	p.198:	27,31,32*,33,37,40,41,42*
	3.11, 4.1:	Linearization and Differentials (cont.) and Extreme Values of Functions	21	p.211:	5,11,13,18*,19,31,35,41,51,53,54*,59
<b>8</b> 3/9 - 3/13	»	<b>REVIEW FOR EXAM II ~ 3/11/2015</b>	22	»	<b>STUDY FOR EXAM II</b>
<b>COMMON EXAM 2: WEDNESDAY, MARCH 11, 2015</b>					
	4.1:	Extreme Values of Functions (cont.)	23	p.228:	7,25,29,33,35,39,41,47,49,51, 61,63,65, 67,69,71,72*,86
	»	<b>GO OVER EXAM 2</b>			
	4.2:	The Mean Value Theorem	24	p.237:	3,4,5,6,11,13,16,21,24*
<b>3/15 - 3/22, SPRING BREAK, NO CLASSES SCHEDULED</b>					
<b>9</b> 3/23 - 3/27	4.2, 4.3:	The Mean Value Theorem (cont.) and Monotone Functions and the First Derivative Test	25	p.237:	31,35,37,41,45,47,49,51,56,63*
	4.3, 4.4:	Monotone Functions and the First	26	p.242:	11,13,21,29,36*,37,40*,41,43,49,61,71,73

		Derivative Test (cont.) and Concavity and Curve Sketching			
	4.4:	Concavity and Curve Sketching (cont.)	27	p.252:	7,13,19,25,28,31,35,39,43,45,49,58*,90*,94*,99,111,121
10 3/30 - 4/2	4.5:	Indeterminate Forms and L'Hopital's Rule	28	p.262:	7,9,11,15,19,21,23,29,33,37,40*,41,44,46,48*,49
<b>MARCH 30,2015 (M): Last day to WITHDRAW from this course.</b>					
	4.5, 4.6:	Indeterminate Forms and L'Hopital's Rule (cont.) Applied Optimization	29	p.262:	51,55,57,58,60*,63,65,67,71,79,82*
<b>APRIL 3,2015 (F): Good Friday, no classes scheduled.</b>					
11 4/6 - 4/10	4.6:	Applied Optimization (cont.)	30	p.270:	4,7,9,11,12,14,23,24*,30*,31,38,39,51,56
	4.7:	Newton's Method	31	p.279:	1,2,5,6*,12*,19
	»	<b>MATLAB 2</b>		»	<b>DUE ON 4/17/15</b>
	4.8:	Antiderivatives	32	p.287:	5,11,19,35,37,39,41,45,47,54*,59,61,64*,69,97,101,104,107,113,122*,123
12 4/13 - 4/17	5.1:	Area and Estimating with Finite Sums	33	p.307:	1,5,7*,8,9,11
	5.2:	Sigma Notation and Limits of Finite Sums	34	p.315:	7,9,17,25,29,33,38,39,40*,43,46*
	5.3:	The Definite Integral	35	p.324:	1,9,13,21,22,28*,33,42,45, and <b>AND MATLAB 2 IS DUE</b>
13 4/20 - 4/24	»	<b>REVIEW FOR EXAM III ~ 4/22/2015</b>	36	»	<b>STUDY FOR EXAM III</b>
<b>COMMON EXAM 3: WEDNESDAY, APRIL 22, 2015</b>					
	5.3, 5.4	The Definite Integral (cont.) and The Fundamental Theorem of Calculus	37	p.324:	57,59,61,71,73*,74*,79,88
	»	<b>GO OVER EXAM 3</b>			
	5.4:	The Fundamental Theorem of Calculus (cont.)	38	p.336:	7,9,13,15,16*,21,23,27,30,41,47,50*,53,55,57,60,61,63,64*,75,77
14 4/27 - 5/1	5.5:	Indefinite Integrals and the Substitution Method	39	p.345:	11,15,18,20,21,23,25,26,27,29,32*,33,36*

	5.5, 5.6	Indefinite Integrals and the Substitution Method (cont.) and Substitution and Area Between Curves	40	p.345:	37,38*,43,46*,47,52*,53,55,56*,59,63,65,79
	5.6:	Substitution and Area Between Curves (cont.)	41	p.353:	3,11,17,19,24*,27,29,33,39,51,64,69,72*,75,81,85,88*,91,95,96*,97,100,113
15 5/4 - 5/5	»	<b>REVIEW FOR FINAL EXAM</b>	42	»	<b>STUDY FOR FINAL EXAM</b>
	May 5,2015 (T): Classes follow a Friday schedule.				
<b>FINALS</b>	<b>FINAL EXAM WEEK: MAY 8 - 14,2015</b>				