

# MTH 1341 -- Calculus I

Fall 2009

Instructor: Robert Case 543a Nightingale Hall.  
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Office hours/problem sessions : Monday and Wednesday: 12:00 – 1:30 Location: 202 Forsyth Hall.

Text: *Calculus, Concepts and Contexts*, 4th Ed. by James Stewart  
(Note: the bookstore has a special edition prepared especially for Northeastern; it is in two volumes – we will be using volume 1 for MTH 1341 and MTH 1342.) and:

on-line, Worldwide Differential Calculus, by David Massey: [centerofmath.org](http://centerofmath.org)

Calculator: You will be expected to own a graphing calculator. The instructor will use a TI - 83. *Note, however, that the instructor may disallow the using of calculators in some exams.*

**Significance of the Course:** Representing the continually changing physical universe became possible 350 years ago with the discovery/creation of calculus by Newton (and others). This course gives us the opportunity to delve into this creation and learn the skills to use it and apply it in a myriad of settings. With calculus, the insight of Galileo becomes even more striking: **“The great book of the philosophy of the universe stands open for all to read. But the language in which this book is written is the language of mathematics. Without this (language) we are like people stumbling about in a dark labyrinth”.**

### **Scope of the Course:**

This course will begin with a brief review/discussion of some of the ways mathematical functions are used. It then will cover the standard topics of calculus I: limits and derivatives, the calculation of derivatives, applications of differentiation to solving the kinds of problems encountered in science and engineering, and an introduction to integration. This is not a theoretical course, but some proofs and mathematical reasoning will be introduced when they are required for better understanding.

**Grading:** Quizzes: 35%

Midterm: 15%

Participation and Homework: 10% (for Honors section, this includes Honors Project)

Final exam: 40%

**Attendance:** It is expected that you will attend every class. The course moves very fast. It is possible to fall behind in a single day. If you miss class for any reason, make an immediate attempt to contact instructor or another student to discuss what you missed and how to catch up.

**Final exam:** You must attend the final exam on the day it is given. *Do not make advance travel arrangements for any dates during the finals week.* Exam conflicts must be resolved in advance with the Registrar's Office and your instructor. Department regulations require that the final count for at least 40% of your course grade. If you miss the final exam, it will count as a 0 and you will fail the course.

**Tutoring:** In addition to the Instructor's office hours and the problem session, you may receive extra help for the course from math tutoring center in 540B Nightingale. Please seek help as soon as you experience any difficulty; do not wait until just before an exam. There are other tutoring opportunities on campus as well.

If there is an issue you would like to discuss, it is a good idea to start by discussing it with your instructor. If this does not help, please see the course coordinator Professor Adam Ding (439 LA, x. 5231). If your problem has not been resolved, you should contact the Undergraduate Coordinator. It is your responsibility to be aware of any changes the instructor may make to the syllabus as they are announced in class. Students are responsible for all information given when they are absent.

**Withdrawal and Incomplete:** Instructors in the course do not have the authority to give a W. If you want to withdraw from the course you must do it through the registrar. Instructors are only permitted to give incompletes under very limited circumstances. The student must have completed at least 75% of the course material and must have a C or better grade at the time. It is University policy that no grade, including an incomplete, can be changed after one year. Exceptions must be authorized by the Academic Standing Committee.

*Sept. 23: last day to file a final exam conflict form with registrar office*

*Sept. 29: last day to drop a course without a W grade*

*Nov. 20: last day to drop a course with a W grade*

**The following is a list of topics and suggested exercise problems from the textbook to be covered. They may change as we progress through the course. These problems are intended as a study guide.**

**Chapter 1: Functions and Models**

- 1.1 Representing Functions, p. 21: 1,2,9,25,27,30,45-47,49,59,60,66
- 1.4 Graphing Calculators, p. 51: 2, 6-10, 16,17,22 – For independent review, will NOT discuss in class.
- 1.7 Parametric Curves, p. 76: 1,2,5-7,9-11,18,22,31,27,31,32

**Chapter 2: Limits and Derivatives**

- 2.2 Limit of a Function, p. 102: 1,3,4,20,21
- 2.3 Calculating Limits Using Limit Laws, p. 111: 1,3,6,7,15,17,18,20
- 2.6 Derivatives and Rates of Change, p. 142: 1,5-9,,11,12,17,27,29-31,33-36,42,50
- 2.7 Derivative as a Function, p. 155: 2-7,9,12,36,41,43
- 2.8 What  $f'$  Says About  $f$ , p. 172: 1-5,12,14,19,22,25,27-30

**Chapter 3: Differentiation Rules**

- 3.1 Polynomials & Exp. Functions, p. 181: 3-25(odds),29,36,41,42,45,54,61
- 3.2 Product & Quotient Rules, p. 188: 3,6,7,10,11,23,24,33,39,42,48,58(a)
- 3.3 Trig. Functions, p. 195: 1,4,6,7,10,21,27,30,33,39
- 3.4 The Chain Rule, p. 205: 1-31(odds),61,52,70,75
- 3.5 Implicit Differentiation, p. 214: 5,9,15-18,22,55
- 3.6 Inverse Trig. Functions p. 217: 17,20,21,25,34,41
- 3.7 Log Functions, p. 226: 3-15(odds),26,34-38
- 3.8 Rates of Change, p. 237: 1,5,10,13,16,18,24,33
- 3.9 Linear Approx., p. 245: 1,2,5,9,28-30,36

**Chapter 4: Applications of Differentiation**

- 4.1 Related Rates, p. 260: 8,10,11,13,16,20,29,34,42
- 4.2 Maxima & Minima, p. 268: 6,9,23,24,29,32,45-51(odds)
- 4.3 Derivatives & Curves, p. 279: 6,7,16,17,21,29,30,33,35,41,58
- 4.4 Graphing with Calculus & Calculator, p. 288: 1,4,8,11,22,23
- 4.6 Optimization Applications, p. 305: 3,4,12,14,18,26,54
- 4.7 Newton's Method, p. 315: 4,8,10,14,15
- 4.8 Antiderivatives, p. 321: 1,11,15,27,34,37,42,48,50,57

**Chapter 5: Integrals**

- 5.1 Areas & Distances, p. 341: 3,4,18,19
- 5.2 The Definite Integral, p. 353: 3,11,17,18,21,22,31,37,40
- 5.3 Evaluating Def. Integrals, p. 363: 3,6,11,17,19,22,23,40,49,52,57,59,61,63
- 5.4 The Fundamental Theorem of Calculus, p. 372: 2,5,8,9,21,26
- 5.5 Substitution Rule (if time permits), p. 392: 1-15(odds),18,21,22,24,,31,32,34,45,47,51