

# MATH 1341 -- Calculus I

Fall 2009

Class: M,W,Th 8:00-9:05 247 RY

Instructor: Zihui Xu

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Office hour: TBA

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 U241 and U242.)

Supplemental textbook with video: *Worldwide Differential Calculus*, by Dave Massey.

Free at <http://www.centerofmath.com/textbooks/diffcalc.html>

Calculator: You will be expected to own a graphing calculator TI-83 or higher and be reasonably proficient in its use. This is to help you visualize functions easily. *However instructor may disallow the using of calculators in some exams including the final exam.*

## **Scope of the Course:**

This course will begin with a brief review/discussion of some of the ways mathematical functions are used to model the real world. 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:** Quiz for every 2 weeks 60%

Final 40%

Two Quizzes will be dropped. No make-up quiz.

**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:** All students without legitimate conflicts (approved by the instructor) will take the final exam at the scheduled time TBA. Do not make travel plans that conflict with the final exam. 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.

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).

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 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 exercise problems from the textbook to be covered. They may change as we progress through the course. Theses problems are intended as a study guide. They are not collected nor graded.**

**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