

# Calculus for Business and Economics

## MATH 1231

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Fall 2009

### Office Hours

Monday, Wednesday, Thursday: 3-4 PM at 543 NI (see a [map of the campus](#))

### Materials

*Calculus Concepts (Fourth Edition): An Applied Approach to the Mathematics of Change* by LaTorre et al, Houghton Mifflin, Boston, 2008.

The TI-83 (TI-83 Plus) or TI-84 (TI-84 Plus) calculator is required. No other calculator may be used on tests or the project without explicit permission of your instructor.

A class packet (for Fall 2009) must also be purchased from NU Reprographics (x2766). Please bring your packet and calculator to each class.

### Course Content

This course introduces students to the use of derivatives and integrals in solving problems in business and economics, e.g., maximizing profit, calculating average investment income, future value of an income stream, and consumers surplus. (A more detailed syllabus is given below.) A project involving optimization is also required. This project is described in the class packet. The graphing calculator is used extensively and prior familiarity with graphing calculators is helpful.

Prerequisites: MATH 1130 (formerly MTH U130) or the equivalent.

### Assignments

A list of homework exercises from the textbook and class packet is attached (this list is subject to revision). Homework exercises should be done by the next class after they are assigned. Homework exercises from the textbook may occasionally be collected and graded. Even if they are not collected, you are responsible for knowing the solutions of all homework exercises. The questions on exams and quizzes will be based on the material in lectures, homework exercises from the textbook, packet and the web and also quiz and test review exercises in the packet.

### **Attendance**

You are expected in class each day. If for some reason, you are unable to come to a class, then (if possible) send an e-mail to let me know. Note that you are always responsible to be aware of any changes that may be made to the syllabus, quiz dates, etc as they are announced in class.

All cell phones must be off in the class. I would often ask you to work on problems in small groups, however when I am teaching I expect everybody to avoid excessive talking, if you have a question or need more explanation while I am teaching, go ahead and ask me instead of discussing it with your neighbor. I would reserve the right to take a point or two off the quiz grades of those who disrupt the class.

### **Exams**

There will be 9 quizzes (20-30 minutes each), 1 hour test (the midterm), and a final exam. (Only the best 7 quiz grades will be counted.) The final exam will count 40% of your course grade. All students without legitimate conflicts approved by the instructor will take the final exam at the scheduled time(TBA). The final exam is cumulative and is common for all sections of MATH U1231. Do not make travel plans that conflict with the final exam.

### **Grading**

Your final grade will be determined by the following quantities: quiz grades (30%); midterm grade (15%); project grade (15%); and final exam score (40%). The approximate cut-offs for letter grades are as follows: D- (60), C-(70), B-(80) and A-(90). Borderline grades are determined by the final exam score.

The last day to drop a course without receiving a W grade is September 29. The last date to drop a class with a W grade is November 20.

As a matter of Math Department policy the **I** grade (incomplete) will be given only rarely. It is intended to cover real emergency situations in which a student who is doing reasonably well (C- or better) is unable, due to circumstances beyond the student's control, to complete all course requirements (e.g., is unable to take the final exam due to hospitalization). An **I** may not be used to rescue a failing grade, or to postpone the final.

### **Academic Honesty**

Cheating will not be tolerated. All incidents of cheating will be reported to the Office of Judicial Affairs. The University's cheating policy and related disciplinary actions are detailed in the Student Handbook.

### **Tutoring**

There is a free math tutoring center located in the math department on the 5th floor of Nightingale Hall (540B NI). Hours of operation for the spring semester will be announced. All tutoring is done on a first come first served basis. Students must come in person to schedule appointments. No appointments can be made by phone.

### **Lecture Outline**

Note that the schedule below is **tentative** and I may make changes if necessary. It is the responsibility of each student to stay abreast of what happens in the classroom, changes in the assigned exercises and changes in the dates of quizzes or exams.

<b>Date</b>	<b>Topic</b>	<b>Assignment</b>
9/9	2.1: average rate of change	9, 17, 18, 22a Read project description in packet
9/10	2.1 Using TI-83/84 <b>Quiz 1</b>	13, 23abd, 24abc packet Model Review problems 1,2 Read packet notes on Use of the Calculator, Scatter Plots and Models on the TI 83-84 See page 80 of textbook
9/14	2.2 2.3: derivatives	2.2: 7,8, 9,10, 15,17,19a, 21, 22 2.3: 2, 5,13,15, 22a
9/16	2.4: limit definition of the derivative	7, 9, 12, 13
9/17	3.1: slope graphs 3.2: derivative rules	3.1: 1,5,24 packet Algebra Review Problems.1-5
9/21	3.3: more derivative rules <b>Quiz 2</b>	3.2: 1-6(slope equations only), 7-26
9/23	3.2 3.3 continued	3.3: 1-6(slope equations only), 7-20
9/24	<b>Project Part A Due</b> 3.4: chain rule	3.4: 9, 10, 14
9/28	chain rule (continued) <b>Quiz 3</b>	3.4: 17-26
9/29	<b>Last day to drop a course without receiving a "W" grade</b>	
9/30	3.4: chain rule 3.5: product rule	27-38 11-18
10/1	3.5: product rule	19-28
10/5	3.2, 3.3 (word problems) Using nDeriv on the TI-83	3.2: 30ab, 34, 35abc, 36 packet Compound Interest Review Problems: 1, 2
10/7	3.4 (word problems)	3.3: 21abc, 22, 33abc (ignore percent rate of change)
10/8	3.4 (word problems) <b>Quiz 4</b>	40ab, 41(ignore percent rate of change), 42ab
10/12	Columbus Day No classes	
10/14	3.5 (word problems) <b>Project Part B Due</b>	4, 31,33abcde
10/15	4.1: Approximating change Marginal revenue, cost and profit	3 ,5, 6, 17abc, 18abde, 19acde,21abc, 22ab packet Algebra Review problems 6-12
10/19	4.2: Optimization Notes on Optimization (class packet) second derivative and concavity	packet Optimization problems 1-10
10/21	Midterm Review	
10/22	<b>Midterm</b>	
10/26	4.3: Inflection Points Point of diminishing returns <b>Project Part C Due</b>	2, 45 packet Optimization problems 11-18
10/28	4.2: Optimization using the calculator Project group meetings on parts C and D	30, 34 31 (like project optimization)
10/29	Finding inflection points with the TI-83/84 anti-derivatives <b>Quiz 5</b>	4.3: 27, 32 (see packet notes) packet Anti-derivative problems 1-5

<b>Date</b>	<b>Topic</b>	<b>Assignment</b>
11/2	5.3: The general anti-derivative	5.3: 9-14, 15, 17 packet Additional Anti-derivative probs 6-12
11/4	5.3: Finding a specific anti-derivative 5.3: Word problems on anti-derivatives <b>Project Part D Due</b>	19-21 24a
11/5	<b>Quiz 6</b>	
11/9	5.1: Accumulated change area approximation by rectangles	5.1: 14a, 19 Page 375: 1 and packet notes
11/11	Veterans Day No classes	
11/12	5.1: The definite integral (see pages 295 and 299) <b>Project Revised Part D Due</b>	5.1: 8, 5.3: 1-4
11/16	Fundamental Theorem of Calculus (see p340) <b>Quiz 7</b>	packet Additional Definite Integral problems 1-8
11/18	<b>Project Presentation</b>	
11/19	5.4 : Evaluating def. integrals using FTC	8abc, 9abc, 10abc, 11c
11/20	<b>Last day to drop a course with a W grade</b>	
11/23	Using fnInt on the TI-83/84 5.4: Setting up, interpreting def. ints <b>Quiz 8</b>	13,15,21,23
11/25-26	Thanksgiving No Classes	
11/30	Area between two curves 5.5: Average value of a function Average value of the rate of change	5.4: 25, 27, 28, 29 2, 5,10
12/2	Differentials Integration by u-substitution	Packet Integration by substitution problems: 1-6
12/3	5.6: Integration by u-substitution <b>Quiz 9</b>	1, 2, 5, 8, 11, 15 Packet Integration by substitution problems
12/7	6.3: Consumers Surplus (see packet notes)	8bcd (use $p_1 = \$555$ ), 9cd (use $p_1 = \$4000$ )
12/9	Review for final exam	
12/10	Reading Day	