

# MATH 1231 (Calculus for Business and Economics) Summer I 2017

**INSTRUCTOR:** Brian Hepler

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**OFFICE HOURS:** MF, 1:30p.m. to 3p.m.

**Materials:** 1. *Calculus Concepts (Fifth Edition): An Informal Approach to the Mathematics of Change* by LaTorre et al, Brooks/Cole.

2. 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 THE EXPLICIT PERMISSION OF YOUR INSTRUCTOR.**

3. A class packet (for Summer 1 2016) must also be purchased from NU Reprographics (x5646) located in the basement of the Ell building behind the NU bookstore. **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 and future value of an income stream. (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 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. You are responsible for knowing the solutions of **all** homework exercises. The questions on exams and quizzes will be based on homework exercises from the textbook, packet, **quiz and test review exercises in the packet** and the material in lectures

## Attendance

You are expected in class each day. If for some reason, you are unable to come to a class, then (if possible) please call or send an e-mail to let me know. Three or more unexplained absences will lower your final grade. Makeup tests are available only in very special circumstances (e.g., participation in university sanctioned activities such as sports, jury duty) and are granted **only after consultation with and approval by your instructor.**

## Exams

There will be 8 quizzes, a 1 hour test (the midterm), and a final exam. (I will drop two lowest quiz grades and no late work is allowed.) 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: June 26-27, 2016.** The final exam is cumulative and is common for all sections of MATH 1231. **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%).

Borderline grades are determined by the final exam score.

**The approximate cut-offs for letter grades are as follows:**

Course Average	Course Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
0-59	F

The last day to drop a course without receiving a 'W' grade is May 21. The last date to drop a class with a 'W' grade is June 25. 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.

**If you want to see me, but cannot do so during my office hours, then please see me before or after any class to set up a convenient time.** Also, please take

advantage of the office hours of the other instructors in the course when they are more convenient.

### **Academic Honesty**

Cheating will not be tolerated. All incidents of cheating will be reported to the Office of Judicial Affairs. The University's policy on cheating and related disciplinary actions are detailed in the Student Handbook and at the following web site (<http://www.northeastern.edu/osccr/academichonesty.html>).

**Tutoring:** There is a free math tutoring center located in the math department on the 5<sup>th</sup> floor of Nightingale Hall (540B NI).

**TRACE:** Every student is required to participate in the student survey known as TRACE (Teacher Rating and Course Evaluation).

**Resolving disputes and complaints:** If you are not satisfied with my responses to your serious concerns (including your final course grade), please contact Prof. David Massey, [d.massey@neu.edu](mailto:d.massey@neu.edu), X5527.

Note that the syllabus below is tentative. The instructor reserves the right to 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.**

**MATH 1231****Schedule****Summer 1 2017**

5/8: 2.1: average rate of change

2.1  
Using the TI-845/9: **QUIZ 1**2.2; 2.3: Tangent line  
and the derivative

5/10: 2.4: Differentiability

2.5: Limit definition of the derivative

2.6: slope graphs

5/11 Powers and Logs (See packet)

3.1: Deriv. Rules;

3.2: More Deriv. Rule;

HW: 9, 17, 18, 22a.

Read project description in packet

HW: 2.1: 13, 23, 24abc; 1.11:9-12;

**Read** packet notes on Use of the Calculator,

Scatter Plots and Models on the TI 83-84;

See "Choosing a Model" in textbook on page 121

HW: 2.2: 7, 8, 11ab, 13ab, 15,17,19, 21;

2.3: 2, 5,13,14ab

HW: 1, 3, 15-18

HW: 1, 3, 4, 5

HW: 2.6: 2, 3, 6; packet Algebra Review Probs.1-5;

HW: 3.1: 1-27(odds), 29abc

HW: 3.2: 1-14

5/15: **PROJECT PART A DUE**

HW 3.3: 9, 10, 14

3.3: chain rule

**QUIZ 2**

3.4: Chain rule (contd)

5/16: 3.5: product rule

HW: 3.4: 1-28

HW: 1, 4, 11, 12, 13, 16, 19

- 3.6: product rule (cont'd)

5/17: Using nDeriv on the TI-84 (word problems)

Word Problems (3.1, 3.2)

5/18: Word problems (3.3-3.6)

**QUIZ 3**

HW: 1-17(odds)

HW: 3.1: 31ab, 35, 36; 3.2: 21, 28

packet Compound Interest Review Probs: 1, 2

HW: 3.4: 34, 38, 42

HW: 3.6: 21abc, 22, 23

5/22: 4.1: Approximating change

 $f(x+h)-f(x) \approx f'(x)h$ 

4.5: Marginal Revenue, Marginal Cost,

Marginal Profit

**PROJECT PART B DUE**

HW: 4.1: 2, 5, 7

HW: 4.5: 1, 3, 5, 7, 9, 11, 16ab, 17abc

packet Algebra Review probs 6-12

5/23: 4.2: Optimization

HW: 4.2: 1,3,5, 9, 11, 13, 15, 21, 23

Critical points

Relative and absolute extreme points

First Derivative Test

5/24: Optimization (cont.)

HW: 4.4: 11, 13, 15

Second derivative and concavity

Second Derivative Test

Notes on Optimization (class packet)

**QUIZ 4**

HW: packet Optimization problems 1-10

5/25 : 4.4: Inflection Points; Point of diminishing returns	HW: 1, 2, 19 HW: packet Optimization problems 11-18
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5/30 : Midterm Review	
5/31 : <b>MIDTERM</b>	
6/1 : 4.3: Optimization using the calculator Project group meetings on parts C and D <b>PROJECT PART C DUE</b>	HW: 17 (like project optimization), 20
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6/5 : Finding inf. pts. with the TI-84 <b>QUIZ 5</b> Anti-derivatives	HW: 4.4: 30, 31 (see packet notes) HW: packet Anti-derivative problems 1-5
6/6 : 5.4, 5.5: The general anti-derivative	HW: 5.4: 11-15, 18, 25, 29  HW: packet Additional Anti-derivative probs 6-12  HW: 5.5: 1, 3, 6
6/7 : Finding a specific anti-derivative Word problems on anti-derivatives <b>PROJECT PART D DUE</b>	HW: 5.4: 19-21; 23a HW: 5.5: 21a, 22a
6/8 : <b>QUIZ 6</b>	
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6/12: Area under a curve Area approximation by rectangles The definite integral (p336) Accumulated Change Properties of the definite integral (Packet Notes)	HW: 5.2: 8 Packet Area Approximation problems: 3 HW: 5.1: 7, 8; 5.2: 4; 5.3: 5b
6/13: Fundamental Thm of Calculus (p375)	Packet problems on Properties of def. ints: 1-4 HW: 5.6: 9 HW: packet Additional Definite integral probs 1-7
6/14 : <b>PROJECT PRESENTATION</b>	
6/15 : <b>QUIZ 8</b> Using fnInt on the TI-84 5.6: Setting up, interpreting def. ints	HW: 14, 16
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6/19 : 5.8: Average value of a function Average value of the rate of change	HW: 1, 3, 5
6/20 : Differentials Integration by u-substitution <b>QUIZ 9</b> 5.9: Integration by u-substitution	Packet Integration by substitution problems: 1-6  HW: 1, 3, 5, 8, 11, 15, 20 Packet Integration by substitution problems: 7-19
6/21 Review Antiderivatives	

6/22: Review for final exam

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6/26-6/27 Final Exam Week