

MATH 1231 Calculus for Business and Economics - Summer 2021

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Contact Hours/Office Hours: Friday 10:30 am to 11:30 am
Saturday 9 am to 10 am

Office/Contact Hour Zoom Link: <https://northeastern.zoom.us/j/99564102973>

Materials: 1. *Calculus Concepts (Fifth Edition): An Informal Approach to the Mathematics of Change* by LaTorre et al, Brooks/Cole, Cengage Learning, 2012 with Enhanced Web Assign (EWA).

You have several options for obtaining the textbook and EWA:

- WebAssign for Latorre Standalone Access, ISBN **9781337769075**
- Cengage Unlimited
 - One semester: ISBN **9780357700006**
 - One year: ISBN **9780357700013**
 - Two year: ISBN **9780357700020**

2. A graphing calculator is required, and we recommend **TI-83 (TI-83 Plus)** or **TI-84 (TI-84 Plus)** calculator.

Class Key: neu 2763 0663

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 or the equivalent.

Course Policies

Exams and Assignments:

- There will be 8 quizzes (about 30 minutes each) and a midterm (1-hour each) and a final exam. Your lowest **quiz** score will be dropped. All quizzes and exams are open book.
- The questions on exams will be based on homework exercises from the textbook, packet, **review exercises in the packet** and the material in lectures. **In order to get credit for doing homework you must do the corresponding exercises online using EWA.** Your scores will be recorded automatically, and this will be the basis of your homework grade.
- **All students without legitimate conflicts approved by the instructor will take the final exam (online, open book) at the scheduled time:** date and time TBD. The final exam is cumulative and is common for all sections of MATH 1231. Only two finals at the same time or three in one day is a University recognized legitimate reason to be excused from taking the final at the scheduled time. Students with such a conflict should complete a final exam conflict form, available on the registrar's website.

Grading: Your final grade will be determined by the following quantities:

Quiz grades	30%
EWA homework	10%
Project grade	15%
Midterm Exam	15%
Final exam score	30%

Borderline grades are determined by the final exam score.

Letter grades are determined from the numerical grades as follows:

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

As a matter of Math Department policy, the **I grade** (incomplete course grade) 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). **I - grade** may not be used to rescue a failing grade, or to postpone the final.

Academic Integrity: Cheating will not be tolerated. All incidents of cheating will be reported to the Office of Judicial Affairs. You can find NU Academic Integrity Policy at the following web site
<http://www.northeastern.edu/osccr/academic-integrity-policy/>

Title IX: The University strictly prohibits sex or gender discrimination in all university programs and activities. Information on how to report an incident of such discrimination (which includes sexual harassment and sexual assault) is located at <http://www.northeastern.edu/titleix>

Tutoring: There is a free math tutoring online. You must make an appointment online through myNEU.

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 the Teaching Director, Professor Alex Martsinkovsky a.martsinkovsky@northeastern.edu

Students with Disabilities: Students who have disabilities who wish to receive academic services and accommodations should follow the standard Disabilities Resource Center (DRC) procedures found at <http://www.northeastern.edu/drc/getting-started-with-the-dr>

Any student with a disability is encouraged to e-mail the instructor during the first week of classes a current Memorandum of Accommodations from the Disability Resource Center.

The schedule 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 exams.**

A list of practice exercises from the textbook and class packet is attached.

Module	Schedule (Tentative)	Exercise problems (based on the section under schedule)
1: May 10-14 Quiz 1	2.1: average rate of change 2.1 continued Using the TI-84	2.1: 9, 17, 18, 22a. Read project description in packet 2.1: 13, 23, 24abc; 1.11:9-12 Read Class Packet notes on Use of the Calculator, Scatter Plots and Models on the TI 83-84; Read textbook page 121
2: May 17-21 Quiz 2	2.2; 2.3: Tangent line and the derivative 2.4: Differentiability 2.5: Limit definition of the derivative 2.6: slope graphs;	2.2: 7, 8, 11ab, 13ab, 15,17,19, 21; 2.3: 2, 5,13,14ab 2.4: 1, 3, 15-18 2.5: 1, 3, 4, 5 2.6: 2, 3, 6; Class Packet Algebra Review Probs.1-5;
3: May 24-28 Quiz 3	3.1: Deriv. Rules Powers and Logs (See packet) 3.2: More Deriv. Rules PROJECT PART A DUE	3.1: 1-27(odds), 29abc 3.2: 1-14
4: Jun. 1-4	3.3: chain rule 3.4: Chain rule (contd) 3.5: product rule 3.6: product rule (cont'd)	3.3: 9, 10, 14 3.4: 1-28 3.5: 1, 4, 11, 12, 13, 16, 19 3.6: 1-17(odds)
5: Jun. 7-11 Quiz 4	Using nDeriv on the TI-84 (word problems) 3.1 – 3.6: Word Problems PROJECT PART B DUE	3.1: 31ab, 35, 36; 3.2: 21, 28 Class Packet Compound Interest Review Problems: 1, 2 3.4: 34, 38, 42 3.6: 21abc, 22, 23
6: Jun. 14-18	4.1: Approximating change $f(x+h)-f(x) \approx f'(x)h$ 4.5: Marginal Revenue, Marginal Cost, Marginal Profit 4.2: Optimization Critical points, Relative and absolute extreme points, First Derivative Test Second derivative and concavity Second Derivative Test, Notes on Optimization (Class Packet)	4.1: 2, 5, 7 4.5: 1, 3, 5, 7, 9, 11, 16ab, 17abc packet Algebra Review problems 6-12 4.2: 1,3,5, 9, 11, 13, 15, 21, 23 4.4: 11, 13, 15 Class Packet Optimization problems 1-10,
7: Jun 21 - 25	Midterm Exam	Time: To be decided

8: June 28 – July 2 Quiz 5	4.4: Inflection Points; Point of diminishing returns 4.3: Optimization using the calculator Finding inf. pts. with the TI-84 PROJECT PART C DUE	4.4: 1, 2, 19 Class Packet Optimization problems 11-18 4.3: 17 (like project optimization), 20 4.4: 30, 31 (see packet notes)
9: Jul 6-9 Quiz 6	5.4, 5.5: Antiderivatives, The general anti-derivative Finding a specific anti-derivative Word problems on antiderivatives PROJECT PART D DUE	Class Packet Anti-derivative problems 1-12 5.4: 11-15, 18, 19-21; 23a, 25, 29 5.5: 1, 3, 6, 21a, 22a
10: Jul 12-16	Area under a curve, Area approximation by rectangles The definite integral (p336)	5.2: 1-4, 8 Class Packet Area Approximation problems 5.1: 7, 8; 5.3: 5b
11: Jul 19 – 23 Quiz 7	Fundamental Thm of Calculus (p375) Properties of the definite integral (Packet Notes) Using fnInt on the TI-84 5.6: Setting up, interpreting def. integrals PROJECT PART E DUE	Class Packet problems on Properties of def. integrals: 1-10 5.6: 9 – 12, 14, 16
12: Jul 26 - 30	5.8: Average value of a function Average value of the rate of change	5.8: 1, 3, 5 Class Packet Average Value problems
13: Aug 2 - 6 Quiz 8	5.9: Integration by u-substitution	5.9: 1, 3, 5, 8, 11, 15, 20 Class Packet Integration by substitution problems: 1-19
14: Aug 9 - 12	Final Exam Review, student evaluations	