NEW YORK UNIVERSITY

NYU STERN

LEONARD N. STERN
SCHOOL OF BUSINESS

V63.0121 Fall 2009
Calculus I (With Business Applications)
Section 60: 3:30pm – 4:45pm, KMC 5-140
Section 61: 4:55pm – 6:10pm, KMC 5-90

| **Professor** | Arun Sundararajan (*http://oz.stern.nyu.edu*) |
| | Office Hours: Tuesdays and Thursdays, 11:00am-12:30pm. |

Instructors/TF's	Margaret Gales (*mog215@nyu.edu*)
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Overview

This course covers introductory calculus, the study of functions and their rates of change. It will introduce the two major ideas of calculus: the derivative, which measures the instantaneous rate of change of a function, and the definite integral, which measures the total accumulation of a function over an interval, showing eventually how they are connected by the Fundamental Theorem of Calculus. Along the way, we will review some algebraic topics, understand limits and their properties, master some techniques of differentiation and integration, understand how calculus is used for optimization, and become conversant with parts of the theoretical framework as appropriate for a freshman mathematics course.

These sections place a special emphasis on how calculus is used for **modeling and analysis in business and economics**. As a consequence, we use a different textbook, have distinct assignments and tests, use different examples, cover some different topics, and probably have more fun than some of the other Calculus I sections. You will find that we emphasize the idea of a mathematical model repeatedly in the course. As you go through this course, remember that calculus is a language used quite extensively in developing business and economic theories. The more fluent you are in this language, the simpler and more accessible you will find your future business education.

Course web site

Blackboard is a web-based application that houses online materials for enrolled students across NYU. You can access our course by logging into *http://sternnewclasses.nyu.edu* (using your Stern netID/password), and choosing the course titled **Calculus I (with Business Applications)**. We will be using Blackboard fairly actively for this course, so make sure that you log in and get familiar with the course web site as soon as possible.

Class Meetings

There are two class sessions each week, on Mondays and Wednesdays, in the Kaufmann Management Center (KMC). Section 60 meets 3:30-4:45pm in KMC 5-140, and Section 61 meets 4:55-6:10pm in KMC 5-90. You register for and attend **one** of four recitation sessions each week. Recitations meet Fridays at 9:30am and 11:00am in Tisch UC07 and UC09. Recitation sessions begin on Friday September 18th.

Textbook

Your required textbook is *Calculus for Business, Economics, Life Sciences and Social Sciences, 11th Edition* by Barnett, Ziegler and Byleen (Prentice Hall, ISBN-10: 0132328186, ISBN-13: 978-0132328180). We will also provide supplementary notes on special topics periodically.

Homework

We will **post your sets of homework problems on Blackboard** a week or so before they are due. Typically there will be one problem set each week, with the exception of the first week of classes and the week of your midterm examination. Most of these problems will be from your textbook. The problem set will include a *practice problem set*, and an *assessed problem set*.

Practice problem set: These are typically odd-numbered problems from your textbook. You do not submit these problems and they will not be graded. Some of these problems will be discussed during recitation.

Assessed problem set: This will comprise about 8-10 problems. You will turn in your solutions to these problems at the beginning of class on Mondays. Four of these problems will be chosen *at random* and graded.

One of the major goals of college-level mathematics is to move students from rote application and computation to conceptual thinking and communication. This transition is especially important for you as business majors. Remember that attending class prepares you to do these problems, rather than showing you how to solve them. A substantial fraction of your learning occurs when you actually solve problems yourself, and when you translate descriptions of situations into mathematical formulations.

Your submitted answers must express your ideas <u>clearly, legibly and completely</u>, often using complete English sentences rather than just strings of equations. This means you can lose points for unexplained answers. Feel free to work in groups on your problem sets. However, each student must turn in his or her <u>own write-up</u> of the solutions, with an acknowledgment of collaborators.

We will not accept late homework. Your <u>lowest</u> problem set score will be dropped in the final grade calculation.

Exams and Quizzes
There will be one midterm examination, four to six quizzes and one final examination. The final examination is on **Friday December 18th, from 2:00pm-3:50pm.** Please plan your travel accordingly.
We will announce quizzes a session in advance. If you miss a quiz, you cannot make it up. Your <u>lowest</u> quiz score will be dropped in the final grade calculation.

Grading
The breakdown of points (out of a total of 500) for each of these:

Homework and Class Participation	75 points
Quizzes	150 points
Midterm examination	125 points
Final examination	150 points
Total	**500 points**

Pre-requisites
To enroll in this course you need to meet one of the following requirements: :
- An SAT Math score of 750 or higher.
- An ACT/ACTE Math score of 34 or higher.
- A score of 4 or higher on the Advanced Placement (AP) Calculus AB test
- A score of 3 or higher on the Advanced Placement (AP) Calculus BC test
- Completion of Algebra and Calculus (V63.0009) with a grade of C or higher.
- The Mathematics department's Calculus I placement test.

See *http://math.nyu.edu/degree/undergrad/calculus.html* for more information.

We look forward to seeing you learn!!

Schedule

All readings listed below are from your required textbook. We may provide you with additional notes from time to time. **This schedule will almost certainly change**. Please check Blackboard regularly.

Week	Dates	Textbook Sections and Topics
Week 1	9/9	1-3: Mathematical Models *(review sections 1-1 and 1-2 on your own)*
Week 2	9/14, 9/16	x-x: Functions 2-4: Exponential Functions 2.5: Logarithmic Functions *(review sections 2-1, 2-2 and 2-3 on your own)*
Week 3	9/21, 9/23	3-1: Introduction to Limits 3-2: Continuity 3-3: Infinite Limits and Limits at Infinity
Week 4	9/28, 9/30	3-4: The Derivative 3-5: Basic Differentiation Properties
Week 5	10/5, 10/7	4-1: Exponential Growth and Decay 4-2: Derivatives of Exponential and Logarithmic Functions 4-3: Derivatives of Products and Quotients
Week 6	10/12, 10/14	4-4: The Chain Rule 3-6: Linear Approximations and Differentials 3-7: Marginal Analysis in Business and Economics
Week 7	10/19, 10/21	4-5: Implicit Differentiation 4-6: Related Rates 4-7: Elasticity of Demand
Week 8	10/26, 10/28	*Monday 10/26: Midterm Examination* 9-1: Trigonometric Functions Review 9-2: Derivatives of Trigonometric Functions
Week 9	11/2, 11/4	5-1: First Derivatives and Graphs 5-2: Second Derivatives and Graphs 5-3: L'Hôpital's rule x-x: The Mean Value Theorem
Week 10	11/9, 11/11	5-4: Curve Sketching Techniques 5-5: Absolute Maxima and Minima 5-6: Optimization
Week 11	11/16, 11/18	5-6: Optimization (continued)
Week 12	11/23, 11/25	6-1: Antiderivatives and Indefinite Integrals 6-2: Integration by Substitution
Week 13	11/30, 12/2	6-2: Integration by Substitution (continued) 6.4: The Definite Integral 6-5: The Fundamental Theorem of Calculus
Week 14	12/7, 12/9	8-1: Functions of Several Variables 8-2: Partial Derivatives 8-3: Maxima and Minima
Week 15	12/14, 12/18	Catch up and Review *Friday 12/18: Final Examination*