MA 121	Calculus I	Spring 2011
Section A	MTWF 10 - 10:50	Keyes 102

Professor:	Scott Taylor
Office Hours:	MWF 12 - 1, 2 - 3.
	Tues 11 - 11:50, 1 - 2
	Thurs 11 - 11:50, 1 - 2
	Wed 8 PM - 9 PM (Calculus After Hours)
	and by appointment!
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Text:	Bretscher, *Calculus I: Lecture Notes*

The Course:

Calculus, in addition to being fundamental to modern science and technology, is one of humanity's greatest ideas. MA 121 introduces the three basic concepts of Calculus: the limit, the derivative, and the integral.

Course Objectives

- Recognize the core ideas of calculus and be able to apply them in new contexts.
- Improve in ability to read mathematics texts and learn mathematics on one's own.
- Understand multiple views of the derivative and integral
- Be able to draw the graphs of the derivative and antiderivative of a function given the graph of the function.
- Be able to evaluate a variety of limits
- Understand the $\varepsilon - \delta$ definition of a limit
- Be able to use the derivative to find local and global minima and maxima
- Be able to calculate derivatives using the power, product, quotient, and chain rules
- Be able to use implicit differentiation
- Be able to set up and solve a variety of related rates problems
- Be able to use the limit definitions of derivative and definite integral
- Understand and use both versions of the Fundamental Theorem of Calculus
- Find antiderivatives by substitution and integration by parts
- Solve separable differential equations

Attendance: I value your involvement in the class, therefore class attendance is mandatory. Absence for official Colby activities requires prior approval. Absence for religious reasons will be considered excused if the policy in the college catalogue is followed. I reserve the right to take attendance. More than 3 recorded unexcused absences will result in the reduction by 1/3 of the final course grade. Excessive tardiness or early departure may also result in such a reduction.

Computing Resources: You are encouraged to bring a calculator to class. On quizzes and exams you may use a graphing calculator. The point of an exam is to test for understanding – such understanding must come through clearly in your answers.

You may be required to use software to complete some homework problems. *Mathematica* is available on many computers at Colby, including the computers in Mudd 415 and Olin 323. From Colby's fileserver you may also download and install *Mathematica* on your personal computer for use while on campus. *Mathematica* is challenging to use, so I also strongly recommend two other free pieces of software:

- *WolframAlpha* (wolframalpha.com) is a web-based computational knowledge engine. It can compute most of the integrals and evaluate most of the limits which we will encounter in the course. It can be a bit tricky to use, so you will need think about whatever response it gives you. Another similar tool from the Wolfram people is available at integrals.wolfram.com
- *Grapher* is software which comes bundled with every modern Macintosh. (It can be found under Utilities). It is very easy to use and can draw almost every imaginable type of 2 and 3 dimensional graph. (Including solutions to differential equations and vector fields.) I highly recommend it – it is particularly easy to use.

You are encouraged to use software to check your answers to homework problems, however you must also be able to solve (most) of them by hand.

Academic Honesty: All work in this course must be your own and you should always be prepared to explain or defend it. You are encouraged to work with other students on the homework assignments and review exercises, but you may not copy another student's work. On exams and quizzes you are not allowed to confer with anybody else, use any notes, books, or online resources, unless otherwise permitted. Calculators are permitted. Please read the section on Academic Honesty in the catalogue (pg 43).

Evaluation: The numerical course grade will be a weighted average of the cumulative grades with weightings as follows:

25%	Weekly Homework	35%	Two Midterms
10%	Quizzes	20%	Final Exam
10%	Term Project		

The maximum of your scores for Exams 1 and 2 will count at 25% of your grade. The minimum of your scores on Exams 1 and 2 will count as 10% of your grade.

Caveat: earning less than 50% on each of the three exams will result in a grade of "F" for the course.

Course letter grades will be assigned (subject to the above caveat) according to the following scale. Any curve will be determined at the end of the course according to the discretion of the instructor. An A+ may be awarded to students who do exceptionally well and who demonstrate an exceptional interest in the course.

93 – 100 %	A	90 – 93 %	A-	87 – 90 %	B+	83 – 87%	B
80 – 83 %	B-	77 – 80 %	C+	73 – 77 %	C	70 – 73%	C-
67 – 70 %	D+	63 – 67 %	D	60 – 63 %	D-	below 60%	F

Homework: Homework is probably the most important part of this course – it's when you get to put into practice the concepts you've played with during class. Some of the homework questions may require you to explore some topic which we didn't discuss in class. The purpose of such questions is to help you develop the ability to read and learn mathematics on your own. If you go into a mathematical or scientific career, there will undoubtedly be times when you need to teach yourself some mathematics. If, however, all the homework problems fall into this category, you should check to make sure that you are working on the correct assignment.

Weekly homework will generally be due on Fridays and will always be posted on the course webpage. You are responsible for checking the webpage. If no homework assignment is posted, you should refresh the webpage on your browser and, if that doesn't work, email me to let me know. In the special circumstance that there is no new homework, the webpage will make note of that. If you will not be in class on the day that homework is due you should arrange to turn it in at my office or to have a friend bring it to class. Late homework may be penalized.

You should start the homework early, some problems will require multiple attempts and careful thought. If you are having substantial difficulty with a

particular problem or the entire homework set you should email me or come to office hours. I am eager to help you!

You are encouraged to work with a partner on the homework, but all work should be your own. In other words, you may discuss particular problems but you may not copy someone else's solution. Doing so violates academic honesty. As the course progresses, the question of how much work to show will arise. I encourage you to use common sense. If the work pertains to concepts discussed in class or in the reading, you should show it. If the work requires substantial effort and thought, you should show it. If the work is simply elementary algebra, you do not need to show it (although showing it may help the grader follow your work).

In general, your work is your answer. It is possible for someone to obtain a correct answer but to not receive full credit because their work is incorrect. Conversely, (almost entirely) correct work with an incorrect answer may receive full credit.

Homework must be very neat. This means: no messy scratchwork, no cramped writing, no huge eraser marks. Multiple pages should be stapled and the problems should be in order with section and problem number clearly indicated. If these guidelines are not followed you may be penalized. If you are incapable of writing neatly, you should type your solutions. LaTex is the most popular mathematical typesetting software, but you may also use programs like *Scientific Word* or *Mathematica*.

Quizzes: You will be given a quiz almost every Tuesday. If you are absent on the day a quiz is given, it may be made up within one week of when it was given. You are responsible for requesting a make-up quiz. The lowest quiz score will be dropped from the computation of the course grade.

Term Project: The term project will be completed on your own and without discussing it with anyone else (except the instructor). The project will involve applying the ideas lying behind the definition of limit, derivative, or integral to an unfamiliar context. More details will be distributed later.

Exams: There will be two in-class exams and a final exam. Each exam is cumulative, although the final exam is "more cumulative". Exams will be designed to test your understanding of the course material, not just your computational abilities. You must understand, and communicate your understanding of the material. Computers, textbooks, notes, and other people may not be used on the exam. The in-class exams will be given on **Friday, March 4** and **Tuesday, April 12**. The final exam is currently scheduled for exam period **13** on **Sunday, May 16** at **9:00 AM**. It may not be rescheduled for personal convenience (including airline reservations).