

AMS/ECON11A: *Mathematical Methods for Economics, I*

Instructor

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Office hours

Monday	12:00-1:20	BE 145
Tuesday	10-11 & 2-3	BE 160
Wednesday	2-3	BE 145
Thursday	11-12 & 3-4	BE 160

Overview of the Course

This course is an introduction to differential calculus in one variable and its applications to economics. We begin with a very brief review of some important pre-calculus topics and an equally brief introduction to mathematical modeling in economics (supply and demand functions).

Differential calculus itself begins with the mathematical concept of a *limit*. We use limits to define the important concepts of *continuity* and *differentiability*, and we learn to compute the derivatives of the functions that we commonly use to model economic variables, i.e., polynomials, power functions, exponential functions, logarithmic functions, and combinations of these functions. Other technical topics include *implicit differentiation*, *Taylor polynomials* and *Taylor approximation*.

While mastering the technical aspects of differentiation, we also learn how differential calculus is applied to economics. Applications include *marginal analysis*, *elasticity*, and *optimization* in one variable. This course is followed by AMS/ECON11B, which covers integral calculus in one variable and differential calculus in several variables.

Teaching Philosophy

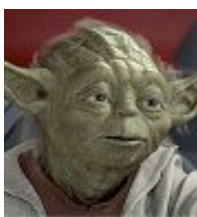
- As much as the material itself, the processes that you learn in this course will stand by you in the future.
- I am organized and have carefully selected material for you to learn; I value your time as much as my own.
- You conduct focused hard work, since there is no success without work.
- Hard work and serious scholarship can be fun.

### Course Slogans

'We can, we will' -- Motto of the US Army 9<sup>th</sup> Cavalry Regiment (the Buffalo Soldiers)



'Try not. Do, or do not. There is no try' – Jedi Master Yoda



'Simple, but not easy' – Dave Draper



### What I expect you to know coming into AMS11A

- Operations on real and complex numbers, polynomials and rational expressions;
- Exponents and radicals;
- How to solve linear and quadratic equations;
- How to graph linear and quadratic functions;
- A passing grade in AMS 3, Math 2B or 3, a score of 31 or higher on the placement examination, or approved transfer credit.

Textbook

***Introductory Mathematical Analysis for Business, Economics and the Life and Social Sciences***, 12th edition or UCSC custom edition, by Haeussler, Paul and Wood. Available at Bay Tree Books.

Cheating

- Is cause for dismissal from the University.
- Devalues everybody's grade – you should not tolerate it (nor will I).
- Students who help others cheat are also cheaters.
- Students caught cheating will automatically receive a failing grade and will be reported to their major department and College.

Approximate Topical Outline

<i>Week of</i>	<i>Topic</i>
21 Sept	Introduction and review
28 Sept	Review; limits (Ch 3 and 4; Section 10.1)
5 Oct	Limits (continued) and continuity (Sections 10.2, 10.3)
12 Oct	The derivative and first rules of differentiation (Sections 11.1,11.2)
19 Oct	Product and quotient rules; derivative as rate of change (Sections 11.3-11.5)
26 Oct	Chain rule; derivatives of exponential and log functions (Sections 11.5, 12.1-12.3)
2 Nov	Elasticity; implicit differentiation (Section 12.4)
9 Nov	Higher order derivatives and Taylor polynomials (Section 12.7)
16 Nov	Maxima and minima (Sections 13.1, 13.2)
23 Nov	Concavity and second derivative test (Section 13.3, 13.4)
30 Nov	Applied optimization (Section 13.6)

Exams

Monday 19 Oct	EXAM #1
Monday 9 Nov	EXAM #2
Monday 23 Nov	EXAM #3
Wednesday 9 Dec	Final Exam (8 am)

Exams are cumulative and 30-40% of the questions will be drawn from the review problems in your textbook.

### Tips for Success

Ask yourself: 1) What are my long-term goals? 2) What is my behavior? 3) Is my behavior contributing to my long-term goals?

**11A covers a lot of ground in a short amount of time. To do well in the class, I recommend the following:**

1. Attend all lectures. Go to section every week for additional review and practice (see below).
2. Read the textbook. The textbook is not just a repository for homework problems. You should at least page through the appropriate sections in the text *before* we talk about them in lecture and then read them carefully again after lecture. Read *actively* - by this I mean that you should follow the text with paper and pencil, work out the details of the examples, supplement your class notes with material from the book, annotate the book with comments from your class notes, etc.
3. Don't do all your studying in one or two blocks - study 1-2 hours a day, 5- 6 days a week: review and revise your class notes, do some of the homework, study the review questions, etc. All in all you should expect to spend 7 - 10 hours (or more) studying outside of class each week.
4. In addition to studying by yourself, spend several hours a week studying with 1-2 friends - take turns explaining the material to each other, quizzing each other and showing each other how to solve problems.

And if you don't want to believe me:

### Hints for Success in a course taught by Mangel (by Kerry Murphy, Fall 1993)

1. Create a small study group. Set up a time to meet. Treat it as a class and attend every meeting.
2. Discuss homework with your study group. You'll be surprised by the many different ways to approach a problem. These discussions will promote a better understanding of the material and improve problem solving approaches.
3. Attend office hours habitually and always attend discussion section. Having done the homework, you will usually have questions. Attend no matter how few questions you have. Other students will inquire about topics that you may not have considered. These new ideas and approaches can be expanded in your homework before you turn it in.
4. Don't overlook the importance of homework. It is a major portion of your grade and you will be rewarded for time spent.
5. Do one or two practice problems with your study group each week. They may give insight into your homework, but most of all you will be slowly preparing for the exams. Procrastination will catch up with you in the long run!

### The Importance of Study Skills

The pace of UC courses is much faster than either high school or community college and may require that you further develop your study skills (check out what your College offers in this area).

- Keep up with the material.
- Start your homework as soon as possible, but no later than Tuesday.
- Start preparing for the exams at least a week in advance.
- Keep in touch with your TA and me if you are having problems. **We want you to succeed.**

### Sections

Sections are not mandatory – but they are intended to help you succeed. In sections you will be reviewing the material by doing exercises and problems and may even get help with homework.

### Grades will be determined as follows

- The average of your 6 highest homework scores: 20%
- Your highest midterm exam: 25%
- Your second highest midterm exam: 15%
- Your lowest midterm exam: 10%
- Your final exam: 30%

Letter grades will be determined as follows: Fail: <50%, D: 50-61%, C: 62-73%, B: 74-86%; A: >86%.

If you are taking the course P/NP, then you must earn a C or better for a P grade. Also, please note that you need a C or better to enroll in AMS/ECON 11B. Intangibles, such as improvement throughout the quarter, can help in borderline cases, especially at the C/D border.

There is **no** extra credit work in this course and **no** exceptions are made in the grading. So, for example, if you have been told that you need a B- or better to declare as an economics major, and you have concerns about earning the grade you want/need, then please come see me early in the quarter so that we can devise a study plan for you that will help you attain your goals.

Remember: **I do not give grades, you earn them.**

Evaluations will report your examination and homework scores, along with the class average and standard deviation. Comments from TAs about your performance will be added as appropriate.

### Missing Class

There are many legitimate reasons for missing class. When I miss class, which will happen three times, I will arrange a substitute teacher. If you are going to miss class because of travel or sickness, arrange a substitute student to take notes – one of your classmates is a good choice.

It is still not clear how large the H1N1 flu pandemic will be, but we must take it seriously. You can find general information for the campus community at

<http://www2.ucsc.edu/healthcenter/healthalert.shtml>.

If you develop the symptoms of flu (fever and chills AND a cough or sore throat) isolate themselves until at least 24 hours after you are free of the fever. (This would likely be a period of 3-5 days.) **Do not come to class, but do send an email message to me indicating that you are sick.**

### Homework

Is due at before lecture starts on the Friday indicated below. It should be stapled with your name PRINTED (so we can read the name) on it. **Do not put homework in my mailbox or under my door after lecture. Do not turn in your homework in Section.** If you know you are going to be gone, you may turn in your homework early in class or during an office hour.

**Remember: the perfect is the enemy of the good – if you don't have all of the homework done, turn in what you have done.**

The late homework policy is simple. ABSOLUTELY NO LATE HOMEWORK WILL BE ACCEPTED UNDER ANY CIRCUMSTANCES. I drop the lowest three homework scores to account for unexpected absences, flat tires, etc.

I will choose 6 problems from each assignment for the readers to grade. Each problem will be scored 0 [nothing right], 1 [something right], or 2 [perfectly correct] and the entire set of 6 will be given up to 3 points for quality of presentation and effort.

HW #	Due Date	Assignment from section
1	October 2	3.2: #1, 7, 16, 19 3.3: #1, 3, 11 3.4: #10, 16, 28 3.5: #4, 10. 3.6: #8, 16. 4.1: # 22, 24, 30. 4.2: #38, 50, 66. 4.3: #24, 26, 36 4.4: # 14, 44.
2	October 9	10.1: #6, 12, 18, 24, 30, 40 10.2: #16, 22, 24, 32, 56. 10.3: #2, 8, 12, 24, 34.

