# AMS/ECON 11A: Math Methods for Economics I, Winter 2016.

## MWF 2:00 – 3:10 pm, Baskin Engineering, 152

## https://courses.soe.ucsc.edu/courses/ams11a/Winter16/01

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**Required text: *Introductory Mathematical Analysis for Business, Economics, etc.* 13th edition, *OR* the custom UCSC version of the 13th edition (blue paperback), by Haeussler, Paul and Wood.**

**Course Description:** This course covers differential calculus in one variable and its applications to Economics. Topics include limits, continuity, differentiation, linear approximation, elasticity, Taylor polynomials and optimization. For more details, please see the schedule of lectures.

**Reading:** The reading assignments listed with the lecture schedule are meant to be completed at least once ***before*** the corresponding lecture. This will make the discussion of the material in lecture much easier to follow. After the lecture, you should read the material again, in greater depth.

Some of the reading is assigned from the *Supplementary Notes*, which can be found on the supplements/review page of the course web site.

**Exams:** There will be four short exams in class, one every other Friday, and a comprehensive final exam. The exam dates are listed in the lecture schedule that follows. Make-up (short) exams will ***not*** be given, but your lowest score will be dropped.

There will be a study guide posted for each exam, and the TAs will go over these study guides in section.

**Homework:** Assignments are listed in the lecture schedule. These assignments will ***not*** be collected or graded. Working on the homework is perhaps the most important thing you can do to master the material and succeed in the class.

**Sections:** Sections are not mandatory, but are *highly recommended*. Mastering the material of this course requires practice and discussion, and in section you will have the opportunity to engage in both activities under the guidance of an experienced Teaching Assistant. In addition, the TAs will review the study guides for the bi-weekly exams during sections.

**Course grade:** Your (three highest) short exam scores contribute 45 percent to your overall score in the class and the final exam contributes another 45 percent. The remaining 10 percent come from attendance (5 percent) and participation (5 percent) — see the ***Top Hat*** information below for more details. Letter grades will correspond (approximately) to the following ranges:

| Overall Score | Grade |
|---|---|
| 90 – 100 | A− to A+ |
| 78 – 89 | B− to B+; |
| 65 – 77 | C to C+ |
| 50 – 64 | D |
| 0 – 49 | F |

***To pass the class, your overall score must be 65 or above and you must score at least 50% on the final exam.***

**Students with disabilities:** If you qualify for classroom/exam accommodations because of a disability, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me as soon as possible, preferably within the first week of the quarter. Contact DRC by phone at ***831-459-2089*** or by email at ***drc@ucsc.edu*** for more information.

**Top Hat:** All students in the class are expected to subscribe to Top Hat, which is an interactive classroom platform. To use Top Hat, you will need a cell phone, tablet or laptop. I will use Top Hat to record attendance and participation in lectures. When you subscribe, please use your full name (the same one the UCSC registrar uses) and your official UCSC email address.

The cost for Top Hat is $24 for one quarter, $36 for a year or $72 for a lifetime subscription. I will be using Top Hat for AMS/ECON 11B in the Spring (and the forseeable future) and other UCSC faculty also use it, so you may want to consider a year-long (or longer) subscription.

***Attendance:*** I will take attendance during the first 10 minutes of each lecture. If you arrive later than that your attendance will *not* be recorded. There will be 28 lectures in all, and the attendance score will be determined as follows:

- 24 - 28 lectures: 5 points.
- 19 - 23 lectures: 4 points.
- 14 - 18 lectures: 3 points.
- 9 - 13 lectures: 2 points.
- 5 - 9 lectures: 1 point.
- 4 lectures or fewer: 0 points.

***Participation:*** I will ask a couple of questions (using Top Hat) during most lectures. Your answers to these questions is how your participation will be measured. Correctness does *not* factor in to the participation score, but I will be tracking it and I may use the correctness score to help determine grades on the border at the end of the course (but only in the positive direction). The participation score will be determined as follows:

- 86% - 100% questions answered: 5 points.
- 71% - 85% questions answered: 4 points.
- 56% - 70% questions answered: 3 points.
- 41% - 55% questions answered: 2 points.
- 26% - 40% questions answered: 1 point.
- 25% or less: 0 points.

***CHEATING:***

**Cheating in any form (using notes on tests or exams, copying from someone else, etc.) will not be tolerated. Any student caught cheating will be reported to the AMS and ECON departments and to his or her college provost. In almost all cases, a student caught cheating will receive a failing grade. Students who help others cheat are also considered cheaters.**

***Cheating devalues everyone's grades.***
***You should not tolerate it either.***

**Lecture Schedule with Homework and Exam Dates.**

**Monday, 1-4:** Introduction. Mathematical models. Approximation.

*Reading:* Supplementary Note #1.

**Precalculus Review:** Chapters 3 and 4, SN #2 and #3.

*Homework.* Chapter 3, review problems: 3, 4, 5, 31, 34, 35, 37, 48, 49, 55.

Chapter 4, review problems: 5, 7, 12, 14, 17, 18, 21, 26, 35, 45, 47, 59, 62.

**Wednesday, 1-6:** Limits.

*Reading:* Section 10.1.

*Homework.* 10.1: 3, 5, 8, 11, 15, 18, 21, 25, 28, 36, 37, 40, 43.

**Friday, 1-8:** More limits; limits 'at infinity'.

*Reading:* Section 10.2.

*Homework.* 10.2: 1, 2, 3, 7, 8, 11, 19, 21, 22, 24, 29, 35, 38, 54.

**Monday, 1-11:** Continuous functions.

*Reading:* Section 10.3.

*Homework.* 10.3: 3, 6, 7, 11, 13, 16, 19, 25, 27, 28, 35.

**Wednesday, 1-13** Differentiable functions.

*Reading:* Section 11.1, SN #4.

*Homework.* 11.1: 1, 3, 5, 8, 12, 15, 25, 27.

**Friday, 1-15:** First rules of differentiation. ***Exam 1***

*Reading:* Section 11.2.

*Homework.* 11.2: 3, 6, 9, 17, 25, 33, 38, 43, 49, 54, 61, 69, 81, 85.

**Monday, 1-18:** ***Martin Luther King day***

**Wednesday, 1-20:** Rate of change; linear approximation.

*Reading:* Section 11.3 and SN #5.

*Homework.* 11.3: 1, 6, 9, 11, 14, 17, 19, 23, 26, 28, 31.

**Friday, 1-22:** Linear approximation, continued.

*Reading:* SN #5.

*Homework.* 11.3: 16, 21, 25, 29.

**Monday, 1-25:** Product and quotient rules.

*Reading:* Section 11.4.

*Homework.* 11.4: 1, 4, 7, 10, 13, 20, 27, 31, 35, 43, 51, 52, 59, 62, 67.

**Wednesday, 1-27:** The chain rule.

*Reading:* Section 11.5

*Homework.* 11.5: 2, 5, 9, 14, 21, 25, 28, 33, 36, 59, 66, 67.

**Friday, 1-29:** Applications. ***Exam 2***

*Reading :* Sections 11.2 - 11.5, SN #5.

*Homework.* RQ#3: 3, 4, 5, 6, 7; RQ#4: 3.

**Monday, 2-1:** Differentiating logarithm functions.

*Reading:* Section 12.1

*Homework.* 12.1: 2, 3, 6, 11, 15, 18, 22, 28, 29, 42, 43, 44, 50.

**Wednesday, 2-3:** Differentiating exponential functions.

*Reading:* Sections 12.2 and 12.5.

*Homework.* 12.2: 1, 4, 9, 12, , 16, 17, 20, 23, 28, 33, 41.

**Friday, 2-5:** Relative rate of change; Elasticity.

*Reading:* Section 12.3 and SN #6.

*Homework.* 12.3: 1, 2, 4, 7, 11, 14, 18, 27; RQ #5: 1, 2.

**Monday, 2-8:** Higher order derivatives and Taylor polynomials.

*Reading:* Section 12.7 and SN #7.

*Homework.* 12.7: 1 – 12, 37, 38.

**Wednesday, 2-10:** Taylor polynomials (continued).

*Reading:* SN #7.

*Homework.* SN #7: 1 - 3; RQ #6: 1 - 4.

**Friday, 2-12:** Relative extreme values and critical points. ***Exam 3***

*Reading:* Section 13.1.

*Homework.* 13.1: 1 - 8, 9, 12, 15, 18.

**Monday, 2-15:** ***Presidents' day***

**Wednesday, 2-17:** The first derivative test.

*Reading:* Section 13.1.

*Homework.* 13.1: 22, 25, 31, 37, 38, 42, 43, 51, 52, 69.

**Friday, 2-19:** Global (absolute) extreme values.

*Reading:* Section 13.2.

*Homework.* 13.2: 1 - 9; RQ #7: 1, 2, 4.

**Monday, 2-22:** Concavity.

*Reading:* Section 13.3.

*Homework.* 13.3: 1, 4, 7, 10, 17, 20, 23, 39, 40.

**Wednesday, 2-24:** The second derivative test.

*Reading:* Section 13.4.

*Homework.* 13.4: 1 - 14.

**Friday, 2-26:** Asymptotes and curve sketching. ***Exam 4***

*Reading:* Section 13.5.

*Homework.* 13.5: 1, 4, 7, 10, 13, 27, 30, 35.

**Monday, 2-29** Curve sketching, continued.

*Reading:* Section 13.5.

*Homework.* 13.5: 11, 15, 31, 37, 43.

**Wednesday, 3-2:** Applied optimization.

*Reading:* Section 13.6.

*Homework.* 13.6: 3, 4, 5, 8, 11; RQ #8: 1, 2.

**Friday, 3-4:** Applied optimization.

*Reading:* Section 13.6.

*Homework.* 13.6: 12, 13, 15, 18, 19; RQ #8: 3.

**Monday, 3-7 :** Applied optimization.

*Reading:* Section 13.6.

*Homework.* 13.6: 13.6: 27, 28, 32, 38; RQ #8: 4, 5.

**Wednesday, 3-9:** Review

*Reading:* Your notes — come to class with questions.

**Friday, 3-11:** Review

*Reading:* Your notes — come to class with questions.

**Tuesday, 3-15:** ***Final Exam: 4:00 – 7:00 pm***