

AMS/ECON 11A: Math Methods for Economics I, Spring 2018.

MWF 9:20 – 10:25 am, J.Baskin Engineering rm 152

<https://ams011a-spring18-01.courses.soe.ucsc.edu/home>

Instructor: Yonatan Katznelson
Office: Baskin Engineering, 361B
Office hours: See course website
Phone: 459 - 1046
Email: yorik@ucsc.edu

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. The lectures are prepared based on the assumption that students have done the assigned reading and they will be significantly easier to follow if you have read the material in advance. After the lecture, you should read the material again (in greater depth) and work on the corresponding part of the homework.

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

Homework: Assignments are listed in the lecture schedule with their due dates.

Late homework will not be accepted, but your lowest two scores will be dropped.

Comment: Only even numbered problems are assigned in the homework. You should work as many of the odd-numbered problems as you can, as part of your *reading* for each assigned section. In particular, you should try the odd numbered problems that are similar to the even numbered ones that are assigned in the homework.

Exams: There will be three short exams throughout the quarter and a comprehensive final exam. The lowest (short) exam score will be dropped. See the lecture schedule for the dates of the exams.

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.

Special Accommodations: UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please contact the Disability Resource Center, which offers services that are confidential and free of charge. Contact DRC by phone at **831-459-2089** or by email at **drc@ucsc.edu**. If you have an Accommodation Authorization Letter from the DRC, please submit it to me privately during my office hours or by appointment, preferably within the first two weeks of the quarter. At that time, I would also like us to discuss ways we can ensure your full participation in the course.

Course grade: Your two highest short exams scores contribute 20 percent each to your overall score in the class, the homework contributes 20 percent and the final exam contributes the remaining 40 percent. Letter grades will correspond (approximately) to the following ranges:

Overall Score	Grade
90 – 100	A– to A+
80 – 89	B– to B+;
65 – 79	C to C+
60 - 64	C-
50 – 59	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.

Comment: *Your grade in the class is determined by your performance in the class, as assessed by the homework and exams, nothing else.* If you need a certain minimum grade for any reason, then you must earn it. In other words, *all students are graded the same.*

We will do everything we can to help you succeed, so if you feel that you are falling behind or if you are concerned about your performance, please come see us (Dr. Katznelson and/or the Teaching Assistants) early in the quarter. *There is little that we can do to help you improve your grade near the end of the quarter, and nothing we can do after the final exam.*

CHEATING:

Cheating in any form (using unauthorized 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 cheaters. Cheating devalues everyone's grades—you shouldn't tolerate it either.

TIPS FOR SUCCESS

- ★ ***Come to all the lectures, and come prepared*** — read the assigned sections at least once before the lecture, so you have an idea of what we will be discussing in the lecture. Read the material again after the lecture, this time in more depth.
- ★ ***Work on the homework*** together with the second reading. Make a note of the problems that you don't understand so that you can ask about them.
- ★ ***Ask questions:*** the more specific your question, the better and more helpful the answer is likely to be. You can ask questions in class, in section and during office hours.
- ★ ***Attend sections regularly.*** You can prepare for section by making a list of the homework problems you find most challenging/confusing.
- ★ ***Study with friends*** for a few hours a week. Technical skills can be practiced alone, but concepts need to be *discussed*.
- ★ ***The average student should spend 8-10 hours studying outside of class/section to be successful.*** Spread those hours out — one to two hours several times a week is optimal.
- ★ ***If you feel that you are getting lost, take action.*** Don't wait and hope 'it goes away'. Come to office hours or ask questions in class (or section) to clear up any confusion.

Lecture Schedule with Homework and Exam Dates.

Monday, 4-2: Introduction. Mathematical models.

Reading: Supplementary Note #1 (SN 1).

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

Wednesday, 4-4: Limits.

Reading: Section 10.1.

Friday, 4-6: More limits; limits ‘at infinity’.

Reading: Section 10.2.

Homework Assignment 1, Due Friday, 4-6

Chapter 3, Review Problems: 36, 54.

Chapter 4, Review Problems: 12, 18, 26, 62.

Section 10.1: 8, 18, 28, 36, 40.

Monday, 4-9: Continuous functions.

Reading: Section 10.3.

Wednesday, 4-11 Differentiable functions.

Reading: Section 11.1, SN 4.

Friday, 4-13: First rules of differentiation.

Reading: Section 11.2.

Homework Assignment 2, Due Friday, 4-13

Section 10.2: 8, 22, 24, 30, 54.

Section 10.3: 4, 6, 10.

Section 11.1: 8, 12, 22.

Section 11.2: 6, 12, 20, 32, 36, 80.

Monday, 4-16: Review for Exam 1

Reading: Homework Assignments 1 - 2 and Study Guides 1 - 3.

Wednesday, 4-18: ***Exam 1*** (precalculus skills, limits, continuity and basic differentiation)

Friday, 4-20: Interpreting the derivative – linear approximation.

Reading: Section 11.3 and SN 5, §1,2 (on the course website).

Monday, 4-23: The Product and Quotient rules.

Reading: Section 11.4

Homework Assignment 3, Due Monday, 4-23

Section 11.2: 6, 18, 28, 44, 58, 64, 80, 84, 86.

Section 11.3: 10, 18, 22, 26, 28.

Wednesday, 4-25: The chain rule.

Reading : Section 11.5

Friday, 4-27: Differentiating logarithm and exponential functions.

Reading: Sections 12.1 and 12.2

Homework Assignment 4, Due Friday, 4-27

Section 11.4: 12, 18, 24, 28, 30, 34, 40, 54, 68.

Section 11.5: 10, 20, 28, 42, 66, 74.

Supplementary Note 5: 4, 5, 6.

Monday, 4-30: Relative rate of change; Elasticity.

Reading: Section 12.3 and SN 6.

Wednesday, 5-2: Elasticity, continued.

Reading: Section 12.3 and SN 6.

Friday, 5-4: Midterm review.

Reading: Homework Assignments 3 - 5, Study Guides 4 - 5.

Homework Assignment 5, Due Friday, 5-4

Section 12.1: 6, 18, 30, 42, 50.

Section 12.2: 10, 14, 24, 52.

Section 12.3: 4, 8, 12.

Supplementary Note 6: 2, 3, 4.

Monday, 5-7: ***Exam 2*** (Differentiation and applications)

Wednesday, 5-9: Higher order derivatives and Taylor polynomials.

Reading: Section 12.7 and SN 7.

Friday, 5-11: Taylor polynomials, continued.

Reading: SN 7.

Homework Assignment 6, Due Friday, 5-4

Section 12.7: 2, 4, 6, 8, 14, 18, 20.

Supplementary Note 7: 2, 3, 4.

Monday, 5-14: Relative extreme values and critical points.

Reading: Section 13.1

Wednesday, 5-16: The first derivative test.

Reading: Section 13.1.

Friday, 5-18: Global (absolute) extreme values.

Reading: Section 13.2.

Homework Assignment 7, Due Friday, 5-4

Section 13.1: 8, 12, 22, 30, 42, 46,

Section 13.2: 2, 4, 8, 12.

Monday, 5-21: Concavity and the second derivative test.

Reading: Sections 13.3, 13.4.

Wednesday, 5-23: Midterm review.

Reading: Homework Assignments 6 - 7, Study Guides 6 - 8.

Friday, 5-25: ***Exam 3*** (Taylor polynomials and optimization)

Monday, 5-28: ***Holiday (Memorial day)***

Wednesday, 5-30: Asymptotes

Reading: Section 13.5.

Homework Assignment 8, Due Wednesday, 5-30

Section 13.3: 4, 10, 14, 18, 26.

Section 13.4: 2, 6, 8, 12, 14.

Friday, 6-1 Applied optimization.

Reading: Section 13.6.

Monday, 6-4: Applied optimization.

Reading: Section 13.6, Study Guide 9.

Homework Assignment 9, Due Monday, 6-4

Section 13.5: 14, 18, 22.

Section 13.6: 4, 10, 12, 18, 30, 36, 38.

Wednesday, 6-6: Applied optimization.

Reading: Study Guide 9

Friday, 6-8: Final Review

Reading: Your notes — come to class with questions.

Thursday, 6-14: ***Final Exam, 12:00 – 3:00 pm***