AMS/ECON 11A: Math Methods for Economics I, Fall 2017.

MWF 8:00 – 9:05 am, Classroom Unit 001
https://ams011a-fall17-01.courses.soe.ucsc.edu/home

Instructor: Yonatan Katznelson
Office: Baskin Engineering, 361B
Office hours: MWF 10:00 - 12:00 am
Phone: 459 - 1046
Email: yorik@ucsc.edu

Required text: *Introductory Mathematical Analysis for Business, Economics, etc.* 13$^{\text{th}}$ edition, *OR* the custom UCSC version of the 13$^{\text{th}}$ 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 homework assignment.

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

Homework: Assignments are listed in the lecture schedule with the reading. These assignments will *not* be collected or graded. Working on these assignments is crucial to mastering the material and succeed in the class. You should think of the homework as part of the reading.

Quizzes and Exams: There will be one midterm exam in class and a comprehensive final exam. The exam dates are listed in the lecture schedule that follows. In addition to the exams there will be 8-10 *unscheduled*, short quizzes during lectures throughout the quarter. Make-up quizzes will *not* be given. You are expected to attend all lectures so you shouldn't miss any quizzes, but in any case your lowest 2-4 scores will be dropped (which may include 0s for missed quizzes).

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 particular, the TAs will review the study guides posted on the review/supplements page of the course website.

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 (6-8 highest) quiz scores contribute 25 percent to your overall score in the class, the midterm contributes 30 percent and the final exam contributes the remaining 45 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
<u>and</u> you must score at least 50% on 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. You don't have to read the material in depth the first time through.

⋆ Read the material again after the lecture, this time in more depth. Read actively: take notes, make a list of questions to ask. Try working the examples in the book/supplementary notes on your own before reading the solutions.

⋆ 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.

⋆ Take advantage of all the resources: lecture, section, MSI, office hours.

⋆ Study with friends for a few hours a week. Technical skills can be practiced alone, but concepts need to be *discussed*.

⋆ The standard for a 5-unit course at UCSC is 15 hours of studying a week. These 15 hours include the time for lectures and sections, but this still leaves close to 10 hours a week you should be spending with the material outside of class.

⋆ 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.

Friday, 9-29: Introduction. Mathematical models.

Reading: Supplementary Note #1 (SN 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.

Monday, 10-2: Limits.

Reading: Section 10.1.

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

Wednesday, 10-4: 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.

Friday, 10-6: Continuous functions.

Reading: Section 10.3.

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

Monday, 10-9 Differentiable functions.

Reading: Section 11.1, SN 4.

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

Wednesday, 10-11: First rules of differentiation.

Reading: Section 11.2.

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

Friday, 10-13: 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.

Monday, 10-16: Linear approximation, continued.

Reading: SN 5.

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

Wednesday, 10-18: 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.

Friday, 10-20: The chain rule.

Reading: Section 11.5

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

Monday, 10-23: Applications.

Reading : Sections 11.2 - 11.5, SN 5.

Homework. SN 5, Exercises 1 - 6.

Wednesday, 10-25: Differentiating logarithm and exponential functions.

Reading: Sections 12.1 and 12.2

Homework. 12.1: 3, 6, 11, 15, 18, 22, 28, 29, 43, 44, 50; 12.2: 1, 4, 9, 12, 16, 17, 20, 23, 33, 41.

Friday, 10-27: Relative rate of change; Elasticity.

Reading: Section 12.3 and SN 6.

Homework. 12.3: 1, 2, 4, 7, 11, 14.

Monday, 10-30: Elasticity, continued.

Reading: Section 12.3 and SN 6.

Homework. 12.3: 17, 18, 19, 21, 23, 25, 27.

Wednesday, 11-1: Midterm Reivew.

Reading: Study Guides 1 - 5.

Homework. Study Guides 1 - 5.

Friday, 11-3: ***Midterm Exam (in class)***

Monday, 11-6: Higher order derivatives and Taylor polynomials.

Reading: Section 12.7 and SN 7.

Homework. 12.7: 1 - 20.

Wednesday, 11-8: Taylor polynomials, continued.

Reading: SN 7.

Homework. SN 7: 1 - 4.

Friday, 11-10: ***Holiday (Veterans' day)***

Monday, 11-13: Relative extreme values and critical points.

Reading: Section 13.1.

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

Wednesday, 11-15: The first derivative test.

Reading: Section 13.1.

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

Friday, 11-17: Global (absolute) extreme values.

Reading: Section 13.2.

Homework. 13.2: 1 - 9.

Monday, 11-20: Concavity and the second derivative test.

Reading: Sections 13.3, 13.4.

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

Wednesday, 11-22: The second derivative test (cont.)

Reading: Section 13.4.

Homework. 13.4: 1 - 14.

Friday, 11-24:   *Holiday (Thanksgiving)*

Monday, 11-27: Curve sketching.

Reading: Section 13.5.

Homework. 13.5: 1, 4, 7, 10, 11, 31, 37.

Wednesday, 11-29: Curve sketching, (cont.)

Reading: Section 13.5.

Homework. 13.5: 13, 15, 27, 30, 35, 43.

Friday, 12-1 Applied optimization.

Reading: Section 13.6.

Homework. 13.6: 3, 4, 5, 8, 11.

Monday, 12-4: Applied optimization.

Reading: Section 13.6.

Homework. 13.6: 12, 13, 15, 18, 19.

Wednesday, 12-6: Applied optimization.

Reading: Section 13.6

Homework. 13.6: 27, 28, 32, 38.

Friday, 12-8: Review

Reading: Your notes — come to class with questions.

Monday, 12-11:   *Final Exam, 8:00 – 11:00 am*