**University of Colorado - Boulder**
**Fall 2025**
**Syllabus ECON1088 - Math Tools for Economists 2**

Instructor: Dr. Shawn Swanson Email: shawn.swanson@colorado.edu
Office: ECON 14b Zoom: https://cuboulder.zoom.us/my/ask.shawn
Office hours: Monday, Wednesday, Friday 9:25 – 9:55 AM ; 11:15 – 11:45 AM ; 2:15-2:45 PM

| Section | Class Time | Room | Final |
|---|---|---|---|
| 1088-001 | 10:10 - 11:00 AM | ENVD 120 | Friday, Dec 12, 10:30 AM– 1 PM |
| 1088-002 | 12:20 – 1:10 PM | ECON 117 | Monday, Dec 8, 4:30–7 PM |

## Description

This class is the second of a two-course sequence. It is a continuation of ECON 1078 and builds upon and reinforces the algebraic foundation developed in that course. We will cover important mathematical tools used in economics and their applications. These tools, which will be used extensively in subsequent economic courses, include derivatives, optimization, and integrals. We will learn to translate intuitive statements into mathematical expressions and vice versa.

## Prerequisites

Requires prerequisite course of ECON 1078 or MATH 1011 or MATH 1071 or MATH 1150 or MATH 1160 (minimum grade C-) or an ALEKS math exam taken in 2016 or earlier, or placement into pre-calculus based on your admission data and/or CU Boulder coursework. College level algebra skills are necessary for success in this course and will be reinforced throughout.

## Required Textbook

Required Textbook: Knut Sydsaeter, Peter Hammond, Arne Strom and Andres Carvajal, *Essential Mathematics for Economic Analysis*. (I teach from the 6th edition, other editions are fine.)

This textbook will serve as an excellent resource for your future Economics classes.

## Attendance

Class attendance is necessary for success in this course and therefore mandatory. To give students an external commitment device, there will be in-class clicker questions.

*If you miss a class for any reason, it is your responsibility to get notes from a classmate. If you still have questions after reviewing those notes, you should come to office hours with specific questions prepared. If you anticipate an EXTENDED absence, please notify me prior to missing any classes, assignments, or exams. There is no need to advise me of short day-to-day absences.*

## Canvas

I use Canvas extensively to keep this course organized and make announcements. Additionally, the problems sets and solutions will be available on Canvas as well. Grades will be posted on Canvas as soon as they are available.

**Office Hours**

Office hours are the best way to get extra help if needed. I would be happy to schedule a time outside of office hours if a scheduling conflict prevents you from coming during the assigned hours. If you wish to Zoom during office hours, please let me know in advance.

**Cheating**

Don't do it. You will get caught, fail the course, and be reported to the Honor Code Council.

**Electronic Device Policy**

Please silence electronic devices during lectures. You are welcome to use electronic devices for note taking and accessing learning materials online. However, do not use electronic devices during class time for non-class activities (i.e. social media, etc.), or you will be asked to turn it off and put it away.

**Communication Policy**

Email will be my primary form of communication with the class:

- I will use your CU email address for class communications, so check your CU mailbox frequently.
- I will answer you as soon as possible. Please allow one business day for a response.
- Please refer to the syllabus to answer questions before contacting me.
- Questions on course material are often more easily and thoroughly answered in person. Please use my office hours as your primary means of obtaining help with course material.
- Under no circumstances can I provide grades through email due to Family Educational Rights and Privacy Act (FERPA) regulations, since emails are not considered secure. Grades will be available on Canvas.

**Grading**

*To provide you with flexibility throughout the semester for things such as illness, bereavement, etc., I will drop your lowest two homework assignments and lowest two clicker scores. There will be no makeup work or makeup exams in this class regardless of the reason. In fairness to everyone, there are no exceptions. Late assignments will not be accepted.*

Your total grade in this course will be determined as follows:

| | |
|---|---|
| Problem sets | 20% |
| Clickers | 20% |
| Midterms | 40% (20% Each) |
| Final | 20% |
| Extra Credit | Up to 3% added to your course grade |

*Problem Sets:*
There will be 11 problem sets. These are intended to push your understanding of the class material. I encourage you to come to office hours with any questions. I'm always happy to help. Many of these problems will be solved during class. It is strongly suggested you attempt additional problems from the text. Problem sets will be submitted on Canvas. *Late work will not be accepted. Problem sets will typically be due Friday at 11:59 PM. The next morning detailed solutions will be released on Canvas.*

*Exams:*
*The exams will be completed on scantron forms, so bring a #2 pencil.* Pens will not work on scantron forms. There are 2 midterm exams, and while they are not explicitly cumulative, the material does naturally build upon itself. The final exam must be held per university policy. The University's final exam policy can be found here. Exams will be closed book, closed notes. Only basic scientific calculators will be permitted, no computers, cell phones, or graphing calculators. All exams will take place in the regular classroom unless otherwise noted. *There will be no makeup exams. If you miss a midterm exam for ANY reason, the weight of the exam with be added to the final.*

*Extra credit:*
There will be extra credit assignments found on Canvas that roughly correspond to each problem set. The extra credit grade will be calculated by adding 3% times your extra credit percentage score to your overall grade. Since it is added to your final grade, any extra credit can only increase you grade. Note that extra credit will not be reflected in the grade on Canvas until the end of the semester. All extra credit will close at 11:59 on the last day of classes.

*Letter Grades:*
Grades may be curved at the instructor's discretion. Your (curved) final course grade will automatically be increased up to 0.5% to meet any grade cutoff. No further grade adjustments are available under any circumstances. No exceptions. Letter grades will be assigned as follows:

| A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 94+ | 90-93 | 87-89 | 83-86 | 80-82 | 77-79 | 73-76 | 70-72 | 67-69 | 63-66 | 60-62 | ≤ 59 |

**Course Resources and Recipe for Success**

Because the class is inherently cumulative, it is essential to invest time early. This will make the rest of the semester much more manageable. Calculus is like lifting weights. I am your personal trainer. You can only reap the benefits if you do enough reps. I can't do that for you.

I want you to be successful in this course. I will do whatever I can to help you learn. Therefore, there are numerous resources for you to succeed.

Office Hours: This is an excellent opportunity to get additional clarification and get one-on-one instruction. I love working with students during office hours. It is among the most rewarding things I get to do as an instructor, so please take advantage. If a scheduling conflict prevents you from attending my office hours, I will be happy to schedule a time with you.

Econ Tutoring Lab: The Economics department provides a free tutoring lab. Information can be found on the department's website: https://www.colorado.edu/economics/undergraduate-program

Private Tutors: Private tutors are available for a fee. Information can be found on the department's website: https://www.colorado.edu/economics/undergraduate-program

There is a strong correlation between attendance and homework with a student's overall grade. The correlation coefficients are greater than 0.60. I would be remiss if I did not note that correlation does not imply causation. Nonetheless, imitating the approach of successful students is not a bad strategy. Take this course seriously. Use the available resources. Keep up with the course and do not fall behind.

## Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

For more information, see the classroom behavior policy, the Student Code of Conduct, and the Office of Institutional Equity and Compliance.

## Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.
If you have a temporary illness, injury or required medical isolation for which you require adjustment, *please notify me if you anticipate missing a week or more prior to missing any classes, assignments, or exams. There is no need to advise me of short day-to-day absences.*

# Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

## Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part in adhering to the Honor Code.
All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit Honor Code for more information on the academic integrity policy.

## Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits protected-class discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email CUreport@colorado.edu. Information about university policies, reporting options, and support resources including confidential services can be found on the OIEC website.

Please know that faculty and graduate instructors must inform OIEC when they are made aware of incidents related to these policies regardless of when or where something occurred. This is to ensure that individuals impacted receive outreach from OIEC about resolution options and support resources. To learn more about reporting and support for a variety of concerns, visit the Don't Ignore It page.

## Religious Accommodations

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please communicate the need for a religious accommodation in a timely manner. In this class, please notify me two weeks prior to missing any lectures, coursework, or exams.

See the campus policy regarding religious observances for full details.

## Mental Health and Wellness

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact Counseling and Psychiatric Services (CAPS) located in C4C

or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through Academic Live Care. The Academic Live Care site also provides information about additional wellness services on campus that are available to students.

## Tentative Course Schedule

| Week | Topics | Due |
|---|---|---|
| Week 1 (8/18-8/22) | • Administration<br>• ECON1078 Review | |
| Week 2 (8/25-8/29) | • Section 6.1 - Slopes of Curves<br>• Section 6.2 - Tangents and Derivatives<br>• Section 6.5 - A Brief Intro to Limits<br>• Section 6.2 - Tangents and Derivatives (cont.)<br>• Section 6.6 - Simple Rule for Differentiation | Pretest |
| Week 3 (9/1-9/5) | • **Labor Day (No Class 9/1)**<br>• Section 6.7 - Sums, Products, and Quotients<br>• Section 6.3 - Increasing and Decreasing Functions | PS1 (Sec 6.1,6.2,6.5) |
| Week 4 (9/8-9/12) | • Section 6.3 - Increasing and Decreasing Functions<br>• Section 6.4 - Economic Applications<br>• Section 6.8 - Chain Rule<br>• Section 6.9 - Higher-Order Derivatives | PS2 (Sec 6.7,6.3,6.6) |
| Week 5 (9/15-9/19) | • Section 6.9 - Higher-Order Derivatives<br>• Section 8.1 - 8.5 - Concave and Convex Functions<br>• Section 8.6 - Inflection Points<br>• Section 6.10 - Exponential Functions<br>• Section 6.11 - Logarithmic Functions | PS3 (Sec 6.4,6.8,6.9) |
| Week 6 (9/22-9/26) | • Section 6.11 - Logarithmic Functions<br>• Section 6.8 - Chain Rule (Revisited)<br>• Section 7.7 – Elasticities<br>• Section 7.8 - Continuity | PS4 (Sec 8.1-8.5,6.10) |
| Week 7 (9/29-10/3) | • Midterm 1 Review<br>• **Midterm 1 on Chapter 6 (10/1)**<br>• Section 7.8 - Continuity | |
| Week 8 (10/6-10/10) | • Section 9.1 - Optimization Introduction<br>• Section 9.2 - Simple Tests for Extreme Points<br>• Section 9.3, 9.5 - Economic Examples | PS5 (Sec 7.7,7.8) |
| Week 9 (10/13-10/17) | • Section 9.3, 9.5 - Economic Examples<br>• Section 9.6 - Local Extreme Points<br>• Section 14.1 - Functions of Two Variables | PS6 (Sec 9.1,9.2,9.3,9.5) |
| Week 10 (10/20-10/24) | • Section 14.1 - Functions of Two Variables<br>• Section 14.5 - Functions of n Variables<br>• Section 14.2 - Partial Derivatives with Two Variables<br>• Section 14.3 - Geometric Representation | PS7 (Sec 9.6,14.1) |
| Week 11 (10/27-10/31) | • Section 14.6 - Partial Derivatives with Many Vars<br>• Section 14.9 - Economic Applications<br>• Section 14.10 - Partial Elasticities | PS8 (Sec 14.2,14.3,14.5) |
| Week 12 (11/3-11/7) | • Section 7.1 - Implicit Differentiation<br>• Section 15.3 - Implicit Differentiation along a Level Curve<br>• Section 7.2 - Economic Examples | PS9 (Sec 14.6,14.9,14.10) |
| Week 13 (11/10-11/14) | • Midterm 2 Review<br>• **Midterm 2 on Chapters 7, 9, 14 (11/12)**<br>• Section 18.1 - 18.4 - The Lagrange Multiplier Method | |
| Week 14 (11/17-11/21) | • Section 18.1 - 18.4 - The Lagrange Multiplier Method<br>• Section 10.1 - Indefinite Integrals | PS10 (Sec 7.2,15.3, 18.1-18.4) |
| Week 15 (11/24-11/28) | • **Semester Break (No classes)**<br>• **Woot! Woot!** | |

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| Week 16 (12/1-12/5) | • Section 10.2 - Area and Definite Integrals<br>• Section 10.3 - Properties of Definite Integrals<br>• Section 10.4 - Economic Applications | PS11 (Sec 10.1,10.2,10.3,10.4) ; Extra Credit (EC) 1-11 |

***All assignments are due on Friday at 11:59 PM unless otherwise announced.***