Econ 1078 - Math Tools for Economists 1

Spring 2023

Instructor:	Anand Butler	Time:	MWF 1:25 { 2:15
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Course Page:

- https://canvas.colorado.edu/courses/90436

O ce Hours:

- Mondays: 10am-12pm & Wednesdays: 10am-12pm - in Econ 414
- You are also welcome to arrange another time to meet with me if that would be preferable.

Course Textbook:

- Kurt Sydsaeter, Peter Hammond, and Arne Strom: *Essential Mathematics for Economic Analysis.* Pearson.

Description: This course is the rst of two courses designed to give you the mathematical background necessary for future courses in economics. Topics to be covered in this course include basic college-level algebra, simple linear and nonlinear equations, functions and their graphs, systems of equations, set theory, summation, logic and proofs.

Objectives: This course aims to both build the mathematical skills required for future economics course-work as well as expose students to applications of these skills in models and other practical settings they may encounter in future courses and beyond. The list of mathematical skills we will learn includes:

- Basic college algebra: including real numbers, integer powers, basic algebraic identities and expressions, factoring, fractions, rational exponents, inequalities, intervals and absolute values.
- Equations: including how to solve simple linear equations (with parameters), systems of two linear equations, quadratic equations and other non-linear equations.
- Set Theory and an introduction to logic (including necessary and su cient conditions).
- Summation notation and working with summations.
- The following topics relating to functions:
  - { The basics: Includes the de nition of a function, notation, domain and range, and graphs of functions.
  - { Linear functions: Includes slopes, the general equation for a straight line, slope-intercept form, graphing, linear inequalities, and linear models.
  - { Quadratic functions and how they can apply to economic models (e.g. a simple monopoly model).
  - {

- Important function properties and techniques: Includes products and quotients, shifting functions, and composite functions.

Course Policies:

- General
  - Please be respectful and courteous to your classmates as well as myself. In an e ort to promote the best environment for learning, I ask that you come to class prepared, engage with the material and coursework, and ask questions as needed to facilitate you and your classmates learning.
  - You are welcome to contact me before/after class, in o ce hours, or via email. Please allow up to 24 hours for an email response during the week and up to 48 hours over the weekend.
  - Note that if you have questions about your grade, I will likely ask you to look in Canvas or come to o ce hours due to FERPA guidelines.
  - Broadly I encourage you to use any resources available to you to learn and solve problems. Calculators, websites, programs, and other sources are wonderful resources. I only ask that you do not use them during lecture, and when you do use them to solve assigned problems, you indicate clearly that you did (and what the resource was).
- Lectures
  - I ask that you attend class as that will be the main vehicle for instruction. Class will consist primarily of lectures on course material, followed by problem solving practice.
  - Please be courteous and refrain from creating distractions during class. This includes silencing and putting away your phone, using any other non-calculator electronic devices only for the purpose of note-taking, and waiting to discuss things outside of the scope of the class until after the lecture.
  - You will receive an attendance grade for being present in class. You will be giving up to three unexplained absences that do not hurt your attendance grade. After that, further misses will come out of your attendance grade. If there is some protracted or signi cant unexpected cause for absences, please let me know so that I can consider it in your attendance grade.
  - I will post the notes from the days lecture on Canvas for reference. We will also do practice problems to guide you through how to apply the topics. It is your responsibility to go over and learn any material that you miss in class - and I cannot promise that everything I say or do in class will appear in the posted notes online. I am always happy to answer your questions about any material.
  - Before every class, there will be a very short Canvas quiz on a couple of the practice problems done in the previous lecture. These will be on the vary same problems we did in lecture, and as such as long as you followed along in class will be trivial. Similar to attendance, your lowest three scores throughout the semester will be dropped. Late quizzes will be penalized by 10 percentage points every day they are late, up to 50 percentage points o .
- Assignments
  - You will have weekly problem sets throughout the semester (starting the rst full week of the semester, the week of January 24th). Emphasis will be directed at developing the mathematical tools covered in this course. There will also be questions, however, that are meant to develop the ability to use these tools in applied settings.
  - Each problem set will be weighted equally, and the individual grade of an assignment will be split 50% for completeness (did you give a thorough attempt of each problem) and 50% for accuracy (is the answer correct). Note that this means a correct answer with no explanation or work provided to show how that answer was arrived at will not receive full credit.

- I encourage you to work together. I do ask, however, that you clearly indicate on your problem set the names of any individuals who you collaborated with a problem on. Group learning is one of the best ways to develop intuition and build your math skills. Please note though that while you are allowed to have someone walk you through a problem and explain the steps, I ask that you write out the steps and answer in your own hand. Direct copying is considered plagiarism (see Honor Code under University policies). Additionally, if you use another outside source (an online resource, for example) please indicate that you did and note that you are still required to detail the steps in solving a problem.
- Assignments will typically be due uploaded to Canvas on Friday of each week. Late assignments will be penalized by 10 percentage points every day they are late, up to 50 percentage points o before the work is graded. I also ask that you let me know if you are turning in work late so that I do not miss it. Your lowest problem set grade will be dropped.

• Exams

- All exams (midterms and nal) will be in-person. Please do not be late for any of those - no additional time will be given.
- I will not give any make-up exams. If you need to take an exam early, please let me know at least two weeks in advance. In the case that you have to miss any of the midterms because of a family or medical emergency, and only if you provide documentation to justify that absence, the weight for the corresponding midterm will be added to the nal exam. In all other cases, a missed exam will result in a grade of zero for that exam.
- The nal exam cannot be missed under any circumstances. During all the exams (midterms and nal), the use of calculators is allowed as long as the calculator is not on a phone. All calculations will be simple enough to do without one. You will need something to write with (pen or pencil) for your exams. If you have 3 or more nals on the same day, you can arrange to take the last nal at an alternate time. Should an emergency arise, please notify me as soon as oo-400(os74(cwletar

University Policies:

- Classroom Behavior
  - Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail 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, political a liation or political philosophy. For more information, see the classroom behavior policy, the Student Code of Conduct, and the O ce of Institutional Equity and Compliance.
- Requirements for COVID-19
  - As a matter of public health and safety, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. CU Boulder currently requires COVID-19 vaccination and boosters for all faculty, sta and students. Students, faculty and sta must upload proof of vaccination and boosters or le for an exemption based on medical, ethical or moral grounds through the MyCUHealth portal.
  - The CU Boulder campus is currently mask-optional. However, if public health conditions change and masks are again required in classrooms, students who fail to adhere to masking requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Con ict Resolution. For more information, see the policy on classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from ful lling these safety measures, please follow the steps in the \Accommodation for Disabilities" statement on this syllabus.
  - If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the Public Health O ce (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the Public Health O ce (contact-tracing@colorado.edu). Please contact me via email to let me know that you have contracted COVID-19 and will not be able to attend class safely.
- Accommodation for Disabilities
  - 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.
- 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, 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. All incidents of academic misconduct will be reported to Student Conduct Con ict Resolution (honor@colorado.edu); 303-492-5550). Students found responsible for violating the Honor Code will be assigned resolution outcomes from the Student Conduct Con ict Resolution as well as be subject to academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the Honor Code website.
- 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 sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, protected-class discrimination and harassment, and related retaliation by or against members of our community on- and o -campus. These behaviors harm individuals and our community. The O ce of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who believe they 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 can be found on the OIEC website. Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of any issues related to these policies regardless of when or where they occurred to ensure that individuals impacted receive information about their rights, support resources, and resolution options. To learn more about reporting and support options for a variety of concerns, visit Don't Ignore It.
- Religious Holidays
  - Campus policy regarding religious observances requires that faculty make every e ort to deal reasonably and fairly with all students who, because of religious obligations, have con icts with scheduled exams, assignments or required attendance. In this class, please let me know at least two weeks ahead of time of an exam if we need to schedule an earlier time to take the exam. Additionally, if a non-exam class will be missed, please let me know ahead of time so that I do not count the absence against your attendance. See the campus policy regarding religious observances for full details.

Tentative Schedule

Week	Date	Content
1	Jan 18, 20	Course material: 1.1
2	Jan 23, 25, 27	Course material: 1.2 1.3, 1.4
3	Jan 30, Feb 1, 3	Course material: 2.1, 2.2, 2.3
4	Feb 6, 8, 10	Course material: 2.4, 2.5, 2.6
5	Feb 13, 15, 17	Course material: 2.7, 2.8, 2.9
6	Feb 20, 22	Course material: Review, Midterm Exam 1 Feb 22, No Class Friday, Feb 24
7	Feb 27, Mar 1, 3	Course material: 3.1, 3.2, 3.3
8	Mar 6, 8, 10	Course material: 3.4, 3.5, 3.6/15.1
9	Mar 13, 15, 17	Course material: 4.1, 4.2, 4.3
10	Mar 20, 22, 24	Course material: 4.4, 4.5, 4.6
11	Apr 3, 5, 7	Course material: 4.7, Review, Midterm Exam 2 Apr 7
12	Apr 10, 12, 14	Course material: 4.8, 4.9, 4.10
13	Apr 17, 19, 21	Course material: 5.1, 5.2, 5.3
14	Apr 24, 26, 28	Course material: 5.4, 5.5, 5.6
15	May 1, 3	Course material: Make-up day, Review
Final Exam	May 8	4:30-7pm