

ECON 1078: Mathematical Tools for Economists 1  
Spring 2022  
Section 003  
*Online Course*

Course Canvas Page: <https://canvas.colorado.edu/courses/80952>

**Instructor:** Lilla Marein

**Email:** [Lilla.Marein@colorado.edu](mailto:Lilla.Marein@colorado.edu)

**Office Hours:** Wednesdays 3 to 5 PM Mountain Standard Time or by appointment

Zoom ID: 953 3507 7477

Direct link: <https://cuboulder.zoom.us/j/95335077477>

**Course Description** This course is the first of a two-course sequence (ECON 1078 and ECON 1088), designed to introduce a variety of mathematical concepts which will be used extensively in future economics coursework. Math will help you understand and describe the way firms and consumers optimize decisions subject to constraints. It will also provide the building blocks you will use in your statistics and econometrics courses, which will enable you to apply economics concepts to real-world data. Topics include logic, algebra, number theory, set theory, graphs, functions, and more. These skills are crucial to the study of economics.

**Online Format** This is an online course with no official class meeting times. Our meetings will be limited to virtual office hours. However, there are exam and assignment due dates and times you must adhere to. All lectures will be recorded and posted to Canvas. The recorded lectures will allow you to slowdown, fast forward, and pause lectures to increase comprehension.

**Prerequisites** There are no prerequisites for this course, though a solid understanding of high school math will serve you well. This class is the first of a two-course sequence (ECON 1078 and ECON 1088).

**Technology Requirements** This is an *online* course, therefore, some technology requirements are essential.

- A **computer** with a microphone, camera, internet access, and Google Chrome installed on it. You'll need this to take exams that will be proctored online and to access class materials.
- Access to a **printer** is also required in order to print problem sets downloaded from Canvas. I will make an exception for those with a tablet and electronic pen who can write *neatly* on PDFs using these tools.
- A **scanner or camera** to capture and upload your handwritten work on your assignments (unless you are submitting assignments written on a tablet with an electronic pen.)

*If you are unable to meet the technology requirements for this course, please contact me immediately.*

**Required Textbook** *Essential Mathematics for Economic Analysis. 5th Ed.* by Sydsaeter, Hammond, Strom. This textbook is also used in ECON 1088. It is okay to use an older edition for this course.

**Proctorio Exam Proctoring** To take the midterm exams and the final exam, you will be required to use Proctorio, an online proctoring tool. Proctorio allows students to complete an assessment at a remote location, such as their home, while helping to ensure the integrity of the exam. There is no cost to use this tool. Please read "Proctoring Information" to set up Proctorio. Note that you are required to have a computer with a functioning webcam and microphone or have access to a computer with a functioning webcam microphone to complete your exams.

**Proctorio Set Up Quiz:** Please complete "Proctorio Setup and Verification Quiz (Remotely Proctored)" as soon as possible. If you have technical difficulties with this practice exam, email me immediately. If you do not complete the practice exam by February 4th (two weeks prior to the first midterm) and have technical difficulties that prevent you from completing the midterms or final exam, you will receive a zero for that exam. This practice quiz is worth 1% of your final grade.

## Grading/Assignments

- **Weekly Practice Problems (14%)** I will solve several practice problems on each recorded lecture video. You are required to turn in your detailed handwritten solutions to these practice problems, which will be labeled clearly on the lectures slides as “Practice Problem #.” Practice problems will be *due weekly on Sundays at 11:59 PM* according to the schedule below. Submit one document per week with all of the practice problems due for that week. These assignments are graded based on completion and effort. To receive full credit, you must submit detailed handwritten solutions for each practice problem from that week. *I will not accept late work; instead, I will automatically drop two submissions from your final grade.*
- **Problem Sets (15%)**: I will assign 6 problem sets throughout the semester. You will need to download these problem sets from Canvas, print them, and solve them by hand, then upload your solutions by their deadlines. You may work on the problem sets in groups, but each student must submit their own work. These assignments are graded based on completion and effort. To receive full credit, you must submit detailed handwritten solutions for each problem. You will have two weeks to work on each problem set, and, therefore, *I will not accept late work.*
- **Exams (70%)**: There will be two midterm exams worth 20% each and a final exam worth 30% of your final grade. The exams will be administered on Canvas and proctored remotely using Proctorio. All exams are strictly closed-book, and you may not consult *any* resources during the exam. Midterms will be available on Canvas for 24 hours on the specified exam date and you will have 1 hour to complete each exam once you start it. The final exam will be available for 48 hours and you will have 2.5 hours to complete it once you start it. *There will be no makeup exams.* In the case of extraordinary circumstances, your final exam may be reweighted (to 50%) if you miss a midterm.
- *Please note, the remaining 1% of your final grade will be earned by completing the “Proctorio Setup and Verification Quiz (Remotely Proctored)” by the due date.*

## Grading Scale

Percentage	Grade	Percentage	Grade
$93 \leq x$	A	$73 \leq x < 77$	C
$90 \leq x < 93$	A-	$70 \leq x < 73$	C-
$87 \leq x < 90$	B+	$67 \leq x < 70$	D+
$83 \leq x < 87$	B	$63 \leq x < 67$	D
$80 \leq x < 83$	B-	$60 \leq x < 63$	D-
$77 \leq x < 80$	C+	$x < 60$	F

**Handwriting** All of your assignments in this course are handwritten. Your handwriting must be legible in order for me to grade your work. If I have trouble reading your handwriting, you will receive partial credit *at most*. *If you are unable to meet the handwriting requirements for this course, please contact me immediately.*

**Canvas Announcements/Email** I will communicate with you primarily using email and Canvas Announcements, so please check your official CU email and course Announcements frequently. Please allow 24 hours for me to respond to your emails. Please do not email me for help with specific math problems. Math is difficult to discuss over email and that is what office hours are for.

**Tutorial Lab** The Economics Department provides a *free* drop-in tutorial office which offers assistance on all core courses in the major, and occasionally on other undergraduate courses in the Department. Its website is <https://www.colorado.edu/economics/node/513/attachment>.

**Private Tutors** The Economics Department maintains a list of tutors who are available for private hire. Its website is <https://www.colorado.edu/economics/node/515/attachment>.

*The information in this syllabus is subject to change. If I make any changes regarding the information presented in this syllabus, I will communicate those changes to the class in writing.*

## Course Content

### I. Introductory Topics

#### Chapter 1: Essentials of Logic and Set Theory

- 1.1 Essentials of Set Theory
- 1.2 Some Aspects of Logic

#### Chapter 2: Algebra

- 2.1 The Real Numbers
- 2.2 Integer Powers
- 2.3 Rules of Algebra
- 2.4 Fractions
- 2.5 Fractional Powers
- 2.6 Inequalities
- 2.7 Intervals and Absolute Values
- 2.8 Summation
- 2.9 Rules of Sums
- 2.10 Newton's Binomial Formula
- 2.11 Double Sums

#### Chapter 3: Solving Equations

- 3.1 Solving Equations
- 3.2 Equations and Their Parameters
- 3.3 Quadratic Equations
- 3.4 Nonlinear Equations
- 3.6 Two Linear Equations in Two Unknowns

### II. Functions

#### Chapter 4: Functions of One Variable

- 4.1 Introduction
- 4.2 Basic Definitions
- 4.3 Graphs of Functions
- 4.4 Linear Functions
- 4.5 Linear Models
- 4.6 Quadratic Functions
- 4.7 Polynomials
- 4.8 Power Functions
- 4.9 Exponential Functions
- 4.10 Logarithmic Functions

#### Chapter 5: Properties of Functions

- 5.1 Shifting Graphs
- 5.2 New Functions from Old
- 5.3 Inverse Functions
- 5.4 Graphs of Equations
- 5.5 Distance in the Plane
- 5.6 General Functions

## Course Schedule

Dates and times follow Mountain Standard Time.

- **Weekly practice problems** are due *every Sunday at 11:59 PM* and are not listed in the schedule below.

Week	Content	Assignments and Exam Dates
Week 1: 1/10 – 1/16	Syllabus, 1.1, 1.2, 2.1	
Week 2: 1/17 – 1/23	2.2, 2.3, 2.4	
Week 3: 1/24 – 1/30	2.5, 2.6, 2.7	Problem Set 1 (1.1 - 2.5) due Thursday
Week 4: 1/31 – 2/6	2.8, 2.9, 2.10	Proctorio Setup and Verification Quiz due Friday
Week 5: 2/7 – 2/13	2.11, Review	Problem Set 2 (2.6 - 2.11) due Thursday
Week 6: 2/14 – 2/20	3.1, 3.2, MT 1	Midterm 1 (1.1 – 2.11): 1 hour on Friday
Week 7: 2/21 – 2/27	3.3, 3.4	
Week 8: 2/28 – 3/6	3.6, 4.1, 4.2	Problem Set 3 (3.1 - 3.6) due Thursday
Week 9: 3/7 – 3/13	4.3, 4.4, 4.5	
Week 10: 3/14 – 3/20	4.6, Review	Problem Set 4 (4.1 - 4.6) due Thursday
Spring Break 3/21 – 3/27		
Week 11: 3/28 – 4/3	4.7, MT 2	Midterm 2 (3.1 – 4.6): 1 hour on Friday
Week 12: 4/4 – 4/10	4.8, 4.9, 4.10	
Week 13: 4/11 – 4/17	5.1, 5.2, 5.3	Problem Set 5 (4.7 - 4.10) due Thursday
Week 14: 4/18 – 4/24	5.4, 5.5, 5.6	
Week 15: 4/25 – 5/1	Review	Problem Set 6 (5.1 - 5.6) due Thursday
FINAL EXAM: 2.5 hours on Saturday, April 30 or Sunday, May 1		

## **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 affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Conduct & Conflict Resolution policies](#).

### **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. Students who fail to adhere to these 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 Conflict 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 fulfilling these safety measures, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus.

CU Boulder currently requires masks in classrooms and laboratories regardless of vaccination status. This requirement is a precaution to supplement CU Boulder’s COVID-19 vaccine requirement. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus. In addition, vaccinated instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

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 Office](#) (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 Office](#) (contacttracing@colorado.edu).

### **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 academic integrity policy. 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 the Honor Code ([honor@colorado.edu](mailto:honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as 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. The university will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by or against members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or email [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about university policies, [reporting options](#), and the 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 incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about their rights, support resources, and reporting 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 effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please email me at least two weeks prior to a scheduling conflict due to religious observance to arrange accommodations.

See the [campus policy regarding religious observances](#) for full details.