

ECON 1078: Mathematical Tools for Economists 1

Spring 2021

MWF 10:20 – 11:10 AM

Remote Course via Zoom: 993 6790 3932

Instructor: Lilla Marein

Email: Lilla.Marein@colorado.edu

Office Hours: Mondays & Wednesdays 11:10 AM - 12:10 PM (immediately after class)

Zoom ID: 993 6790 3932 (use for lectures & office hours)

Direct link: <https://cuboulder.zoom.us/j/99367903932>

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.

All lectures will take place live remotely via Zoom (ID: 993 6790 3932) and recorded then posted to Canvas for your convenience. The recorded lectures are a useful tool, which will allow you to slowdown, fast forward, and pause lectures to increase comprehension. Office hours will be held via Zoom as well, using the same Zoom ID.

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).

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

Technology Requirements

- An **electronic device** that can *access the internet* and has *audio and video capture* is required. This will be necessary to access lectures, problem sets, exams, Canvas, and Zoom and to upload completed work.
 - Access to a **printer** is also required in order to print exams and problem sets downloaded from Canvas.
 - A **scanner or camera** to capture and upload your written work on all assignments, including exams.
- If you are unable to meet the technology requirements for this course, please contact me immediately.*

Grading/Assignments

- **In-class Practice Problems (10%)** I will solve several practice problems with you during each lecture. The lectures will be recorded and posted on Canvas along with lecture slides for your viewing. While you are *not* required to attend lectures, you are required to turn in your handwritten detailed solutions to in-class practice problems, which will be labeled clearly on the lectures slides as “Practice Problem #.” In-class practice problems will be *due weekly on Sundays at 11:59 PM*. Submit one document per week with all of the practice problems from the lectures that week clearly labeled. 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 (20%)**: 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. To receive full credit, you must submit detailed handwritten solutions for each problem. You will have more than 2 weeks to work on each problem set, therefore, *I will not accept late work.*
- **Midterms (40%)**: There will be two midterm exams, worth 20% each. You will need to download the exams from Canvas, print them, and solve them by hand. The exams will be proctored by me over Zoom during our regular class time, so you will need to be connected to the internet and have a working camera on exam days. You will upload your exam answers to Canvas *immediately* after completing the exam. You may submit a picture or scanned version (preferred) of your exam. *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.
- **Final Exam (30%)**: The final exam will be administered in the same manner as the midterm exams, except it will not take place during our regular class time. The final exam will be on *Sunday, May 2 at 1:30-4 PM*. The final exam will be cumulative.

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

Tentative Course Outline

- **In-class practice problems** are due *every Sunday at 11:59 PM* and are not listed in the schedule below.
- **Problem sets** are due on *Sundays at 11:59 PM* during the weeks indicated in the table.
- All exams will be administered over Zoom, and you must have a working camera.

Week	Content	Announcement
Week 1: Jan 15	<i>Introduction</i>	
Week 2: Jan 18	1.1, 1.2	No Class on Monday, Jan 18 (MLK Day)
Week 3: Jan 25	2.1, 2.2, 2.3	
Week 4: Feb 1	2.4, 2.5, 2.6	Problem Set 1 (1.1-2.5) due
Week 5: Feb 8	2.7, 2.8, 2.9	
Week 6: Feb 15	2.10, 2.11	No Class on Wednesday, Feb 17 (Wellness Day) Problem Set 2 (2.6-2.11) due
Week 7: Feb 22	<i>Review, MT 1, 3.1</i>	Midterm 1 on Wednesday, Feb 24
Week 8: Mar 1	3.2, 3.3	
Week 9: Mar 8	3.4, 3.6	Problem Set 3 (3.1-3.6) due
Week 10: Mar 15	4.1, 4.2, 4.3	
Week 11: Mar 22	4.4, 4.5, 4.6	Problem Set 4 (4.1-4.5) due
Week 12: Mar 29	4.7, 4.8, 4.9	
Week 13: Apr 5	4.10, <i>Review, MT 2</i>	Midterm 2 on Friday, Apr 9
Week 14: Apr 12	5.1, 5.2, 5.3	Problem Set 5 (4.6-4.10) due
Week 15: Apr 19	5.4, 5.5, 5.6	
Week 16: Apr 26	<i>Review</i>	No Class on Friday, Apr 30 (Reading Day) Problem Set 6 (5.1-5.6) due
FINAL EXAM on Sunday, May 2 at 1:30-4 PM		

The schedule is subject to change, and any changes will be announced in class.

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 cannot read your handwriting, I will give you partial credit *at most*.

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

Calculators Only basic scientific calculators are permitted on exams. No computers, cell phones, or graphing calculators. You are encouraged to use graphing calculators and software to study in order to deepen your understanding.

Email I will communicate with you primarily using email, so please check your official CU email 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>.

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 Code of Conduct](#).

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 policy may include: 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); 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 at the [Honor Code Office website](#).

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.

Requirements for COVID-19

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- maintain 6-foot distancing when possible,
- wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- clean local work area,
- practice hand hygiene,
- follow public health orders, and
- if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert [CU Boulder Medical Services](#).

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 policies on [COVID-19 Health and Safety](#) and [classroom behavior](#) and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the “Accommodation for Disabilities” statement on this syllabus. All students who are new to campus must complete the [COVID-19 Student Health and Expectations Course](#). Before coming to campus each day, all students are required to complete the [Buff Pass](#).

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home. In this class, if you are sick or quarantined, please contact me as soon as possible.

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.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder 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 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 cureport@colorado.edu. Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when 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 options for reporting and support resources.

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. Contact me if this applies to you.

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