ECON 1078-001 Mathematical Tools for Economists 1

University of Colorado Boulder
Department of Economics
Spring 2022

Instructor:	Sutianjie Zhou (Joe)	**Time:**	MWF 10:10 – 11:00 AM
Email:	Sutianjie.Zhou@Colorado.EDU	**Place:**	Zoom(by Jan 24), ECON 117
Office:	Zoom Meeting	**Office Hours:**	MTWTh 9:00 – 10:00 AM

Course Pages: https://canvas.colorado.edu/courses/81883

Lecture Zoom Link: https://cuboulder.zoom.us/j/91771224622

Office Hour Zoom Link: https://cuboulder.zoom.us/j/97472440270

The course syllabus, handouts, supplementary materials, and homework assignments will be posted on Canvas. Please check the course webpage frequently as I will be updating it with materials and assignments. You are responsible for checking the canvas webpage regularly to avoid missing any assignments or announcements.

Office Hours: MTWTh 9:00 – 10:00 AM, or by appointment.

Course Description: This is a one-semester course on mathematical tools that are frequently used by economists. In this course, things will be built up gradually. Topics 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. With the introduction of the necesarry contents above, the course aims to cement a solid foundation for your future learning of economics and business courses. In terms of teaching pedagogy, one of the class activities that will be visited and revisited thoughout the course is to establish the linkages among figurative, formulative, and quantitative approaches when solving mathematical problems. Also, in-class brainstorming is a good place to see different ideas shine. There will be extensive cross-groups sharing of mathematical modeling techniques for basic economic ideas.

Main References:

- Knut Sydsaeter, Peter Hammond, and Arne Strom, *Essential Mathematics for Economic Analysis*, 4th Edition. (required)
  (you may use a previous edition - just make sure to match up the relevant chapters).

Objectives: This course is primarily designed for undergraduate students to have a snapshot of the relationships between economic theory and basic mathematics, and a decent grasp of the following contents:

- 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).

- Polynomials: Includes factoring polynomials, division, and rational functions (these skills are often employed in Econ 3070).

- Exponential and logarithmic functions used extensively in intermediate economics courses (e.g. when presenting positive, monotonic transformations).

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

Grading Policies:

Midterm 1	20%
Midterm 2	20%
Final Exam	30%
Homework	20%
Participation	10%

Letter Grade Distribution:

>= 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	<= 59.99	F

A curve may be applied to the overall course grade to conform to departmental standards. Other than that, I will not grant any request to increase your grade to meet a certain cutoff. You will receive the grade that you earned throughout the course. If you are concerned about your grade(s) you should immediately come talk to me. I will do everything I can to help you be successful in this course.

Course Policies:

- **Lectures**

  Lectures Note-taking is very important in this course. It is highly recommended that you attend lectures, since **I will not post or distribute my class notes.** If you miss some lectures, it is your responsibility to contact a classmate to get the notes corresponding to the missed lecture(s). You are also responsible for any announcement or instructions given in class (this may include instructions for tests). **Notice that lecture recordings will be posted via class emails. Please check them out weekly.**

- **Exams**

  All exams (midterms and final) will take place online. Please do not be late for any of those.

  I will not give any early or make-up exams. 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 final exam. In all other cases, a missed exam will result in a grade of zero for that exam.

  The final exam cannot be missed under any circumstances. During all the exams (midterms and

final), the use of calculators will NOT be allowed. If I ask for any calculations, these will be easy enough. The only thing you will need for exams will be something to write (pen or pencil). If you have 3 or more finals on the same day, you can arrange to take the last final at an alternate time. **However, you must notify me of this no later than the 10th week into the semester (before Mar 15th) and provide proof that it is your 3rd or more exam on that day.**

Cheating in any of the exams is unacceptable. Any cheating instances will result in a grade of zero and a report to the Honor Code Council.

- **Email**

  If you have any questions about the material, send me an email. Sometimes it will be more effective to discuss those questions in office hours. If that is the case, I will ask you to come to my office hours. I will try to respond all emails within 24 hours. If you have any administrative issues covered in the syllabus, please check it before asking me. If after checking the syllabus you still have any questions, come directly to me during office hours. I will not answer administrative questions over the email.

  According to FERPA, we are not allowed to discuss grades via email. If you have any questions or concerns about your grade, please come to my office during office hours.

- **Office Hours**

  At the top of this syllabus you can find when and where my office hours take place. If you cannot make it at any of those times, send me an email and we can set up an appointment outside those hours.

- **Laptops/electronic devices**

  Laptops or other electronic devices are allowed in class.

University Policies:

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 Code of Conduct.

- **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.

Before returning to campus, all students must complete the COVID-19 Student Health and Expectations Course. Before coming on to campus each day, all students are required to complete a Daily Health Form.

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 and complete the Health Questionnaire and Illness Reporting Form remotely. In this class, if you are sick or quarantined, continue with the online lecture material. For extra practice and questions, attend virtual office hours.

- **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.

- **Intellectual Property** All course materials are the property of the instructor and may not be shared with any individual outside of the course at any time for any reason without permission in writing from the instructor. Course materials, including but not limited to lecture presentation slides, assignments, grading rubrics, exams, discussion posts, and recitation activities, may not be posted to any website (e.g., Course Hero or similar sites, social media, etc.). The same applies to any audio or video recordings of lecture or recitation. A violation of this policy will be treated as a violation of the academic integrity policy.

- **Honor Code:** Students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. Incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from myself and non-academic sanctions (including but not limited to university probation, suspension, or expulsion).

- **Religious Holidays:** Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have con-

flicts with scheduled exams, assignments, or required attendance. If you have a conflict, please make arrangements with me no later than the first week of the semester.

- **Code of Behavior Policy:** Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to such behavioral standards may be subject to discipline. Faculty has the professional responsibility to treat all students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which we express opinions. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences or race, culture, religion, politics, sexual orientation, gender variance and nationalities.

- **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 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.

Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments. **Important Dates:**

Week	Date	Content
1	Jan 10, 12, 14	Course material: 1.1, 1.2, 1.3
2	Jan 19, 21	Course material: 1.4, 1.5, No class on Mon, Jan 17
3	Jan 24, 26, 28	Course material: 1.6, 1.7, 2.1
4	Jan 31, Feb 2, 4	Course material: 2.2, 2.3, 2.4
5	Feb 7, 9, 11	Course material: 2.5, 4.1, 4.2
6	Feb 14, 16, 18	Course material: 4.3, 4.4, 4.5
7	Feb 21, **23**, 25	Course material: Review, **Midterm** I, 4.6
8	Feb 28, Mar 2, 4	Course material: 4.7, 4.8, 4.9
9	Mar 7, 9, 11	Course material: 4.10, 5.1, 5.2
10	Mar 14, 16, 18	Course material: 5.3, 5.4, 5.5
11	Mar 21, 23, 24	**Spring Break, No Class**
12	Mar 28, 30, Apr 1	Course material: 5.6, 3.1, 3.2
13	Apr 4, **6**, 8	Course material: Review, **Midterm II**, 3.3
14	Apr 11, 13, 15	Course material: 3.4, 3.5, 3.6
15	Apr 18, 20, 22	Course material: 2.7, 15.1, 15.2
16	Apr 25, 27	Course material: Final Review, No class on Friday, Apr 29
Final Exam	**April 30**	**Saturday, 4:30 p.m. - 7:00 p.m.**

- *First Day of Class:* Jan 10th

- *Martin Luther King, Jr. Holiday:* Jan 17th, No Class

- ***Midterm 1:*** **Wednesday, Feb 23th, class time**

- ***Midterm 2:*** **Wednesday, Apr 6th, class time**

- *Spring Break:* March 21th - March 25th

- *Last Day of Class:* Thursday, Apr 28th

- *Final Exam:* **Saturday, April 30, 4:30 - 7:00 PM**