

Economics 4808
Introduction to Mathematical Economics
Spring 2020

Important!!!! Please note that ALL information contained in this syllabus, except the part under “additional notes” is crucial for the course, and therefore, subject to examination. In other words, anything from this syllabus could (and will) turn up on a quiz or exam!

Instructor: Billy Mertens

Office: ECON 12

E-mail: mertens@colorado.edu Email is by far the best way to contact me. I check my email and respond (if time) every T,R and most M,W,F between 8:30 and 9am. If there is not enough time to respond to all emails during that time, then I will respond in the evening.

Class website: <https://canvas.colorado.edu/>

Office Hours: T, TH 12:15-1:45 & 3:15-3:45pm, and by appointment (please give 2 weeks’ notice for appointments).

Course Description:

Econ 4808 is a course that (for some) will improve your math skills, but more importantly, will introduce you to how mathematical tools are applied in economic analysis. The ability to apply mathematics is crucial for economic modeling.

The course covers the mathematics and economic applications of equilibrium, slopes and derivatives, optimization (maximizing profit and utility, and minimizing cost), and constrained optimization (e.g., maximizing utility subject to the budget constraint). Applications include problems in consumer and producer theory, general equilibrium, and welfare economics.

A more detailed outline of covered material is posted separately.

Class Format:

This class will be slightly different from many of your usual classes. Some terms for our class format might be “relatively learner-centered” or “semi-rotated”. Research on learning supports the use of these systems, and if I were to ignore them, I would be utilizing outdated and even defective teaching methods. For example, current research demonstrates that repetition helps strengthen neuronetworks and thus, increases long-term learning. Frequent problem solving, reviews and cumulative exams are all effective methods of beneficial repetition. Other research-backed effective systems are outlined below.

In-class problems will be performed both in pairs and in small groups. The readings for this course will be posted on the course web site although some of the material for which you are responsible will be presented in lectures only and is not explicitly covered in the readings. Review problems will be posted on the course web site.

Prerequisites

Principles of Economics, Econ 2010 and Econ 2020, are prerequisites, as are Econ 1078 (Mathematical Tools for Economists 1) and Econ 1088 (Mathematical Tools for Economists 2), or the equivalent. One or more semesters of Calculus would suffice for Econ 1078 and 1088, but **“Business Calculus” is not recommended**. Econ 3070 is a prerequisite. It is **very** important that you fulfill the prerequisites **before** you take this course, and still understand the materials in the prerequisites. To be successful in mathematical economics, you need to first be comfortable with algebra and derivatives. If you have any uncertainty as to whether you are under or over qualified to take the course, please talk to me ASAP. The prerequisites must be strictly enforced.

Prerequisite Quiz

To be sure you are prepared for the material to be covered in this course, you will take a preliminary quiz. The quiz will cover some basic economics and calculus, as well as many of the concepts we will cover in the course. The quiz *may* have an impact on your overall grade. Two items are very important for passing this course: a good economics and math foundation, and more importantly, a willingness to strive to find answers even when they are not obvious. For this reason, you either need to score 80% or more on the prerequisite quiz, **or** at least continue to attempt to solve the problems given for a full 40 minutes. If you do not spend 40 minutes on the quiz, **or** you do not score above 80% (you only need 1 of the 2), then your overall grade will be reduced by 10%. I will also group-score the exams and give you feedback and possible options going forward.

Policy on Cheating:

If you are suspected of cheating, I will immediately and without notification forward your case the honor code office. This is actually the fairest way to proceed. In these instances, if I took it upon myself to make the decision of whether you violated the honor code, there could be bias involved. The honor code council has both students and faculty members, and they are trained to deal with these types of situations. I will accept the honor code decision as final. If the honor code finds that you did not violate the code, then there will be no repercussions, and all grades will be entered based on your submitted work. If you are found to have violated the honor code (see below), by both the honor code council and I, you will automatically fail the course!

Electronics in the Classroom

Laptops, tablets, and even phones can actually benefit learning in many types of classes. There are many pros and cons of allowing consistent use of these devices during the class period. However, it has become abundantly clear to me that these devices are more of a distraction than a learning aid in most situations. In addition, taking notes by hand has been shown to be more effective than taking them on a laptop or tablet. , and use of devices has been shown to lower not only the grades of the users, but also of the surrounding students. Therefore, electronic devices will NOT be allowed in the classroom (this includes cell phone use for texting, etc.). **You especially cannot use any form of electronic device during Group Assignments (it defeats the purpose of working together). You should take a calculator to class on Group Assignment days and put your phone completely out of sight!** If you are expecting an important call or text, then simply put your phone on vibrate, sit near the door, and step out when the call/text comes through. Otherwise, keep your phone in your pocket/bag, and **not** on your desk (or I may ask you to put it away or leave the class). Of course, if you have a disability services related need for these devices they will be allowed – in that case notify me of your exception ASAP. Some people write out their notes into a tablet; in this case an exception may be made – again notify me ASAP.

Required Materials:

1. Text: *Essential Mathematics for Economic Analysis* (by Knut Sydsaeter and Peter Hammond) is the official math text for undergraduate economics majors here at C.U. You are expected to own a copy and understand much of the material in this book. The book is the required text for Econ 1078 and Econ 1088 and students in those courses are told to keep and use the book until they finish their undergraduate major in economics. **Book problems will be assigned.**
2. You will need a financial (not a graphing) calculator for some exams.

A Note on Learning Systems and Assessments:

This course is a little more traditional than many of the other classes I teach. Lecture is still one of the primary components, but group assignments are just as important. One of the most important changes from prior years is that all exams will be cumulative, and we will spend at least a little time reviewing for each exam. A little more detail on learning systems is given below:

Learning systems:

1. Lecturing: explaining difficult material not easily learned on your own with text, groups, etc.
2. Exams: exams should be learning tools as well as assessment tools! We will go over each exam in depth in class. Reviewing exams is one area where in-class discussion and explanation are most effective. Just reading answers on a key has been shown to be one of the least effective ways to learn material. Therefore, exam reviews will be the one area of class where no notes, associated pictures or keys will be posted.
3. Group scholarship: we will work some practice problems in groups, which can help your understanding of the material whether you already understand it fairly well or are struggling a bit. These cooperative learning exercises are extremely helpful in preparing you to solve more in-depth analytical problems.
Peer-learning of material is one of the most instructive learning systems because:
 - a. *If you are going to inform others about what you know, you must first fully understand it yourselves. If you cannot explain a concept to others you may not fully understand it yourself.*
 - b. *Most “real-world” careers require some form of teamwork skills.*
 - c. *You can discern what it takes to teach others.*
 - d. *It will teach you how to respond to critical questions in front of others.*
4. Self-study: reading the text and solving the review questions.

Assessment systems:

1. Cumulative Exams: shown to improve learning more than virtually every other technique. As noted above, exams are a part of the learning process, not just a part of assessment – we will go over every exam (except, unfortunately, the final) in class. *It is important to review and relearn the material as we build upon that information. This increases long-term learning!* There will be three exams and a cumulative final. All exams are cumulative, and the material does build on itself, so it is important to understand all of the concepts as we go.
2. Group assignments will account for part of your grade (see below).
3. In-class Problems can add to your group-assignments grade.

More Information on Assessment:

In-class Problems

It is important to understand how to apply concepts as we cover them, so you will have the opportunity to work on some problems in class (in pairs or small groups) almost every day. You may be selected to show some of these to the class, and this demonstration can add to your group-assignments grade.

Group Assignments:

These cooperative learning exercises (detailed above) are extremely important. The group assignment dates are listed in the course outline. It is important not to miss these days without an excused absence. The object of these assignments is to work together and engage your brains in the learning process. The goal is NOT to try and finish the assignments quickly, or in most cases, to even finish them at all. You will receive a passing score of 75% just for being present and working on the in-class problems with your group. Also, any group-work that you submit with the names of all members of your group listed by last name in alphabetical order, will receive an additional 10%. Any day that no cell phone of any member of your group is visible, your group will receive an additional 10%. Lastly, if I never see your cell phone during class throughout the entire semester, your overall grade for these assignments will be raised another 5%. Additionally, I will sometimes have a random member of a random group demonstrate a problem at the board, and if you are a member of the group that presents, it can raise your grade for that assignment.

Exams: There will be three exams and a cumulative final. These will be given in class on the days listed. No exams will be dropped. To be fair to everybody, I will not answer ANY questions during exams (even about typos) – this puts everyone on equal footing during the exams. The material does build on itself, so it is important to understand all of the concepts as we go. **Exams will be given in class on the days listed. If you miss an exam with a valid excuse (e.g. a note from your doctor or Wardenburg), then the weight of your final will be increased. Undocumented illnesses do not count as valid excuses (as long as this is not in conflict with a University policy). Note that the exam dates below are not tentative – exams will be given in class on the days listed. NO EXAMS Will Be DROPPED!!**

Exam Schedule:

Exam I: Tuesday, February 11th

Exam II: Tuesday, March 17th

Exam III: Tuesday, April 21st

Final exam: Wednesday, May 6th at 4:30 pm in our usual room

Final Exam Conflicts

Official University Policy states that: If you have three or more final exams scheduled on the same day, you are entitled to arrange an alternative exam time for the **last** exam or exams scheduled on that day. To qualify for rescheduling final exam times, you must provide evidence that you have three or more exams on the same day, and arrangements must be made with your instructor no later than the end of the tenth week of the semester (i.e. before spring break)

Attendance Policy

There are many studies showing a clear relationship between class attendance and student achievement. For this reason, there is a strict attendance policy for this course. Attendance will be taken on most days. If at any point after the first two weeks, your absences account for more than 19.5% of the course days to that point in the term (see examples below), then you will be asked to withdraw from the class. If you do not withdraw, you will receive a failing grade. Please note that staying in a course despite a failing grade will not help you in terms of student loans (they are on to that), and typically does not help in terms of scholarships or visas. If I tell you it is a good idea to withdraw, you should withdraw!! A sign-in sheet will be circulated daily *when necessary*. **It is your responsibility to make sure that you have signed in for each class (having someone else sign your name is a violation of the honor code).** Due to new policy, I have added on to the days you can miss because Wardenburg would rather not have you just stop by to pick up an excuse form. The added days are meant to include absence due to a “one-off” illness, family emergencies, etc. If you must miss an extended period of time (e.g. due to extended illness), please let me know ASAP, and we will make arrangements.

In addition, you will be administratively dropped if you do not attend each (all) of the first 3 days of class.

Examples of attendance policy violation:

1. If you miss more than one day in the first 5 weeks, you would be in violation.
2. If you miss more than two days in the first 7 weeks, you would be in violation.
3. If you miss more than three days in the first 10 weeks, you would be in violation.
4. If you miss more than five days in the semester, you would be in violation.

Weights of Assignments:

Group Assignments	15%
Exam I	19%
Exam II	20%
Exam III	21%
Final Exam	25%

Incompletes, Extra Credit, etc.

I adhere strictly to the University guidelines on Incompletes (“An I is given only when students, *beyond their control*, have been unable to complete course requirements. A substantial amount of work must have been *satisfactorily completed* before approval for such a grade is completed.”). Bad grades, unsatisfactory performance, too many credit hours, work conflicts, etc. are not reasons for an incomplete.

I am adamant about giving each student an equal opportunity to perform well in the course, so there will be no extra credit opportunities that are not offered to the entire class. You should focus your efforts on learning the material and doing well on the exams.

Grading Scale:

Your Score:	Grade:	Your Score:	Grade:
92% to 100%	A	78% to 79%	C+
90% to 91%	A-	72% to 77%	C
88% to 89%	B+	68% to 71%	C-
82% to 87%	B	62% to 67%	D
80% to 81%	B-	60% to 61%	D-

Additional Notes:*Honor Code*

All 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. All incidents of academic misconduct shall 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 the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Additional information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://www.colorado.edu/academics/honorcode>

Disabilities

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu.

If you have a temporary medical condition or injury, see Temporary Injuries under Quick Links at [Disability Services website](#) and discuss your needs with your professor.

Religious holidays

A comprehensive calendar of the religious holidays most commonly observed by CU-Boulder students can be found at <http://www.interfaithcalendar.org/> Review this list and the class syllabus. After reviewing the syllabus, please see the instructor if you believe that you need an accommodation for religious reasons. The instructor should be notified within the first two weeks of classes. Campus policy regarding religious observances states that faculty must make *reasonable* accommodation for them and in so doing, be careful not to inhibit or penalize those students who are exercising their rights to religious observance. For more information see http://www.colorado.edu/policies/fac_relig.html

Code of Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. 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 differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Policy on Discrimination and Harassment

The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. The University of Colorado does not discriminate on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to, and treatment and employment in, its educational programs and activities. (Regent Law, Article 10, amended 11/8/2001). CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, or veteran status. Individuals who believe they have been discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>.

Any University policies that are in conflict with my own policies will supersede my policy!

A reply from one student to another on the discussion board for one of my colleague's online classes: "If you read the course syllabus you will find the answer to your questions. If you do not understand what you read I recommend you read multiple times. After reading the syllabus if you still have questions come back and I will try to help you as much as possible."

