



ECON 3620-090 Mathematics for Economics
Spring Semester of 2021

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Office Hours: by appointment

Office Location: Department of Economics

Zoom/Canvas Conference Office Hours: by appointment

Required Materials

(Required) Michael Hoy, John Livernois, Chris McKenna, Ray Rees and Thanasis Stengos (2011), Mathematics for Economics, 3rd Edition, Publisher: The MIT Press

(Optional) Edward T. Dowling (2011), Schaum's Outline of Introduction to Mathematical Economics, 3rd Edition, Publisher: McGraw Hill.

Course Description

This course will introduce students on how economists use mathematics as the primary tool in their analyses in order to understand, and often apply, economic theory. It is intended to cover several important mathematical concepts that will be studied in the context of their applications to economics theories. Also, it is aimed to develop students' abilities to use mathematical techniques to solve problems in economics applications. At the end of this semester, students would be expected to understand basic mathematical techniques used in economics such as linear algebra, derivative, differential, optimization with and without constraints, and matrix algebra, and be prepared to take courses in the Economics major that have 3620 as a prerequisite. However, students should be aware that the real use of mathematics in economics is far more advanced than what they will see in the class; therefore, the course is merely designed to be the first step for those who are interested in mathematical economics.

In this three credit hours class, it is expected a good background in college algebra and equivalent knowledge to ECON 2010 and ECON 2020.

Course Outcomes

By the end of this course, you will be able to:

- Recognize the components of functions used in economics theory.
- Integrate Math skills in solving economics problems.
- Recognize how Math and previously learned theories are integrated and applied in academic journals or contemporary research.
- Build confidence in using Math skills to help complete advanced economic classes.

- Think about and develop strategies for learning Math, e.g., to solve problems and develop good study habits and skills.

Teaching and Learning Methods

This is an online class. All requirements can be fulfilled online; we will use Canvas. Multiple choices, practice exercises, and discussion assignments facilitate learning. Interaction between students and the instructor will be fostered in order to create a dynamic learning experience.

University Policies

1. ***The Americans with Disabilities Act.*** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.
2. ***University Safety Statement.*** The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.
3. ***Addressing Sexual Misconduct.*** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).
4. ***Undocumented Student Support Statement.*** Immigration is a complex phenomenon with broad impact—those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your

residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit dream.utah.edu.

Course Policies

Canvas: It is the student's responsibility to follow emails and announcements sent through Canvas, and to stay up to date with readings (textbook chapters, discussions, assigned homework, etc) since this is an online class.

Assignments

Assignments will be posted in detail in Canvas, including due dates.

Grading Policy (Evaluation Methods & Criteria)

There will be one module assigned for each week on Canvas in which the reading lists, videos, and homework will be explained. You are required to review the assigned reading, watch the videos, and work on the assignments. Assignments are classified as:

- Discussion (10%): You are expected to participate in five discussions throughout the semester. Active participation and responses are highly encouraged. All comments must be related to the topic and show respect to your classmates.
- Practice Problems (10%): There will be weekly Practice problems to work on. The problems are from the textbooks, and the solutions will be provided (or else it would be indicated). I will assign a specific number of questions in each Module. There is no point assigned directly on the Practice Problems. However, after you finish the Practice Problems, you need to finish the 'Practice Problem Completion Check to confirm you did finish the Practice'. The checklists overall contribute 10% to your total grade. Keep in mind that this is the most crucial exercise that could sharpen your expertise on this course's materials. The more you work on them, the more you would become better! The checklists will be due at the following Monday at noon.
- Weekly Homework (15+15= 30%): There are two components of Weekly Homework: Weekly Quizzes and Weekly TWO Math Problems. Weekly Quizzes, all in multiple-choice questions, will be available on Canvas. Weekly TWO Math Problems' questions can be viewed/printed from Canvas on each Module. Students must work on paper or tablet and submit your work on Canvas in pdf format. Both types of homework are due at the following Monday at noon.
- Learning Plan (5%): You will be assigned to draft a Learning Plan for this course at the beginning and review/adjust it in the middle of the course. The purpose of this assignment is to encourage you to take ownership of your learning process and think about how you are planning to work through the course. You will not be graded on what strategies you will be using. The Plan should supposedly guide you what activity you need to perform on each

day in the week. This is because I believe, work discipline is the crucial element to succeed in any job, including studying in the college and any career you pursue in the future.

- Midterm (20%) + Final (25%) Exams: Students will need to take two exams (mid-term, and final exam).

Course Schedule

<u>Module/Week</u>	<u>Topic/Discussion</u>	<u>Reading</u>
1: Jan 19-24	Introduction to Math for Economics and Prerequisite Review	See in Canvas
2: Jan 25-31	Linear Equation and Equilibrium Analysis	See in Canvas
3: Feb 1-7	Matrix Operations and Determinants	See in Canvas
4: Feb 8-14	Minor, Cofactor and Matrix Inversion	See in Canvas
5: Feb 15-21	Using Matrix to solve linear equations with multi-variables	See in Canvas
6: Feb 22-28	Limit Theorems and Rules of Differentiation	See in Canvas
7: Mar 1-7	Concavity and Convexity	See in Canvas
8: Mar 8-14	Midterm Exam	See in Canvas
9: Mar 15-21	Partial Differentiation	See in Canvas
10: Mar 22-28	Total Derivative and Total Differentials	See in Canvas
11: Mar 29 Apr 4	Optimization of Multivariable functions	See in Canvas
12: Apr 5-11	Optimization with constraint: Lagrangian	See in Canvas
13: Apr 12-18	Optimization with constraint: Lagrangian (cont.)	See in Canvas
14: Apr 19-25	Comparative Statics	See in Canvas
15: Apr 29 May 5	Final Exam	See in Canvas

Note: This syllabus is meant to serve as an outline and guide for our course. Please note that I may modify it with reasonable notice to you. I may also modify the Course Schedule to accommodate the needs of our class. Any changes will be announced in class and posted on Canvas under Announcements.