

# Syllabus

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ECON 3620 – Mathematics for Economists – Spring 2016

3.0 Credits

Pre-requisite – College Algebra (MATH 1090 preferred); ECON 2010 and ECON 2020

Time – Thursdays, 6:00PM-9:00PM

Location – OSH 238

Instructor – Shai Gorsky

Email – [shai.gorsky@utah.edu](mailto:shai.gorsky@utah.edu)

Phone – 801-581-7481 (Department Office)

Office Hours – Thursdays 4:00PM-5:45PM; Location – OSH 360

## Course Overview

The course focuses on the mathematical foundations used in economic theory. The purpose of the course is to provide students with the necessary mathematical tools that are used in studying and understanding economics. Throughout the course, we will take a fairly high-level approach to the mathematics, but most of the emphasis will be on the applications or economic models rather than abstract mathematical theorems or concepts. The course will not be highly devoted to learning intense mathematical theorems or use pure mathematical language.

## Course Objectives

The objective of this course is to help the students develop a precise understanding of mathematical reasoning; the majority of the course will be devoted to teaching the concepts of calculus and linear algebra, and incorporating these concepts into economic theory. At the end of the course, students will be able to solve rather complex economic problems using a fairly high level of mathematics.

Essential General Education Learning Outcomes targeted by the course: Quantitative Literacy: The course will strengthen a student's ability to interpret certain economic equations through the use of concrete mathematical foundations. The goal of the course is that each student will be able to grasp the mathematical tools and foundations needed in order to apply them to certain economic situations and economic theories. In doing so, the students should be able to interpret, and successfully explain, the information presented in class. In order to be successful at this, the class focuses on developing a student's ability to explain and understand the mathematical equations and calculations first; then build up to the process of applying it to economic situations. It is important that each student can successfully complete all of the calculations needed with consistency and accuracy. After building on the mathematical foundation and required calculations, the course shifts over to applications, analysis and estimation. In this section, the student will be required to make assessments through the use of quantitative analysis. Lastly, the student will be required to clearly communicate these assessments to the instructor.

## Required Textbook

None.

## Optional textbooks

- Chiang, Alpha C., and Kevin Wainwright, *Fundamental Methods of Mathematical Economics (Fourth Edition)*
- *Introduction to Mathematical Economics*. Schaum

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Comprehensive lecture notes as well as many exercises will be available through CANVAS as the course proceeds. It is NOT recommended to purchase any of textbooks before class begins.

## **Policies**

The University expects regular attendance at all class meetings. Instructors must communicate any particular attendance requirements of the course to students in writing on or before the first class meeting. Students are responsible for acquainting themselves with and satisfying the entire range of academic objectives and requirements as defined by the instructor.

## **Americans with Disabilities Act (ADA) Statement**

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 the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

## **Wellness Statement**

Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness - [www.wellness.utah.edu](http://www.wellness.utah.edu); 801-581-7776.

## **Veterans Center**

If you are a **student veteran**, I want you to know that the U of Utah has a Veterans Support Center on campus. They are located in Room 161 in the Olpin Union Building. Hours: M-F 8-5pm. Please visit their website for more information about what support they offer, a list of ongoing events and links to outside resources: <http://veteranscenter.utah.edu/>. Please also let me know if you need any additional support in this class for any reason.

## **LGBT Resource Center**

If you are a member of the **LGBTQ community**, I want you to know that my classroom is a safe zone\*. Additionally, please know that the U of Utah has an LGBT Resource Center on campus. They are located in Room 409 in the Oplin Union Building. Hours: M-F 8-5pm. You can visit their website to find more information about the support they can offer, a list of events through the center and links to additional resources: <http://lgbt.utah.edu/>. Please also let me know if there is any additional support you need in this class.

## **Learners of English as an Additional/Second Language**

If you are an English language learner, please be aware of several resources on campus that will support you with your language development and writing. These resources include: the Department of Linguistics ESL Program (<http://linguistics.utah.edu/esl-program/>); the Writing Center (<http://writingcenter.utah.edu/>); the Writing Program (<http://writing->

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[program.utah.edu/](http://program.utah.edu/)); the English Language Institute (<http://continue.utah.edu/eli/>). Please let me know if there is any additional support you would like to discuss for this class.

## Grading Policy

Class work/participation	5%
Homework assignments	15%
First Midterm Examination	25%
Second Midterm Examination	25%
Final Examination	30%

**All exams will be in-class exams.**

**Prior to each of the exams, we will hold a review session.**

## Grading Schedule:

A	Excellent 94% and above	4.0 GPA
A-	Excellent 85% to 93%	3.7 GPA
B+	Good 80% to 84%	3.3 GPA
B	Good 75% to 79%	3.0 GPA
B-	Good 70% to 74%	2.7 GPA
C+	Standard 65% to 69%	2.3 GPA
C	Standard 60% to 64%	2.0 GPA
C-	Standard 55% to 59%	1.7 GPA
D+	Substandard 50% to 54%	1.3 GPA
D	Substandard 45% to 49%	1.0 GPA
D-	Substandard 40% to 44%	0.7 GPA
E	Unsatisfactory Below 39%	0.0 GPA

## Tentative Class Outline

- 1) Introduction and Fundamentals
  - a. Introduction to mathematical economics
  - b. A review of some basics of mathematics
  
- 2) One-variable Calculus and Optimization
  - a. Limits and functions
  - b. Continuity, derivate, differential
  - c. Optimization of functions of one variable
  
- 3) Linear Algebra
  - a. Matrices and vectors
  - b. Linear systems, matrix algebra, identity matrices, Cramer's rule

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## 4) Calculus of Several Variables and Optimization

- a. Functions of several variables, partial derivatives and total derivatives
- b. Gradients, Hessians and implicit functions
- c. Unconstrained optimization
- d. Constrained optimization, Lagrange multiplier
- e. Utility maximization and consumer demand
- f. Homogenous functions