

Mathematics for Economists
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MTWR 10:45AM-12:20PM WAVE 367

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Do we have to study math in order to do economics? Yeah. You got to have a quantitative mind. How much do we have to learn or what should we learn? I think that one should think about this question backward. Instead of trying to study all fashionable math tools, first you need a basic mathematical tool kit which is essential to understanding and analyzing economic models. This course aims to provide this. To this end, we will discuss mathematical concepts at some abstract level as well as their applications in economics.

To my experience, learning (digesting) mathematics requires a lot of problem solving and practice. Given the time pressure (6 weeks), I highly recommend you to study for this course on a daily basis to produce the best outcome. Doing daily homeworks are essential for your success. Since each topic is built on preceding topics, make sure that you understand the core of the material before we move to the next topic. Do not hesitate to contact me and/or your TA for your questions.

The course is composed of three parts. In the first part, first you will learn the language that one should use in order to rigorously state and solve mathematical problems. This includes some preliminary notation and logical concepts. Then, we will discuss several aspects of functions of a single variable as well as their analysis (limit, continuity, derivative, local optimization). We will conclude this part by focusing on the applications of what we learned in economics.

In the second part, we will develop some basic tools required to analyze functions of several variables. In particular, we will focus on vector algebra, matrix algebra, linear operators etc.

Third part will be the analysis of functions of several variables. Note that a good understanding of functions of single variable and the tools we developed in the second part will make this part a lot easier.

Grading: Your scores on daily quizzes and a final exam will determine your final grade.

Homeworks and Quizzes: In each class, you will be assigned homeworks. Your homeworks will not be graded; however, same and/or similar questions will be asked in short quizzes. Each quiz will be typically 5 to 10 minutes. I will drop out reasonable number of the (depending on the total number of quizzes) lowest scored quizzes and the average of the rest will be 70% of your grade.

Final: The comprehensive final exam will constitute 30% of your final grade.

Texts: Your course notes will be the basic source to study. I will supplement handouts whenever necessary. Moreover, I will refer to three basic texts:

- "Mathematics for Economics" by Hoy, Livernois, McKenna, Rees and Stengos,
- "Fundamental Methods of Mathematical Economics" by Chiang and,
- "Optimization in Economic Theory" by Dixit.

Some other textbooks that are more advanced but you may find useful are

- "Mathematics for Economists" by Simon and Blume
- "A First Course in Optimization Theory" by Sundaram.