

ECONOMICS 630-002: Mathematics for Economists (Master's Section)

Course: ECON 630 (M, 7:20-10:00)

Term: Fall 2009

Instructor: Garrett Jones

Office hours: Monday, 6-7pm, at Cosi in the FDIC building. Wednesday, 1:30-3:30 in Fairfax, Carow Hall 8A.

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Course Description

The primary goal of this course is to provide an introduction to a modern language widely used in economics: The language of mathematics. Economists use only a narrow set of idioms and expressions in this rich language, and we'll focus on the most important ones: linear algebra, multivariate calculus, and probability. By gaining comfort with this language, you will be able to read academic articles yourself, without having to depend on third- or fourth-hand translations written by other economists or by journalists.

Another important goal of the course is to help you survive and thrive in your elective courses here at GMU: In many of those courses, whether in public choice or industrial organization or labor, you will be in courses with Ph.D. students who have usually had much more rigorous mathematical training. This course should help you bridge the gap.

Required Texts

Alpha C. Chiang and Kevin Wainwright, *Fundamental Methods of Mathematical Economics*, fourth edition. The classic in the field, frequently updated and still quite useful.

Hal R. Varian, *Intermediate Microeconomics: A modern approach*. A leading figure in the economics of information in the 1970's, Varian is now Chief Economist at Google: Maybe you'll find the secret to his success in this textbook. Officially it's an undergraduate textbook, but it's quite rigorous, and the appendices (all of which are required reading) bridge the gap between undergraduate microeconomics and the ability to read academic journal articles.

Edward T. Dowling, *Schaum's Outlines: Introduction to Mathematical Economics*, third edition. You can never have too many solved problems. An inexpensive way to practice the skills you'll be building.

Schedule Notification

We will miss class on September 7. On the week of Columbus Day (October 12), we will meet on Tuesday instead of Monday.

Tentative Schedule

Chiang and Wainwright, Chapters 1-4: Algebra review, mathematical syntax, and the basics of linear algebra. (Schaum: 1-2, 10).

Quiz 1 (all quizzes last 30 minutes, and will take place at beginning of class)

Chiang and Wainwright, Chapters 5-8: Linear algebra and differential calculus. (Schaum: 11-12, 3)
Application: Sargent, Macroeconomic Theory, Chapter 1.

Quiz 2

Chiang and Wainwright, Chapters 9-12: Optimization. (Schaum: 4-9)
Application: Mankiw, Romer, Weil, (1992). “A Contribution to the Empirics of Economic Growth,”
Quarterly Journal of Economics.

Quiz 3

Varian, Chapters 3-6: Preferences, Utility, and Choice. (Note: Read chapters 1 and 2 of Varian for background)
Application: Becker, Murphy, Grossman, (2006). “The Market for Illegal Goods: The Case of Drugs,”
Journal of Political Economy.

Quiz 4

Varian, Chapters 10-13 and 37: Time, Uncertainty, and Information
Applications:
Akerlof, (1970). “The Market for 'Lemons': Quality Uncertainty and the Market Mechanism”. *Quarterly Journal of Economics*
Friedman and Savage (1948). “The Utility Analysis of Choices involving Risk,” *Journal of Political Economy*.
McFadden, (1999). “Rationality for Economists?” *Journal of Risk and Uncertainty*.

Final Exam

In addition, I reserve the right to make minor changes, as well as to provide a few short (<5 pages) handouts in class.

Grading Procedures

You will have regular quizzes and a comprehensive final. Your lowest quiz score will be dropped. Ten percent of your grade will be based on *informed* class participation (a proxy for attendance and civil, intelligent comments).

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| Quizzes | 45% (15% each: lowest score dropped) |
| Class Participation | 10% |
| Final Exam | 45% |

Academic Ethics

Please note that you are at an Honor Code university. You are expected to conduct yourself in a manner that is consistent with the learning mission of the University. All forms of academic dishonesty are strictly forbidden. This includes but is not limited to the following: communicating with other students during exams; unapproved references to books, notes or “cheat sheets” during exams; and plagiarism—representing another person’s work as your own. You should be aware that plagiarism is often easy to recognize. The minimum penalty for an incident of academic dishonesty will be a score of zero on the assignment where the dishonesty occurred. For further information on academic ethics, please consult the student handbook.

Class Attendance/Missed Exams

I highly recommend class attendance, since I believe there is strong correlation between class attendance and academic performance. If you happen to miss a class, you should ask a classmate to borrow their notes. I will not, as a general rule, offer make-up exams or early finals. Exceptions will be made for students with documented illnesses.

For Further Reading:

Avinish K. Dixit, *Optimization in Economic Theory*. A short classic that covers most of this semester's topics in 183 fast-moving, elegantly written pages.

David Kreps, *A Course in Microeconomic Theory*. The first few chapters of this text give a slow, masterful, coverage of the basics of the microeconomic theory of choice.

Dennis Lindley, *Making Decisions*. A low-tech coverage of choice under uncertainty. He recently wrote a similar book entitled *Understanding Uncertainty*.

Jean-Jacques Laffont, John Bonin, Helene Bonin, *Economics of Information and Uncertainty*. A fast-moving treatment by a great theorist.

Hal Varian, *Microeconomic Analysis*. I was torn between using Varian's intermediate text and beefing it up versus using his graduate text and slowing it down. If you're looking to speak the language of microeconomics, this is a great place to continue your research.

McAfee, Preston, [*Introduction to Economic Analysis*](#). A Caltech economist, McAfee is also Vice President and Research Fellow at Yahoo! Research. This is his freeware freshmen economics text for Caltech students, and it would make a great master's level text. Many, many good ideas.

McCloskey, Deirdre, [*The Applied Theory of Price*](#). This fantastic price theory textbook captures the best of what McCloskey calls the "Good Old Chicago School" of microeconomic theory: The age of Stigler, Friedman, and Becker is captured here. You will learn much from this book, which McCloskey makes available for free on her website.

Schaum's Outline of Probability and Statistics. Recommended if you've never seen probability or statistics before.