

Economics 720.01
Mathematics for Economists
Syllabus, Fall 2004

Tuesdays and Thursdays, 1:30-3:30 p.m.
Carney Hall, Room 011

Dr. Scott Schuh,
Visiting scholar, Federal Reserve Bank of Boston

General Information

Office: Administration Building, Room 443
Telephone: (617) 552-2182
Email: schuh@bc.edu
Office hours: Tues/Thur 3:30-4:30 p.m., Wed 9-10 a.m., or by appointment.

Course Description

This course will introduce you to a variety of mathematical tools that are useful in analyzing dynamic economic models. These tools include: (i) methods for solving dynamic optimization problems, and (ii) methods for solving differential and difference equations. The course is usually taught by Professor Peter Ireland, and I will be following his class structure and lecture notes quite closely.

Course Materials

1. Professor Ireland's lecture notes are excellent and will serve as the main text for the course. The notes are available on his web site at:
<http://www2.bc.edu/~irelandp/ec720.html>
2. Two textbooks will be helpful and are available in the Boston College Bookstore:
 - Dixit, A.K. *Optimization in Economic Theory* (2nd Edition). Oxford University Press, 1990.
 - Simon, Carl P. and Lawrence Blume. *Mathematics for Economists*. W.W. Norton & Company, Inc., 1994.
3. Miscellaneous journal articles, book chapters, computer programs, etc. may be assigned throughout the course.

Course Requirements

Your grade for the first part of Economics 720 will be based on a final exam, to be held on Tuesday, October 19, from 1:30-3:30 p.m.

Problem Sets

Problem sets will be handed out periodically and collected on dates announced ahead of time in class. I also expect to make the problem sets, and later their answers, available to you on Professor Ireland's web site (listed above).

Strictly speaking, these problem sets will not factor into the determination of your grade for this course. Nevertheless, I strongly encourage you to work through and hand in the problem sets. The teaching assistant and I will review them carefully to make sure that you are following along with the material that is presented in class. Also, the questions on the final exam will resemble the questions from the problem sets quite closely, both in format and content. By working through the problem sets, you will be preparing for the exam. You may work with other students on the problems sets, but if you cannot do them on your own you will have trouble on the final. I recommend that you try the problems sets on your own first and then work with others.

Computer Exercises

If time permits, I hope to assign some relatively simple computer programming exercises using Matlab software. Writing Matlab programs to implement the mathematical techniques we will be covering is a fun and excellent way to learn the material better, and you probably will need to learn to do this eventually in your career anyway. These exercises will not factor into your grade at all, and you may work on them in teams. However, like the problem sets, these exercise can help prepare you for the final so I strongly encourage you to work through them.

Please make sure that you have access to the Department's student version of Matlab and begin to familiarize yourself with the software so you will be ready when the exercises are assigned.

Office Hours

I will hold regular office hours on Tuesdays and Thursdays from 3:30-4:30 p.m. after class, and on Wednesdays from 9-10 a.m. I will be available at other times if necessary, which can be arranged by phone or e-mail. Although I am on leave from the Federal Reserve Bank of Boston, I will be working at the Bank one day per week (usually Mondays) and there may be other times/days when I need to go to the Bank. If I have to miss my office hours, I will try to notify the Department and have a sign posted.

Reschedule Classes

I will be out of town on Bank business the week of September 27 through October 1 so we need to reschedule the regular class meetings on September 28 and 30. I propose that we tentatively plan to have class on the preceding and subsequent Fridays, September 24 and October 8, from 1:30-3:30 PM. Once I have verified the dates and located a room, I will finalize this rescheduling with you in class.

Course Outline

- I. Dynamic optimization
 - Two Useful Theorems
 - Dixit chapters 2, 3, and 5
 - Simon and Blume chapters 18-19
 - The Maximum Principle
 - Dixit chapter 10
 - Dynamic Programming
 - Dixit chapter 11
- II. Differential and difference equations
 - Eigenvalues and Eigenvectors
 - Simon and Blume chapter 23
 - Differential Equations
 - Simon and Blume chapters 24-25
 - Difference Equations
 - Simon and Blume chapters 23

Miscellaneous

My goal is to make sure everyone passes this class. Do not hesitate to ask questions. If I do not know the answer immediately, I will find it (or we will find it together).

Because this is my first time teaching this class, I reserve the right to modify the syllabus along the way as necessary.

I expect all students to adhere to the highest standards of academic integrity. For information on this issue, go to the “Academic Integrity” section of:

<http://www.bc.edu/schools/cas/services/students>