

SYLLABUS: INTRODUCTION TO MATHEMATICAL ECONOMICS

Purpose of the Course: This course has been designed to give advanced undergraduate students an idea of how use of elementary college mathematics can provide special insight into the types of economics problems they have already encountered in their economics courses. We will primarily take mathematical techniques which students have already learned and apply them to questions students have already addressed elsewhere. The emphasis of the course, therefore, is less on learning new mathematics and/or new economics (though we will do some of both), but on discovering the important strengths and limitations that mathematics can bring to the analysis of an economic problem.

Text: We will be using *Mathematical Economics (2nd edition)* by Baldani, Bradfield and Turner (BBT). This is an expensive book! However, the 2nd edition does not differ widely from the 1st edition, two copies of which I have put on reserve in the library. With a small class such as ours, there would be only minor disadvantages to the student, I believe, from relying upon the reserve copies of the 1st edition.

Grading: There will be two hourly exams and a comprehensive final exam. The hourly exams will each account for 25% of the grade and the final 30%. The remaining 20% of the grade will derive from homework assignments. You will be called upon each week to present answers to homework assignments *on the board*, in class. This will help students understand how technical economics is done -- by continually conferring with colleagues, and by having results criticized at seminars long before they appear as publications. Developing the ability to give and *accept* criticism is crucial to becoming a successful researcher. The students will, I hope, come to recognize that all researchers make lots of mistakes, all of the time. In general, this class will be *highly interactive*, with all of us working together to understand the material. It will be important, therefore, for you to STUDY IN GROUPS. Work on your homework as a team. If you have trouble forming teams on your own, I will be happy to create some for you. No one will be taking this class alone; we will all be taking it together.

Course Outline

1. The Art of Economic Modeling
Ch.1 in BBT (The final section of chapter 1, on value functions, is not in the 1st edition; we can work around this.)
2. A Quick Review of the Calculus and Optimization
Ch.1 and Appendix 1 in BBT.
3. Economic Applications of Univariate Calculus
Ch. 1 in BBT
4. Matrix Theory and Its Economic Applications

Chs. 3 (if needed) and 4 in BBT

5. Multivariate Calculus and Its Applications

Chs. 5 and 6 in BBT

6. Multivariate Optimization without Constraints

Chs. 7 and 8 in BBT

7. Optimization with Equality Constraints

Ch. 9 and 10 in BBT

8. Optimization with Inequality Constraints

Ch. 11 (excluding 11.6 & 11.7) and Ch. 12 in BBT

9. Value Functions

Chs. 13 and 14 in BBT

10. Linear Programming

Class handout, Sections 11.6 and 11.7 in BBT.

11. Dynamics

Chs. 15 and 16 in BBT (These chapters are different in the 1st edition; if we get this far we'll work around this.)