ECON5153 MATHEMATICAL ECONOMICS

University of Oklahoma, Fall 2014
Tuesday and Thursday, 9-10:15am, Cate Center CCD1 338

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Office Hours: Tuesday and Thursday, 1:30-2:30pm, and by appointment

Course Description
This is the first course in the graduate Mathematical Economics/Econometrics sequence. The objective of this course is to acquaint the students with the fundamental mathematical techniques used in modern economics, including Matrix Algebra, Optimization and Dynamics. Upon completion of the course students will be able to set up and analytically solve constrained and unconstrained optimization problems. The students will also be able to solve linear difference equations and differential equations.

Textbooks

Other useful books available on reserve at Bizzell:

Assessment
Grades are based on homework (15%), class participation (10%), two midterm exams (20% each) and final exam (35%). You are encouraged to form study groups to discuss homework and lecture materials. All exams will be in closed-book forms.

Problem Sets
Several problem sets will be assigned during the semester. You will have at least one week to complete each assignment. Late homework will not be accepted. You are allowed to work
with other students in this class on the problem sets, but each student must write his or her own answers. Each student is also required to write the names of the other students he or she worked with on each homework assignment.

**Exam Dates**

Midterm 1 – Tuesday, September 30
Midterm 2 – Thursday, November 6
Final – Thursday, December 11, 8-10am

**Tentative Outline**

SB=Simon and Blume. Approximate number of lectures to cover each chapter is listed in parenthesis.

1. Introduction (0.5)

2. One-variable calculus is mainly for self-reading. SB Part I, Appendix A1, A2.1-A2.3, A2.7 (1.5)

3. Matrix algebra (6)
   
   
   
   (iii) Euclidean spaces and linear independence. SB 10.1-10.4, 11.1.

Chapter 4: Functions of several variables (3)

   (i) Limits and sets. SB 12.

   (ii) Functions of several variables. SB 13.2-13.5, 30.1.

   (iii) Calculus of several variables. SB 14.2, 14.4, 14.6, 14.8.

   (iv) Implicit function theorem. SB 15.3

   *Exam 1 approximately here.*

Chapter 5: Optimization (11)

   (i) Quadratic forms and definite matrices. SB 16, especially pp. 391-392.

   (ii) Unconstrained optimization. SB 17, 30.2-30.4
(iii) Constrained optimization I: FOCs. SB 18, Dixit. 1-6.
(v) Homogeneous and homothetic functions. SB 20.1, 20.3-20.4.

Exam 2 approximately here.

Chapter 6: Dynamics (7)

(i) Linear difference equations, eigenvalues and eigenvectors. SB 23.1-23.4, 23.7-23.8.

Handouts: Integration; Probability and Statistics (1)

Follows Must-have Math Tools for Graduate Study in Economics by William Neilson, Chapters 10-13. The book is downloadable at

http://web.utk.edu/~wneilson/mathbook.pdf

Final exam.