

**Fall 2011**  
**Econ 600, Quantitative Methods in Economic Analysis II**  
Course Outline for Part I (first 7.5 weeks)

**Instructor:** John Schroeter, 266B Heady, 294-5876, [johns@iastate.edu](mailto:johns@iastate.edu)

**Office hours:** No regular office hours but “drop-ins” welcome. Or phone or e-mail to make an appointment.

**T.A.:** Wenwen Xi, 180B Heady, 294-5895, [wxi@iastate.edu](mailto:wxi@iastate.edu)

**Office hours:** 11:00 a.m. – 12:30 p.m., Tuesdays and Thursdays

**Class meeting time:** MW 11:00 a.m. - 1:00 p.m., Heady 274 (lecture); F 11:00 - 11:50 a.m., Heady 274 (recitation).

**Course webpage:** <http://www2.econ.iastate.edu/classes/econ600/Schroeter/>

**Course requirements:** Two exams. The first exam will probably be held during the week of September 19<sup>th</sup>. The second will be held at (or just after) the end of Part I of the course, probably during the week of October 17<sup>th</sup>, and probably in a special evening session to be scheduled later. The grade for Part I of the course will be determined based on the following weights: Exam #1: 35%, Exam #2: 65%. The overall grade for Econ 600 will be a simple average of the grades for Parts I and II. Practice exercises will be assigned each week. Solutions will be presented by the T.A. during recitation.

**Books:**

Required:

Simon, C. P. and L. Blume (SB), *Mathematics for Economists*, W. W. Norton, 1994.

Additional books:

Intriligator, M. D. (I), *Mathematical Optimization and Economic Theory*, Prentice Hall, 1971.

Sundaram, R. K. (S), *A First Course in Optimization Theory*, Cambridge University Press, 1996.

Simon and Blume is available in the bookstore. All three books are will also be available on course reserve at the Reserve and Media Services Desk in the basement of Parks Library.

Intriligator is a classic reference. Our treatment of equality-constrained optimization will closely follow Intriligator's method and notation. Sundaram provides a somewhat higher-level treatment of most of the topics we will study.

**Prerequisites:** The outline for the summer's Ph.D. Math Review Course, or “math camp,” lists the topics in calculus, linear algebra, and elementary real analysis that are considered prerequisite knowledge for Econ 600. The outline also lists the sections of Simon and Blume that serve as references for each of these topics. Students should use these references to review any unfamiliar concepts.

**Course content:** Part I of Econ 600 will focus primarily on static optimization problems and the characterization of solutions to these problems. At the end of Part I, we will study a few topics from real analysis, some of them introduced in math camp, as a prelude to the work you will do in Part II.

Concave and quasi-concave functions, convex sets (SB 3.2, 21.1-4; S 1.2.9, 7, 8)

Statement of the mathematical programming problem (I 2; SB 17.1, 18.1)

Unconstrained optimization (SB 17.2-4; S 4)

Equality constrained optimization and the method of Lagrange (SB 18.2, 19.3; I 3.2, 3.3)

Envelope theorem, first- and second-order envelope properties, interpretation of  
Lagrange multipliers (SB 19.1, 19.2)

Inequality constrained optimization and the Kuhn-Tucker formulation (SB 18.3, 18.4,  
18.6, 19.3)

Sequences, limits, convergence, Cauchy sequences in  $\mathfrak{R}^n$ . Compact sets. Weierstrass  
theorem (SB 12.1-5, 29.1-2, 30.1; S 1.2.1-8, 3.1)