University of Mississippi
Department of Economics

Fall 2012
609: Methods of Mathematical Analysis

Meeting Days/ Times: Monday and Wednesday 4-5:15pm
Holman Hall 132

Instructor: Natalia Kolesnikova
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Office Hours: Tuesday and Thursday 9:30-11am
Or by appointment

Textbook
"Mathematics for Economists" by Carl P. Simon and Lawrence Blume, W.W. Norton & Company, 1994.

Course Description

The purpose of this course is to ensure that all students possess a common body of knowledge of basic mathematical techniques which are frequently encountered in graduate economics and business courses. Some of the material will not be new but will nonetheless warrant being studied again, so that the student's memory is refreshed and his or her understanding is reinforced. Other material will be new and unfamiliar. This course approaches mathematics as a tool for economists. So the emphasis will be on procedures and examples rather than proofs.

Learning Objectives

After completing this course, students should know mathematical techniques used in modern economics, business, finance, and related fields, and develop skills and confidence in using them.

Grading Criteria

Your final grade for the course will be determined using the following formula:

Homework Assignments	20%
Mid-Term Exam 1	25%
Mid-Term Exam 2	25%
Final Exam	30%
	100%

The letter grades will be assigned based on the following percentage points:

A	90% and above
B+	87% < 89%
B	80% < 86%
C+	77% < 79%
C	70% < 76%
D	60% < 69%
F	Below 60%

Homework Assignments

Students are expected to turn in their own work and to complete all the assigned problems. However, only a subset of the problems will be graded. Late homework will not be accepted and will count as a zero for that assignment. The assignment with the lowest score will be dropped from the calculation of the homework average.

Students may work together on assigned problems but are encouraged to first work on the problems by themselves and then discuss them with others. Each student is expected to write up his or her own work. Copying someone else's work is not permitted and is considered cheating. Remember the purpose of the assignments is to get you to learn the skills and to practice them.

Exams

There will be two midterm exams, each counting for 25% of the final grade, and a final exam, 30% of the final grade. All exams are closed notes, closed books exams. The final exam will mostly focus on the material covered in the last part of the course. However, mathematics is cumulative in nature.

There will be no make-up exams. If a student must miss an exam for a valid reason, he or she must obtain permission from the instructor *before* the exam. In this case, the weight of the missed exam will be distributed over the other two exams. An exam missed without a prior approval from the instructor will be given a score of zero.

The final exam is on Friday, Dec. 7 at 4pm.

Attendance Policy

Students are expected to attend all the classes. Students who miss a class are responsible for knowing the material covered in that class. For more information about the university attendance policy see *Class Attendance Guidelines* (ACA.AR.200.004).

Academic Integrity

Plagiarism and cheating are serious offenses and may be punished by failure on the assignment, or failure in course. For more information please refer to the university policy on *Student Academic Conduct and Discipline* (ACA.AR.600.001).

Course Outline (tentative)

I. Calculus of One Variable
   - Functions (2.1-2.3, 5.1-5.4)
   - Rules of Differentiation (2.4, 4.1, 4.2, 5.5)
   - Differentiability and Continuity (2.5)
   - Convexity (2.6, 3.2)
   - Maxima and Minima (3.1, 3.5)
   - Mean Value Theorems (30.1)
   - Applications (3.6, 5.6)

II. Linear Algebra
   - Matrices (8.1-8.4)
   - Systems of Linear Equations (6.1, 7.1-7.4, 28.1)
   - Determinants (9.1-9.2, 26.1-26.3)
   - Eigenvalues and Eigenvectors (23.1-23.3)

III. Multivariate Calculus
   - Functions of Several Variables (13.1-13.5)
   - Calculus of Several Variables (14.1-14.6, 14.8)
   - Implicit Functions (15.1)

IV. Optimization
   - Quadratic Forms (16.1-16.2, 23.8)
   - Unconstrained Optimization (17.1-17.5)
   - Equality Constraints (18.1, 18.2)
   - Inequality Constraints (18.3-18.5)
   - Lagrange Multiplier and Envelope Theorems (19.1-19.2)
   - Second Order Conditions (19.3)
   - Kuhn-Tucker Conditions (18.6)

V. Homogeneous and Homothetic Functions (20.1-20.4)

VI. Concave and Quasiconcave Functions (21.1-21.3)