THE UNIVERSITY OF MEMPHIS

Fogelman College
of Business and Economics

Adv Quant Econ Analysis ECON 71/8120
Wed 7:10-10:10 pm, 262 FCBE
Fall, 2010

Prof. Oleksandr Nikolsko-Rzhevskyy
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A. COURSE INFORMATION: Advanced mathematical methods used in economics, finance, accounting, and management science with specific applications to micro- and macroeconomics; review of matrix algebra, differential and integral calculus, constrained, unconstrained, and dynamic optimization, comparative statistics, and optimal control. PREREQUISITES: ECON 6810 or permission of instructor.

B. CONTACT INFORMATION: The course webpage link is available at www.nikolsko-rzhevskyy.com. My office hours are on Wed, 5:00-6:30pm, and almost any other day/time I am at school – feel free to stop @ 415 FCBE whenever you have a question. My TA is Michael Jetter, mjetter@memphis.edu. His office hours TBA.

C. TEXTBOOKS: The main textbook is "Fundamental Methods of Mathematical Economics," Alpha C. Chiang and Kevin Wainwright (CW). Older editions of the same textbook are written by Alpha Chiang alone. For those who are confident in their skills, the following textbook provides a very good review: "Schaum's Outline Introduction to Mathematical Economics," Edward Dowling (D). Finally, if you already own any of the following two textbooks, you can use those: "Mathematical Methods for Economics," Michael Klein and "Mathematics for Economists," Carl P. Simon and Lawrence E. Blume.

D. EXAMS: There will be 3 exams (25% each). All exams will be noncomprehensive, i.e. you will not be tested again on the chapters you've already been tested on before. The exams dates TBA.

E. HOMEWORK ASSIGNMENTS: There will weekly homework assignments that make up the last 25% of your grade. The homeworks will be graded on the "check-/check/check+" basis, which roughly correspond to 60/80/100 points. It's nearly impossible to complete a homework assignment in one day, thus I strongly recommend starting early.

E. CLASS PARTICIPATION: As all our classes would include both theoretical and practical parts, I expect you to actively participate in class discussions and solve problems on your own in your notebooks and on the whiteboard when needed.

G. COURSE OUTLINE:

1. Quiz.
2. Review of Basic Concepts (CW 2; D 1)
3. Linear Models and Matrix algebra (CW 4,5; D 10, 11)
    a. Matrices and vectors
    b. Matrix and vector operations
    c. Identity and null matrices
    d. Determinants and nonsingularity
    e. Finding the Inverse Matrix
    f. Transposes, inverses, and operations with them
    g. Solving systems of linear equations
4. Differentiation (CW 6,7,8; D 3, 13)
    a. The Concept of Limit and Continuity
    b. The Derivative
    c. Rules of Differentiation of a Function of One Variable
    d. Rules of Differentiation of two or more Functions of One Variable
    e. Partial Derivatives and Functions of Several Variables
    f. Differentials and Total Derivatives
    g. Implicit and Inverse Function Rules
    h. Comparative Statics
5. Optimization (CW 9,11,12,13; D 4)
    a. Increasing and Decreasing Functions , Concavity and Convexity
    b. Relative and Absolute (global) Extrema, Unconstraint Optimization
    c. Taylor and Maclaurin Series
    d. Extreme Values of a Function of Two Variables
    e. Extreme Values of a Function of n Variables
    f. Optimization with Bounding Constrains
    g. Optimization with Inequality Constrains
6. Integration (CW 14; D 14,15)
    a. Indefinite Integrals
    b. Rules of Integration
    c. Integration by Substitution
    d. Integration by Parts
    e. Definite Integrals and Area Under the Curve
    f. Improper Integrals
    g. L'Hopital's Rule
7. Differential and Difference Equations (CW 15,16,17,18,20; D 16,17,18)
    a. First Order Differential Equations
    b. Higher Order Differential Equations
    c. Difference Equations in Discrete Time
8. Dynamic Programming and Optimal Control Theory (CW 20; D 21)
    a. The Hamiltonian and the necessary conditions for maximization
    b. Sufficiency conditions for maximization
    c. Optimal control theory with a free endpoint
    d. The current-valued Hamiltonian