**University of Connecticut**

**Department of Economics**

**ECON 2301-003: Mathematical Economics**

**Course Syllabus, Spring 2016**

**Instructor Information**

Instructor: Stan McMillen, Ph.D. Class Location: Oak 117

Office: Oak 316 Class Meeting: MW, 2:00 – 3:15 PM

Phone: 860-742-8447 (H), 860-208-4352 (C) Office Hours: Monday and Wednesday, before (or after) class and by appointment

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***Please read this document completely and carefully. It is the contract between me and you concerning the general topic areas the course will cover and how I will conduct and administer the class. I will interpret continued enrollment in the course as de-facto assent to all the requirements and policies set forth in this document. If you have questions or concerns about any items expressed here, please see me immediately to discuss these issues.***

**Course Description.** This course covers the mathematics needed to develop and solve theoretical models in micro- and macroeconomics. Thus, the focus is on how economic theory is made precise through the application of mathematical techniques such as differential calculus and matrix algebra. We will learn about the comparative static techniques used to derive testable predictions from theoretical models. Our intent will not just be to develop a toolbox of methods, but to learn applications of the various techniques and to try and develop the mindset for setting up an economic model that is appropriate for addressing the question or problem at hand.

**Learning Objectives.** By the time students finish this course they should be able to:

1. Understand how mathematics is used to develop, solve and interpret economic models

2. Translate an understanding of class material into creative, independent problem-solving skills

3. Work through problems in a collaborative setting

4. Demonstrate research and critical thinking skills through clear written and oral communication

**Prerequisites.** Prerequisite: [ECON 1200](http://catalog.uconn.edu/econ/#1200) or both [ECON 1201](http://catalog.uconn.edu/econ/#1201) and [1202](http://catalog.uconn.edu/econ/#1202); [MATH 1071Q](http://catalog.uconn.edu/MATH/#1071Q) or [1110Q](http://catalog.uconn.edu/MATH/#1110Q) or [1121Q](http://catalog.uconn.edu/MATH/#1121Q) or [1131Q](http://catalog.uconn.edu/MATH/#1131Q). Differential calculus, the theories of the consumer and the firm, and the IS-LM model are absolutely essential.

**Required Text:** Chiang, Alpha and Wainwright, Kevin (2007). *Fundamental Methods of Mathematical Economics*, 4th edition, McGraw-Hill**. I may post additional readings on HuskyCT.**

**Course Grading**

1. Class participation: 5%
2. Four (4) Problem sets: 20%
3. Two (2) Midterm Exams: 40%
4. Mathematical modeling paper: 15% [proposal 2%, first draft 5%, final draft 8%]
5. Final Exam: 20%

Notes: Each week, I will post class note and a set of practice problems on HuskyCT. You will find these helpful for completing problem sets and preparing for exams. I encourage group work on the problem sets and is required on the mathematical modeling paper. Group size for the paper should be no more than **three** people. The paper should be a collaborative effort; therefore, I will not accept solo-authored papers for this class.

**Course Policies, Expectations and Requirements**

***Etiquette.*** Please behave in a respectful manner at all times toward classmates and the instructor. This includes in-class and out-of-class (e.g., e-mail, office hours) meetings and communication.

***Attendance and Participation.*** Expected and required. Active participation is essential for creating an engaging classroom environment by offering meaningful contributions to class discussions. Occasionally I may call on students to share in class, and answering when called on counts as participation. However, you should expect to participate even at times when you have not been prompted.

***Lectures.*** Notes for each week will be posted on HuskyCT. Please read them before class and bring them to class with you. The notes have gaps in them that we will fill in during class.

***Readings.*** Reading is essential for active class participation. Thus, I will assume the reading material for each class session (including textbook, class notes, and supplemental readings if any) has been looked at before class and conduct the lectures accordingly.

***Exams.*** Will be challenging by design and will involve a mix of problems, graphical analysis, and short-answer questions. The exams will include some problems that you have not seen before, since one of the course goals is to develop creative and independent problem-solving ability.

***Mathematical Modeling paper.*** Details of the assignment will be provided later, but it will involve applying the course material to develop and solve your own mathematical model of some economic issue, process or phenomenon. There will be suggestions for paper topics on HuskyCT as we approach midterm. The paper will be turned in, graded, and handed back in stages: preliminary proposal, first draft, and final draft with due dates given below. Students should use feedback from earlier drafts to improve later drafts.

***Late work.*** A valid reason for late work would include illness, family emergency, religious observances, travel required for members of UCONN teams or clubs, and so forth. It needs to either be something unforeseen or entirely out of your control. Items that can be anticipated ahead of time and planned around the academic schedule do not count. Not being ready to do something, or not having had time to do it, also does not count. Even if valid, reasons must be documented in a way that the instructor can easily verify. If there is no valid documented reason why a homework assignment or paper is late, points are deducted at a 10% rate for each school day the work is late.

***Missed Exams.*** If there is a valid documented reason for missing an exam (in the sense described above), a makeup exam date will be arranged between the student and instructor. Please note again here that things that can be planned around the academic schedule are not valid reasons for missing an exam. Likewise, not being ready to take the exam or not having had sufficient time to study (except when this is due to illness or emergency) are not valid reasons. Makeup exams will be generally be harder than the exams taken by the rest of the class at the scheduled time. Note that if you miss the final exam, the makeup exam may have to occur after the beginning of spring semester due to the extremely tight scheduling of fall exams right before the holidays.

***Regrades.*** If something on an assignment, paper or exam is graded incorrectly, please let me know as soon as possible. Please provide me with a written statement of why your answer is correct, and the item will be regarded. Otherwise, I do not negotiate on the number of points that are given for answers on tests or homework assignments, the quality of in-class participation, or drafts of papers.

***Final grade cutoffs.*** ≥ 90% at least A-, ≥ 80% at least B-, etc. No other guarantees, no negotiations.

***Extra Credit.*** Not offered under any circumstances. However, I may make exceptions on certain exams.

***HuskyCT.*** Please consult frequently. All course materials and announcements will be posted there. Forgetting to check HuskyCT is not a valid reason for turning in work late or missing an exam.

***Academic Honesty.*** I expect everyone to abide by the University’s Intellectual Honesty Code. Plagiarism on research papers and cheating on exams are unacceptable violations of the Code that will be dealt with according to the procedures set forth in the Code.

***Disability*.** Please see me, or have the Dean of Students inform me, as soon as possible if you are entitled to accommodations for a documented disability. Letting me know during the week of an exam, for example, is not sufficient advance notice for providing accommodations.

**Tentative Schedule of Topics and Due Dates**

***Week 1 (January 20)***

Introduction and algebra review; mathematical issues in economic modeling *Chaps 1 & 2*

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***Week 2 (January 25 & 27)***

Static analysis: applications to supply/demand and national income models *Chapter 3*

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***Week 3 (February 1 & 3)***

Differential calculus and its application to comparative statics  *Chapters 6 and 7*

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***Week 4 (February 8 & 10) Problem Set 1 due Wednesday, February 10***

Comparative statics for general function models *Chapter 8 [pp 178-199]*

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***Week 5 (February 15 & 17) Exam 1 Wednesday, February 17***

Optimization; concavity and convexity; second derivative test *Chapter 9 [sections 9.1-9.3]*

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***Week 6 (February 22 & 24)***

Optimization applications *Chapter 9 [section 9.4]*

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***Week 7 (February 29 & March 2)***

Matrix Algebra: matrix operations; matrix notation for linear systems  *Chapter 4*

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***Week 8 (March 7 & 9) Problem Set 2 due Wednesday, March 9***

Matrix Algebra: determinants; matrix inversion; Cramer’s Rule  *Chapter 5*

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***Week 9 (March 21 & 23)***

Comparative statics for “large” general function models *Chapter 8* *[pp 199-217]*

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***Week 10 (March 28 & 30) Paper Proposal due Wednesday, March 30***

Exponential and logarithmic functions  *Chapter 10*

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***Week 11 (April 4 & 6) Problem Set 3 due Wednesday, April 6***

Optimization w/ more than one choice variable  *Chapter 11*

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***Week 12 (April 11 & 13) Exam 2 Wednesday, April 13***

Constrained optimization with equality constraints  *Chapter 12*

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***Week 13 (April 18 & 20) Paper 1st draft due Monday, April 18***

***Problem Set 4 due Wednesday, April 20***

Constrained optimization with inequality constraints*Chapter 13* *[pp 402-427]*

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***Week 14 (April 25 & 27) Paper final draft due Wednesday, April 27***

***REVIEW***

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***FINAL EXAM TBA***