Department of Economics
Course Outline

		Term:	Fall 2005
Course:	Economics 611.19 [Mathematical and Computational Economics]	**Section:**	01
Time:	MW 1400 ? 15:15	**Place:**	SS 423
Instructor:	Dr. Aaron Strong		
Office:	SS 542	**Telephone:**	220-5602
Office Hours:	TBA	**E-Mail:**	astrong@ucalgary.ca

Textbook(s):

Intriligator, Michael, *Mathematical Optimization and Economic Theory*, Society for Industrial and Applied Mathematics, 2002.

In addition there may be a set of required readings that I will make available during the course.

Book(s) on Reserve:

N/A

Course Outline:

The idea of this course is to introduce you to a fairly broad set of tools. These tools will allow you to analyze a large variety of economic problems ranging from trade and tax policy to spatial and environmental impacts. My ultimate goals are that we can speak a common language and to show you and have you implement a large set of models.

In order to talk about computational economics, we need to first have a language with which to talk. Additionally, we do not want to be arbitrarily choosing models and functional forms and hoping that the computer gets it right. So our first step

will be to lay out the foundations of mathematical optimization and discuss some of the subtleties that are often overlooked by theorists using the techniques.

Next, we will discuss the implementation of a particular software, GAMS, General Algebraic Modeling System. This is but one of the many potential choices including but not limited to MATLAB, GAUSS, C++, ? I have chosen this particular software for three reasons, (1) it was specifically designed for economists and (2) I am an economist and not a computational operations researcher as such Micheal Ferris, one of the top OR guys in the world, writes my optimization routines for me and they are infinitely better than I could ever hope to do. The ideas that I would like to distill in you are that you want to be thinking about economics and not the optimization subroutines, leave that to the experts. (3) GAMS is incredibly flexible and moving from a two sector economy to a 100 sector economy is easy.

Next, we will discuss moving from a classical programming world, linear and non-linear problems, to a mixed complementary world. Both worlds have advantages and some problems are better suited for non-linear programming but general equilibrium problems are better suited for a complementarity world. Finally, we will discuss an add-on to GAMS that will make you lives infinitely easier and more productive, MPS/GE, Mathematical Programming System for General Equilibrium Analysis.

If there is time at the end, I will show you how I use computational methods to analyze dynamic ecosystem-economic problems and spatial allocation models with interacting agents.

Prerequisites

In a perfect world, everyone would have had a semester of graduate micro, a semester of math-econ, but the world isn?t perfect and that is why the first bit of this course will allow us develop a language to talk with. Familiarity with a text editor such as emacs, VI, epsilon, etc. would be helpful but you can get by without it.

Grade Determination and Final Examination Details:

Homework	50%
Paper	50%

This course will be a homework intensive course with little to no in class grading. Regurgitating back to me what I have told you won?t help you in the long run. Implementing ideas through problems is the only way to master and understand this material. As such, I expect you to put in the time to not only get the right answer but understand how to do exploratory exercises on your own.

In addition to the homework, there will be a required paper. This paper could take on one of two forms. First, you may replicate the results of another paper and discuss some alternative policy questions that could have been asked. Since there are a variety of papers out there and implementation of the models goes from relatively easy to extremely difficult, if you chose this option, please discuss the paper you would like to implement with me. Second, an original work. For students wishing to use computational methods in a thesis, this may be a very useful option.

Additionally, computers are finicky creators and small mistakes sometimes cost beginners large amounts of time. If you are having trouble, come see me. Also, computers don?t lie. Many times interesting results that arise from computation methods are errors in code. Most long standing theories are right. If you have an incredible result make sure you check your code and model first before telling the world.

Homework and papers are marked on a numerical (percentage) basis, then converted to letter grades. As a guide to

determining standing, these letter grade equivalences will generally apply:

A+	95 ? 100	B	75 - 79	C-	55 ? 59
A	90 ? 94	B-	70 ? 74	D+	50 ? 54
A-	85 ? 89	C+	65 ? 69	D	45 ? 49
B+	80 ? 84	C	60 ? 64	F	0 ? 44

If, for some reason, the distribution of grades determined using the aforementioned conversion chart appears to be abnormal the instructor reserves the right to change the grade conversion chart if the instructor, *at the instructor's discretion*, feels it is necessary to more fairly represent student achievement.

A passing grade on any particular component of the course is not required for a student to pass the course as a whole.

Organization

The primary means of communication outside of the class will be by email list. Therefore, one requirement for this course is for each student to obtain and monitor an email account. All general announcements regarding readings, etc. will be made via email.

Students? Union Vice-President, Academic
Paige Forsyth
Phone: 220-3911
E-mail suvpaca@ucalgary.ca

Students' Union Faculty Representative (Social Sciences)
Teale Phelps
Phone: 220-3913 Office MSC 251
E-mail socialscirep@su.ucalgary.ca

Notes:

- Students seeking reappraisal of a piece of graded term work (term paper, essay, etc.) should discuss their work with the Instructor *within* fifteen days of the work being returned to the class.

Safewalk / Campus Security: 220-5333

* * * * *

AS:pst
2005-08-04