AEREC 597B
Applied Computational Economics
Spring 2010
Location: 103 Ferguson
Wednesdays, 9:05-12:05
*****DRAFT—Subject to change*****

Instructor:
Professor Karen Fisher-Vanden
Agricultural Economics and Rural Sociology
Office: 112E Armsby, 867-2752
Office hours: by appointment

Required Readings

Computational Economics, by Kendrick, Mercado, and Amman, Princeton University Press, Princeton, NJ.


Other readings (in .pdf format) posted on ANGEL

Prerequisites:
A graduate course in microeconomic theory and a calculus course, or permission of the instructor.

Course Description

Economists often find themselves in situations where closed-form solutions do not exist or econometric estimation is inappropriate due to data limitations or the nature of the problem. In these cases, numerical approaches, using computer-based methods, may be an economist’s best option. In this course, we will explore four topics in the field of computational economics: computable general equilibrium modeling, growth modeling, uncertainty and formal monte carlo analysis, and agent-based modeling. This is a “hands-on” course which will combine formal lecture and discussion with in-class model building. This course is computationally intensive and students will be required to complete a number of computer-based modeling exercises using software packages such as GAMS and MATLAB.
Course Requirements

1. **Class Participation**: The success of any course depends on active class participation. This requires each student to read carefully and think critically about the assigned readings each week. A significant portion of a student’s grade will be based on attendance, preparedness, and participation in class.

2. **Model building assignments**: The goal of this course is for students to gain experience with computational methods. Students will be assigned four model building exercises over the course of the term. Assignments and due dates are provided below. **Late assignments will not be accepted.**

3. **Take-home Final Exam**: A take-home final exam covering the assigned readings of the course can be picked up anytime **before 4:00 pm on Monday, May 3rd** and will be due on or before the scheduled final exam date and time.

Grading

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<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Class participation</td>
<td>40 pts</td>
<td>(20%)</td>
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<tr>
<td>Assignment #1</td>
<td>30</td>
<td>(15%)</td>
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<tr>
<td>Assignment #2</td>
<td>30</td>
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<tr>
<td>Assignment #3</td>
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<tr>
<td>Assignment #4</td>
<td>30</td>
<td>(15%)</td>
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<tr>
<td>Take-home Final</td>
<td>40</td>
<td>(20%)</td>
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<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>(100%)</td>
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Academic honor

Students are encouraged to work together on assignments and interpreting assigned readings; however, each student must submit his or her own work. No assistance is allowed while taking the final exam. Each student is expected to conduct his or herself in accordance with the College’s Academic Integrity Policy which can be found at http://students.cas.psu.edu/AcademicIntegrity.htm. Please consult the instructor with any questions regarding the Academic Integrity Policy.

Disabilities

Students with disabilities should contact the instructor by the second week of classes in order that appropriate accommodations can be made.
Course Schedule

**Week 1: Wednesday, January 13** – Introduction to the course; CGE modeling overview; GAMS Tutorial

Kendrick, Mercado, and Amman, Chapter 8, “General Equilibrium Models in GAMS.”

Mitra-Kahn, B., “Debunking the Myths of Computable General Equilibrium Models,” (ANGEL)

Rosenthal, R., “A GAMS tutorial” (ANGEL)

**Week 2: Wednesday, January 20** – CGE model structure

Sue Wing, I., “Computable General Equilibrium Models for the Analysis of Energy and Climate Policies” (ANGEL)

Sue Wing, I., “Computable General Equilibrium Models for the Analysis of Economy-Environment Interactions” (ANGEL)

**Week 3: Wednesday, January 27** – Model parameterization and calibration


**Week 4: Wednesday, February 3** – CGE policy analysis

**Week 5:** Wednesday, February 10 – CGE model applications


**Week 6:** Wednesday, February 17 – Growth models


Kendrick, Mercado, and Amman, Chapter 1, “Growth Model in Excel.”

**Week 7:** Wednesday, February 24 – Application: the Dynamic Integrated Climate-Economy Model (DICE)

Kendrick, Mercado, and Amman, Chapter 15, “Global Warming in GAMS.”


**Week 8:** Wednesday, March 3 – Economic and climate modeling in DICE


**Week 9:** Wednesday, March 10 – SPRING BREAK, No Class
**Week 10: Wednesday, March 17 – Policy analysis using DICE**


**Week 11: Wednesday, March 24 – Sensitivity analysis and modeling uncertainty**


**Week 12: Wednesday, March 31 – Formal Monte Carlo analysis**


**Week 13: Wednesday, April 7 – Introduction to agent-based modeling**

Kendrick, Mercado, and Amman, Chapter 14, “Agent-based Model in MATLAB.”


**Week 14: Wednesday, April 14 – Building agent-based models**


**Week 15: Wednesday, April 21 – Agent-based model applications**


**Week 16: Wednesday, April 28 – Overflow and course wrap up**