AGEC 685 (section 329): Directed Study
1 or 2 Credits 10-week Summer 2002

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Objective:  This course will cover a mixture of general equilibrium modeling empirical and theoretical issues. After the course one should be able to build a simple CGE model using GAMS. The general purpose of the course is to cause graduate students to:

(i) become familiar with the basic structure of a simple computable general equilibrium model and the economic logic underlying CGE,
(ii) gain experience in implementing and solving basic CGE models including problem formulation and solution,
(iii) examine selected applications of CGE to policy analysis issues gaining insight into potential application areas and model use techniques,
(iv) be able to interpret and evaluate results from real-world CGE exercises, and
(v) learn the basics of formulating CGE models in the Generalized Algebraic Modeling System (GAMS) programming software language.

Conduct:  Each week we will have a single 1 hour and 15 minute lecture.  
The class will be on Wednesday at 3:30 p.m. in Room 448, Blocker Building.  
The first day of the class starts on June 5, 2002.

Grading:  Assignments 30%
Final exam 70%

Assignments:  During the semester a few assignments will be given. Individuals will turn in their own assignments, but group efforts are encouraged.

Final:  The final exam will be comprehensive. Time and place will be arranged to accommodate everyone’s schedule.

Additional Credit Project:  Students who elect to may register for 2 hours. Those registering for the additional hour are expected to do an independent project.

Project Guidelines:  If you choose to do the project, please make sure that your project follows these guidelines:
(1) Build a simple CGE model that includes at least 2 households, 2 goods, and 2 factors.
(2) Use either real-world data or simulated data.
(3) Model calibration.
(4) Run the benchmark equilibrium.
   - Your results should replicate the observed data.
   - All equilibrium conditions must hold.
(5) Introduce a shock to the system.
(6) Compare results between the benchmark and counterfactual equilibrium after the shock, and
(7) Provide a discussion of the project in terms of model structure and explanation for the results.

The project should not be longer than 15 pages, double-spaced, excluding tables and figures. It should address all issues above in point 1-7. The project is to be submitted by August 15, 2002. Students taking the project option are required to turn in a topic and basic outline by July 1. If desired, one could submit an outline earlier than July 1 for some suggestions.

Text:

(1) There is no assigned textbook required for this course. All reading materials will be drawn from an applied general equilibrium textbook chapters or the literature, the GAMS manual, and the PATH solution manual. References related to each topic discussed in the class are given as a guide for one who wishes to explore the topics profoundly. However, the recommended textbook is:


(2) Copies of the GAMS manual will be made available at the website [http://agecon.tamu.edu/faculty/mccarl/mccarl.htm](http://agecon.tamu.edu/faculty/mccarl/mccarl.htm).

(3) GAMS student version will be available and installed to individual PCs if desired.

(4) Course materials will be made available in pdf form through the mccarl web site.

Tentative Outline

1. **Overview of Computable General Equilibrium Model**
   - What and why CGE?
   - Partial equilibrium & econometrics
   - Benefits and drawbacks of CGE
   - Overview of CGE modeling
   - Theory behind CGE
- Walrasian equilibrium and conditions

**Suggested Reading:**


Hertel, T. W. “Applied general equilibrium analysis of agricultural and resource policies. *Staff Paper* 99-2, Department of Agricultural Economics, Purdue University, March 1999.


2. **An Introduction to the Structure of CGE Models**
   - Fundamental relationship of simple CGE model
   - Incorporating taxes
   - Interpretation of results
   - Incorporating shocks
   - Comparative analysis

**Suggested Reading:**


3. **An Introduction to GAMS**
   - Using GAMS
   - A User interface -GAMS IDE
   - GAMS Documentation
   - Dissecting GAMS formulation
   - GAMS Exercise

**Suggested Reading:**

McCarl, B. A. *Basic GAMS class.* (http://agecon.tamu.edu/faculty/mccarl/mccarl.htm).
4. CGE Modeling via GAMS
   - Applying CGE into GAMS
   - Extend simple CGE including hierarchical (nested) functions
   - Choice of functional forms
   - Numerical examples

Suggested Reading:
McCarl, B. A. Basic GAMS class (http://agecon.tamu.edu/faculty/mccarl/mccarl.htm.).

5. The Data Base and application
   - Input-output table
   - Social Accounting Matrices
   - Other supplemental data e.g. energy balance table
   - Building benchmark equilibrium data sets
   - Parameters calibration
   - Discussion on a selected application

Suggested Reading:

6. Mix complementary problem (MCP)
   - Moving from LP to NLP to MCP
   - MCP solvers
   - General modeling examples
   - Tricks to overcome problems

Suggested Reading:
McCarl, B. A. Basic GAMS class. (http://agecon.tamu.edu/faculty/mccarl/mccarl.htm.).


7. Review of Basic Application of CGE Models
   - Review of existing CGE models
   - Discussion on selected applications

Suggested Reading:

8. Advanced application of CGE Models
   - Review of existing CGE models
   - The impact of greenhouse gas mitigation policies on the U.S. emissions under the Kyoto protocol.

Suggested Reading: