ECON 4838-005
MICROCOMPUTER APPLICATIONS IN ECONOMICS
Fall 2006

CLASSROOM LOCATION: ATLS 104 (use Excel 2003 for Mac)
CLASS DAYS/TIME: TR 5:00-6:15

INSTRUCTOR: Professor Frank S. T. Hsiao
OFFICE: Economics Building 107
OFFICE HOURS: TR 1:10-2:40
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HOMEWORK WEB SITE: www.colorado.edu/Economics/courses/hsiao/index.HTM

OBJECTS: The main object of this course is innovative uses of the personal computer in economic analysis and in model building techniques. Students will acquaint themselves with the nature and properties of economic models by trial and error through individualized, computer generated exercises. The course contents are divided into five parts:

> Part I Economic Static and Comparative Static Analyses with MS Excel,
> Part II Basic Statistics, Finance, and Matrices with Excel,
> Part III. Economic Optimization and Oligopoly using Excel,
> Part IV. Handling Large Data Sets and Online resources,
> Part V. Economic Dynamics and Comparative Dynamic analysis: Business Cycles
> and Chaos.

Different skills in using Excel will be introduced gradually while we review/learn basic Economics, Mathematics, and Statistics. The exact contents and emphasis of the course may differ from year to year depending on the interest of the students and the instructor. In previous years, Part V covered Input-output Analysis, Linear Programming, or Game Theory.

TEXTBOOKS:
> Hsiao, F., *Economic and Business Analyses-Quantitative Methods with Spreadsheets*, 2006 (required). The Lecture Notes are available from the CU Bookstore.
> (This lecture Notes are written for Excel 2003 for Windows. Thus, some translation into Mac version is needed).

PREREQUISITES: Math 1050-1, 1060-1, 1070-1, 1080-1, 1090-1, 1100-1; or Math 1070-3 and 1080-3; or Econ 1078-3 and 1088-3; or Math 1300-5; or higher.

> We assume that the students have completed the equivalence of the following textbook:

Mizrahi, Abe, and M. Sullivan. *Mathematics for Business and Social Sciences, An Applied Approach*, 4th ed., John Wiley and Sons.
This book is generally used in Math 1050-1 to Math 1100-1. The equivalent level of the book is used in Econ 1078-3 and 1088-3.

Previous knowledge of microcomputers or software is not required. However, students should have enough time to practice and familiarize themselves with the computer and the software package within a short period of time. This takes constant effort and great determination.

THE SOFTWARE PROGRAM: The software program we use is Microsoft Excel 2003 for Mac. It is installed on the hard disk of the Laptops in the classroom.

The reason we use Excel is simple. It is practical and widely available. We have been using spreadsheets programs in this class since 1986: VisiCalc, Lotus 1-2-3, Quattro Pro, and now Excel, depending on the most popular spreadsheet program of the time. As shown in the reference section below, we have demonstrated that the spreadsheet program is an excellent tool for computer assisted instruction (CAI) in economics and statistics. Unlike a packaged learning program, students can learn economic and statistical concepts and methods by actually writing the formulas directly on spreadsheets. However, no programming knowledge and skill, like BASICS, C+, etc., are required.

On the other hand, many students find that the spreadsheet program is easy to learn and use, as compared with software packages like TSP, RATS, SPSS, the commands of which are oftentimes confusing, idiosyncratic, and easy to forget. They also find that Excel is useful in daily life (balancing the budget, doing financial planning, etc.), and helps them easier to get a job in business and government (Excel is required in the Business School).

FACILITIES: The computers we use are laptops with Office XP Professional for Mac. The class will be held in the new ATLAS Building, Room 104. Students can borrow Laptops for use in the classroom. There are 25 Laptops in the room, each with a wide-screen color graphic monitor. Software programs are installed on the hard disk drive.

Excel is also installed in the microcomputers located in the Economics Building Room 7 and Engineering Center. They are also available in Business, Room 104 and 107, Norlin Library Rooms 310 and M350. There are about 30 computing sites throughout the campus. The Excel program is installed in most of the sites. When they are not in use by classes, the facilities are available for individuals.

Reference books and periodicals on Excel (and other spreadsheet programs) are available at the Math/Physics Library, the Business Library, and the Boulder Public Library. There are only a few changes in Excel commands since Excel 98 was published. Hence, references books for other versions of Excel may also be useful.

COURSE SCHEDULE

No.	Week	Chapter	Title

I. Basic Economic Analysis

No.	Week	Chapter	Title
1	8/29	1	Total Revenue, Total Cost, and Profits - Excel Worksheets
2	9/05	2	Static Analysis in Economics: Market models and Keynesian Models - Excel Graphics
3	9/19	3	Comparative Static Analysis: Microeconomics and macroeconomics - Name that Range!

II. Statistics

No.	Week	Chapter	Title
4	9/26	4	Some economic and statistic functions and regression analysis- equations and formulas

9/28   First Mid-term Exam - 100 points (20%)

No.	Week	Chapter	Title
5	10/03	5	Random numbers and frequency distributions - large data base. The probability, uniform and normal distributions
6	10/10	6	Mortgage calculation - optimal decision models. The future and present value problems with or without annuity
7	10/17	7	Price Indexes - sums and products. Laspeyres, Paasche, Edgeworth, Divisia price indexes
8	10/24	8	Vectors and Matrices - linear economic models. Linear economic policy and input-output models

III. Optimization

No.	Week	Chapter	Title
9	10/31	9	Production and utility functions and optimization problems - 3D graphics, Oligopolistic competition

11/02   Second Mid-term Exam - 100 points (20%)

IV. Large Data Base

No.	Week	Chapter	Title
10	11/14	10	The state of the world - sorting, filtering, subtotaling, pivoting
11	11/28	11	Online resources - text import wizard
	12/05	12	Summary of the semester - flow charts and slides. What have we learned so far?

V. Dynamics

No.	Week	Chapter	Title
13	12/12	13	Business cycle models: Samuelson-Hicks models - linked cells
14	12/19	14	Chaos: The butterfly effect - very large data set

FINAL EXAM   Comprehensive (40%)

Date: Please check with the University calendar

PLEASE COME IN DURING THE OFFICE HOURS AND TALK WITH YOUR

INSTRUCTOR ABOUT ANY PROBLEM RELATED TO THIS COURSE, ESPECIALLY IF YOU HAVE WORKED HARD OR YOU WANT A LETTER OF RECOMMANDATIN IN THE FUTURE. LET THE INSTRUCTOR KNOW YOU.

NOTES:
1. The new computers do not use the 3½ inch diskettes and zip diskettes. To save the files or class notes, you should use a flash disk, a memory stick or a card, or burn a CD, or send the Excel file directly to your e-mail address.

2. There are weekly homework assignments. They will be announced in class. They will also be listed at the class website at

    www.colorado.edu/Economics/courses/hsiao/index.HTM

    E and HTM must be in capital letters.
    a. Homework - 10 points. Late homework will not be accepted.
    b. Homework should be handed in in hard copies. Do NOT send it to the instructor's e-mail address. The first page of the homework should begin with the following:

    HW chapter #; due date; your name.

Homework will be returned and handed in on every Thursday. Please keep the returned homework for your own record and for future reference.
    c. Check your homework record with the instructor at the end of the semester to make sure all your homework assignments have been properly recorded.
    d. Homework sheets MUST be stapled (no staple, no grade), and paginated.

3. Quiz/attendance will be taken frequently during the semester.

4.   All tests should be printed in a hardcopy and should be saved in your files in a CD or a flash disk and HAND IN the CD or flash disk. Otherwise, **send your test file to** the instructor as follows.
    a. Save your file in drive D:\ under filename "**003Test1 (or Test2, or Final) Yourlastname**" (enter your section number first).
    b. Open your e-mail account (in webmail), and send the saved exam file in D:\ as an **attachment** to frank.hsiao@colorado.edu.

4. Semester Grading: Semester grades consist of three parts: exam scores (80% = 20% + 20% + 40%); homework and exercise scores (15%), attendance and quiz scores (5%).
    Probable cutoff points are in the vicinity of 90% (A-), 80% (B-), 70% (C-), 60% (D-). Some curving may be used.

GENERAL REMARKS:
1. Please **attend the classes** regularly. We expect every student to participate in all classes.

2. Test dates are firm. Please prepare for the tests long before the test dates.

3. If you use flash disks to save the test, the test disk must be blank. No files except the test file are allowed in the test disk. (This means that you should transfer your previous test files and all other files to your computer after you take the test.)

4. If you use disks, hand in the test disk one class before the test day (Tuesday). The test disk will be returned to you in exchange for the test sheets before the test starts.

5. Seating will be assigned randomly on the test day.

6. If you are going to miss or have missed an exam, hand in an explanatory statement and **documentation** to the instructor or call/e-mail the instructor for approval of excused absence within 24 hours after the test time. Otherwise, no make-up test and a zero grade will be given to unexcused absences for exams.

"**Students with disabilities** who may need academic accommodations should discuss options with the professor during the first two weeks of class."

SOME REFERENCES:

Hsiao, F.S.T. "Matrices, Regression, and Linear Programming on Spreadsheets," *Bulletin of Information Processing Center*, Otaru University of Commerce, Japan, Vol. 2, January 1991, pp. 123-141.

--------- "The Simplex Method of Linear Programming on Microcomputer Spreadsheets," *College Mathematics Journal*, A publication of the Mathematical Association of American, Vol. 20, No. 2, March 1989, pp. 153-160.

--------- "Implementation of the Gauss-Jordan Method of Matrix Inversion by Spreadsheet Macros," *International Journal of Mathematical Education in Science and Technology*, Vol. 19, No. 5, September/October 1988, 729-737.

--------- "An Evaluation of Spreadsheet Macros for CAI—with Applications to Matrix Multiplication," *Collegiate Microcomputer*, Vol. 5, No. 4, Winter 1987, pp. 333-342.

--------- "A Computational Design of Some Matrix Iterative Method Using Spreadsheets," *Industrial Engineering*, Vol. 9, No. 5, May 1987, pp. 17-26.

--------- "The Gauss Quadrature Numerical Integration—A Comparison of the Programming Method and the Spreadsheet Method," *ACCESS*, the Journal of Microcomputer Applications, 5(5), Sept/Oct 1986, pp. 38-40.

--------- "A Statistical Method of Grading—Theory and Practice," *Computers and Education, An International Journal*, Vol. 9, No. 4, 1985, pp. 227-233.

--------- "A New CAI Approach to the Teaching of Calculus," *The Journal of Computers in Mathematics and Science Teaching*, (a quarterly journal of Association of Computers in Mathematics and Science Teaching, Austin, Texas), Vol. 4, No. 2, Winter 1984-85, pp. 29-36.

--------- "Micros in Mathematics Education—Uses of Spreadsheets in CAL," *International Journal of Mathematical Education in Science and Technology*, Vol. 16, No. 6, 1985, pp. 705-13.

--------- "The Electronic Gradebook—An Application of dBaseII Program for Academia," *Collegiate Microcomputer*, Vol. 3, No. 1, February 1985, pp. 59-67.

Hsiao, F.S.T. and Y. Umehara, "Understanding Statistics through Spreadsheets," in Japanese (Hyokeisan Sofuto de Tokei o Rikaisuru), *Keizai Seminar* (Economics Seminar). Part I, "Simulation of the Law of Large Numbers," October 1997, pp. 39-45. Part II, "Theoretical Sampling Distributions," December 1997, pp. 86-91. Part III, "Empirical Sampling Distributions," January 1998, pp. 86-90.

--------- and -------, *Pasokon de Gaimu no Riron* (*Game Theory Step-by-Step using Spreadsheets*), in Japanese, Tokyo: Nihon Hyoronsha Publishing Company, 1997, 212 pp. Second printing, 1999.

REFERENCES ON GAME THEORY
Bierman, H. Scott and Luis Fernandez, *Game Theory with Economic Applications*, Addison-Wesley, 1993.
Binmore, Ken, *Fun and Games, A Text on Game Theory*, D. C. Heath, 1992.
Dorfman, R., Paul A. Samneson, and Robert . Solow, *Linear Programming and Economic Analysis*, McGraw-Hill, 1958.
McKinsey, J.C.C., *Introduction to the Theory of Games*, McGraw-Hill, 1952.
Rasmusen, Eric *Games and Information, An Introduction to Game Theory*, 2nd ed., Basil Blackwell, 1995.
Romp, Graham, *Game Theory, Introduction and Applications*, Oxford University Press, 1997.

REFERENCES ON INPUT-OUTPUT ANALYSIS
Blitzer, C.R., P.B. Clark, L. Taylor (ed), *Economy-Wide Models and Development Planning,* Oxford University Press, 1975.
Bulmer-Thomas, V., *Input-Output Analysis in Developing Countries: Sources, Methods and Applications*, Wiley, 1982.
Chenery, H.B. and P.G. Clark, *Interindustrial Economics*, Wiley, 1969.
Miernyk, W.H., *The Elements of Input-Output Analysis*, Random House, 1969.
Todaro, M.P., *Development Planning: Models and Methods*, Oxford University Press, 1971.