

ECON 4838-003
MICROCOMPUTER APPLICATIONS IN ECONOMICS
Spring 2009

CLASSROOM LOCATION: HUMN 1B45

CLASS DAYS/TIME: TR 11:00-12:15

INSTRUCTOR: Professor Frank S. T. Hsiao

OFFICE: Economics Building 107 (shared with Prof. Keith Maskus during my office hours only. Any written message, including HW, should be given to the Department Office (EB212) upstairs to put it in my mailbox).

OFFICE HOURS: TR 12:20-1:20, or by appointment.

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HOMEWORK WEB SITE AND CLASS ANNOUNCEMENTS:

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 Excel and basic economic and business analysis,
- Part II Basic statistics
- Part III Private and public decision making
- Part IV. Optimization
- Part V. Large data basis and presentation
- Part VI. Dynamics and Comparative Dynamic analysis.

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 VI covered Input-output Analysis, Linear Programming, or Game Theory.

TEXTBOOKS:

Hsiao, F., *Economic and Business Analysis-Quantitative Methods with Spreadsheets*, 2008 (required). The Lecture Notes are available from the CU Bookstore.

References for Windows Excel 2007: Any *Microsoft Excel for Windows* books available in the bookstores, university libraries, or public libraries.

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 program in a short period of time. This takes constant effort and great determination.

THE SOFTWARE PROGRAM: The software program we use is Microsoft Excel 2007 for Windows. It is installed on the hard disk of the computers in the classroom.

The reason we use Excel is simple. It is practical and widely available. We have been using many different 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 (see the last section of this syllabus). Unlike a packaged learning program, students can learn economic, statistical, and mathematical concepts and methods by actually writing the formulas directly on spreadsheets. However, no knowledge and skill of programming languages, like BASICS, FORTRAN, C+, 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, SAS, 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.) for personal decision making, and helps them easier to get a job in business and government (Excel is required in business schools).

FACILITIES: The computers we use are Dell computers, Microsoft Windows Office 2007 with Microsoft Windows XP Professional Operation System, which is similar for Mac based computer. The class will be held in the new Humanities Building, Room 1B45. There are 22 Dell microcomputers in the room, each with a 24" wide-screen color graphic monitor. Software programs are installed on the hard disk drive.

Microsoft Excel is also installed in the microcomputers located in the Economics Building Room 7 and Engineering Center. They are also available in Business School Library, 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, although the appearance of the latest Excel 2007 is quite different from the previous versions. Reference books for other versions of Excel may also be useful.

COURSE SCHEDULE

Week	Week of	Chapter	Topic
I. Excel and Basic Economic and Business Analysis			
1	13-Jan	1	Excel Worksheets
2	20-Jan	2	Total Revenue, Total Cost, and Profits – Excel Tables
3	27-Jan	3	Static Analysis in Economics and Business: Excel Graphics
4, 5	10-Feb	4	Comparative Static Analysis: -Name that Range!
II. Basic Statistics			
6	17-Feb	5	Some Useful Statistic Functions – Equations and Formulas
2/19 (R) First Mid-term Exam - 20%			
7	24-Feb	6	Random Numbers and Frequency distributions –Large Datasets
8	3-Mar	7	Regression Analysis – Excel Commands
III. Private and Public Decision Making			
9	10-Mar	8	Future Value Problems – Exponential and Logarithmic functions
3/17 (T) Second Mid-term Exam - 20%			
10	19-Mar	9	Present Value Problems with or without Annuity-Optimal Decision
11	24-Mar	Spring Break	
12	31-Mar	9	Present Value Problems with or without Annuity-Optimal Decision
13	7-Apr	10	Economic Policy Analysis -Vectors and Matrices
IV. Optimization			
14	14-Apr	11	Production and Utility Functions–3D Graphics
15	21-Apr	12	Constrained Optimization– Uses of the Excel Solver
IV. Large Data Base			
16	28-Apr	13	The State of the World - Sorting, Filtering, Subtotaling, and PivotTable
	30-Apr		Review
Final Examination Comprehensive (40%)			

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 RECOMMENDATION IN THE FUTURE. LET THE INSTRUCTOR KNOW YOU.

NOTES:

1. To save the files or class notes, you should use a flash disk, secure disk (SD), or burn a CD, or send the Excel file directly to your e-mail account.
2. There are weekly **homework** assignments. They will be announced in class, and will also be listed at the class website at

Here E and HTM must be in capital letters.

- a. Homework - 10 points. Late homework will not be accepted.
- b. Homework should be handed 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 #; date; your name.

Old homework will be returned and new one 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 paginated and stapled (no staple, no grade).
3. Quiz/attendance will be taken frequently during the semester.
4. All **tests** should be printed in a hardcopy (please activate your Buff Card so you can use the classroom printer), and should be saved in your files in a flash disk and **HAND IN** the flash disk. Otherwise, **send your test file to** the instructor as follows.
- a. Save your file in drive D:\ under filename “**Test1 (or Test2, or Final) Yourlastname**”
 - 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 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 absence for exam.

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 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.

UNIVERSITY POLICY

The University adheres to the standards for student privacy rights and requirements as stipulated in the Federal Rights and Privacy Act (FERPA) of 1974.

Campus policy regarding disabilities requires that faculty adhere to the recommendations of Disability Services. In addition, campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly accommodate all students who, because of religious obligations, have conflicts with scheduled examinations, assignments or required

attendance.

Any student eligible for and needing academic adjustments or accommodations because of disability or religious practice should arrange to meet with the instructor immediately. Those with disabilities should immediately submit a letter from Disability Services describing appropriate adjustments or accommodations.

Students and faculty share responsibility for maintaining an appropriate learning environment. All are subject to the University's policies on Sexual Harassment and Amorous Relationships. Students who fail to adhere to appropriate behavioral standards may be subject to discipline.

University policies regarding classroom behavior are available at
<http://www.colorado.edu/policies/classbehavior.html>

and at
http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

The Honor Code Council can be contacted by email at honor@colorado.edu or by telephone at 303-725-2273. Additional information regarding the University Honor Code is available at
<http://www.colorado.edu/policies/honor.html>

and at
<http://www.colorado.edu/academics/honorcode/>.