III. Facilities

The computer we are going to use is IBM-PC/AT compatible Zenith AT with 512K of memory and the software program is Lotus 1-2-3, version 3.0, by Lotus Development Cooperation.

The class will be held in the Engineering Center Class Room (ECOR) 2-3. There are 19 Zenith AT's in the room, each with a monochrome Zenith Monitor with a graphic board. Available software is installed on the 20mb hard drive.

In addition, 17 IBM-PC with 512K RAM, each with a monochrome monitor, and 9 Zenith 1000 Series PC with 320K, are available in the fourth floor PC Room of the Norlin Library. 16 copies of Lotus 1-2-3, version 1A, 16 copies of WordStar, version 3.3, and 16 copies of BASIC programs may be checked out at the first floor Audio-visual library. There are about 20 computing sites throughout the campus. When they are not in use by classes, the facilities are available for individuals.

Reference books and periodicals are available at the Math/Physics Library and the Business Library.

III. Textbooks

There are two required textbooks.


Hand-outs will be distributed in class. Some lecture notes (Part I and Part II) and some journal articles are also available at Kinko.

Microcomputer Applications in Economics

Econ.483/583
Spring 1987
Prof. Hsiao
TT 9:30-10:45

I. Objective

The main objective of this course is innovative uses of personal computer in economic analysis and 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 may be divided into three parts: Part I Microcomputers and Lotus 1-2-3; Part II Input-Output Analysis; Part III Linear Programming and Other Applications. The exact contents and emphasis of the course may differ from year to year depending on the availability of software packages. This course will be offered in spring semesters.

II. Prerequisite

There are two prerequisites for this course. One is Econ. 480/580: Introduction to Mathematical Economics, which roughly covers the topics in the first 12 chapters of Chiang, A. Fundamental Methods in Mathematical Economics, McGraw-Hill, 3rd ed., or Math 130: Calculus. Another is Econ. 407: Intermediate Microeconomics. Since the class room space is limited, these two prerequisites will be strictly observed.

Previous knowledge of microcomputers or software is not required. However, you should have enough time to practice to familiarize yourself with the computer and the software package within a relatively short period of time. This also takes constant efforts and great determination, which not everyone has.

Students who are taking for graduate credits (Econ.583) are required to write a term paper at the end of the semester. The topic should be related to the course, in particular, the spreadsheet macro programming method should be used. Some of the topics in Input-output Analysis are attached to this course outline. Graduate students should also answer an extra question in the final examination (This extra question will be extra credit for the undergraduate students).
## IV. Course Schedule

### PART I MICROCOMPUTER AND LOTUS 1-2-3

<table>
<thead>
<tr>
<th>Week of</th>
<th>Text</th>
<th>Chapter</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/15</td>
<td>Baras</td>
<td>1,2</td>
<td>Using 1-2-3 worksheet</td>
</tr>
<tr>
<td>1/20</td>
<td>Baras</td>
<td>3,4</td>
<td>Using copy, print, file, macros, and graphics</td>
</tr>
<tr>
<td>1/27</td>
<td>Baras</td>
<td>5,6</td>
<td>A simulation model and database management</td>
</tr>
<tr>
<td>2/3</td>
<td>Baras</td>
<td>7,8</td>
<td>Data query command</td>
</tr>
<tr>
<td>2/10</td>
<td>Baras</td>
<td>9</td>
<td>Macroprogramming</td>
</tr>
<tr>
<td>2/17</td>
<td>Baras</td>
<td>10</td>
<td>Forms-oriented data management</td>
</tr>
<tr>
<td>2/19</td>
<td></td>
<td></td>
<td>FIRST MID-TERM TEST (30%)</td>
</tr>
</tbody>
</table>

### PART II INPUT-OUTPUT ANALYSIS and LINEAR PROGRAMMING

<table>
<thead>
<tr>
<th>Week</th>
<th>Text</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/24</td>
<td>Chiang, App</td>
<td>Review of Matrix Algebra (pp. 189-202)</td>
</tr>
<tr>
<td>3/3</td>
<td>Lecture Notes</td>
<td>The Gauss-Jordan elimination method</td>
</tr>
<tr>
<td>3/10</td>
<td>Chiang</td>
<td>Review of Input-output system</td>
</tr>
<tr>
<td>3/17</td>
<td>Chiang</td>
<td>Multiplier Analysis</td>
</tr>
<tr>
<td>3/24</td>
<td></td>
<td>Spring Break</td>
</tr>
<tr>
<td>4/2</td>
<td></td>
<td>SECOND MID-TERM TEST (30%)</td>
</tr>
<tr>
<td>4/7</td>
<td>Lecture Notes</td>
<td>Development planning</td>
</tr>
</tbody>
</table>

### PART III OTHER APPLICATIONS

<table>
<thead>
<tr>
<th>Week</th>
<th>Text</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/14</td>
<td>Chiang</td>
<td>Applications to linear programming</td>
</tr>
<tr>
<td>4/21</td>
<td>Chiang</td>
<td>The Simplex Methods</td>
</tr>
<tr>
<td>4/28</td>
<td>Chiang</td>
<td>Taylor Series</td>
</tr>
<tr>
<td>5/6</td>
<td></td>
<td>FINAL EXAM WEEK (40%, COMPREHENSIVE EXAM)</td>
</tr>
</tbody>
</table>

**ECON 483/583 WEEKLY HOMEWORK ASSIGNMENTS  Prof. Hsiao**

**Spring 1987**

1. Reproduce the graph and calculation of Income Statement in Baras, Table 3-7, p. 60.
2. Set up a simulation model of Stochastic demand and production as in Baras, Figure 5-9, p. 116.
3. Construct a sine/cosine table and illustrate diagrammatically, as in Lecture Notes #3.
4A. Simple regression analysis, Lecture Notes #4.
   B. Exercises on vlookup function using a tax table.
   C. Reproduce database management: Sorting and data distribution in Chapter 6 of Baras, Figure 6-9, Pie Chart and Figure 6-10, the frequency distribution.
5A. Construct a logarithmic function and illustrate the function diagrammatically, Lecture Notes, Figure 2.
   B. Apply the least squares method to the GNP and consumption data in *The Economic Report of the President, 1984*.
6. Exercises on derivatives and Taylor's expansion. Reproduce the tables and figures in Hsiao's paper on "A New CAI Approach to Teaching Calculus."
7A. Reproduce the tables in Baras Chapter 9 (Lecture Notes #7) on macroprogramming-sorting and graphics.
   B. Complete Q2 and Q3 of the first mid-term test.
8. Reproduce Baras, Chapter 10, on macroprogramming - forms-oriented database management.
9A. Set up matrix multiplication macros (Lecture Notes Part III in Kinko) and try the macros on any two 5x5 matrices.
   B. Set up matrix inversion macros (Lecture Notes Part III in Kinko) and try the macros on any 5x5 nonsingular matrix.
10. Set up the consolidated input-output table as in Lecture Notes #13 (Determination of Equilibrium Output).
11. Exercise on indirect methods of matrix inversion applied to the technology matrix.
12. The price effects in Input-Output Analysis.
13A. On Ruritinian Input-Output Table ______ Exercises in the power series Expansion of the technology matrix and multiplier analysis.
   B. Complete Q2 of the second mid-term test.
14. Exercise on forecasting the input coefficients - the RAS method.
ECON. 483/583

Notes:
1. Test dates are firm. Please prepare long before the text.
2. If you are going to miss, or have missed, the test, hand in a written statement to the instructor. Otherwise, ZERO POINT will be given to the test at the end of the semester.
3. Homework - handed in on time:
   - late before grading: 10 points
   - late after grading: 7 points
4. 20% of total homework grades will be added to the total grades.
5. PLEASE COME IN AND TALK WITH YOUR INSTRUCTOR ABOUT ANY PROBLEM RELATED TO THE COURSE. ESPECIALLY, IF YOU HAVE WORKED HARD, LET THE INSTRUCTOR KNOW.

Office: Econ. 103
Office Hours:
TTH 11:00-12:30 (or immediately after the class)
F 11:00-1:00
Office Telephone: 492-7908

Some References:

Part I. Microcomputers and Lotus 1-2-3


Part II. Input-Output Analysis
Bulmer-Thomas, V., Input-Output Analysis in Developing Countries: Sources, Methods and Applications, Wiley, 1982.

Part III. Calculus

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