

## **ECON 280: Computation**

Instructors: Julian Betts and Yixiao Sun  
Department of Economics, UCSD  
Spring 2005

### **Course Description**

The first half of the course will be dedicated to the basics of three software packages: SAS, STATA and Matlab. SAS is arguably the best program available for cleaning and merging messy data, although STATA and Matlab also are quite good at this. Whereas SAS and STATA are useful for carrying out standard data-analysis procedures, Matlab provides the power to carry out non-standard procedures without having to rely on other people's computer programs. (SAS and STATA have this capability as well but Matlab has advantages in terms of ease of programming and in particular, speed.) The second half of the course will be dedicated to numerical methods to solve a nonlinear equation and to optimize a nonlinear objective function. If time permits, the course will also introduces simulation-based econometric methods.

### **Tentative Schedule**

- Overview of the statistical packages and computing environment, by Julian Betts, Yixiao Sun and Chris Reicher, 0.25 week
- Introduction to SAS, by Julian Betts, 2.25 weeks
- STATA: A Primer, by Julian Betts, 1.25 weeks
- Costs and Benefits of writing econometric code to run at the San Diego Super Computer Center at UCSD – Guest lecture by Giuseppe Ragusa, 0.25 week
- MATLAB Guide, by Yixiao Sun, 1.5 weeks
- Numerical Methods, by Yixiao Sun, 2 weeks
- Simulation-based Econometric Methods, by Yixiao Sun, 2.5 weeks

### **General References: SAS**

- Professor Betts will hand out extensive notes on SAS. In addition, SAS has extensive online help. Among the most useful SAS books for economists is:

Learning and Practicing Econometrics, SAS Handbook  
William E. Griffiths, R. Carter Hill, George G. Judge, Wiley, 1993, ISBN: 0-471-58553-X  
Paperback, 408 pages. (US \$41.95) A copy is available in the lab. This book is very useful because it shows how to program virtually all the econometric estimators in the Judge et al text.

### **General References: STATA**

- Hamilton: Statistics with STATA 8
- STATA Cross-Sectional Time Series Reference Manual, Release 8.
- STATA User's Guide, Release 8.

### **General References: MATLAB**

- Moler, C.B.(2004) *Numerical Computing with MATLAB*. Free on-line text available at <http://www.mathworks.com/moler/> A hard copy of this text is also available from Amazon. Moler is the Chairman and Chief Scientist of the MathWorks, which produces Matlab. He is the original author of Matlab and knows what he is talking about.
- Duane Hanselman and Bruce Littlefield (2004), *Mastering MATLAB 7*. This book covers all essential aspects of MATLAB. More book information is available at <http://www.eece.maine.edu/mm/mm7.html>

### **General References: Numerical Methods**

- Press, et al, *Numerical Recipes* Chapters 9 – 10, available on line at <http://lib-www.lanl.gov/numerical/bookcpdf.html>
- Judd, K. (1998) *Numerical Methods in Economics*, MIT Press.
- M. Miranda and P.L. Fackler (2002) *Applied Computational Economics*, MIT Press.

### **General References: Simulation-based Econometric Methods**

- Stern, S., (1997) “Simulation Based Estimation,” *Journal of Economic Literature*, 35: 2006-2039.
- Train, K., (2002), *Discrete Choice Methods with Simulation*, Cambridge, MA: Cambridge University Press, Ch. 10.

### **Grading Policy:**

Grades will be based on group assignments. There will be four such assignments during the quarter. Each student must do all of these assignments with a passing grade to pass the course.

**Office Hours: Julian Betts:** Monday 2-3:30 PM (Weeks 1-4). **Yixiao Sun:** Thursday 9:00 am-11:00am