Syllabus

The goal of the course is to provide a set of tools used in modern macroeconomic analysis. The representative agent model studied in the first and second quarters will be extended to include stochastic shocks, heterogeneity and market incompleteness. These extensions are now standard in the analysis of business cycles and income distribution, among other issues. Unfortunately, the degree of complexity of these models require most of the time to simulate the results numerically, instead of relying on analytical solutions.

Considering this, for each class of model the course will include: (i) a review of the relevant theory, with emphasis on the mathematical language and the main results; (ii) a description of the computational methods used to solve the models numerically; and (iii) an application to a subset of economic problems. Students will be required to learn a programming language (Matlab or Fortran).

Program
1. Review of the Representative Agent model
   • Competitive equilibrium and social planner’s problem
   • Sequence of markets and Arrow Debreu representations
     COMP: Newton-Raphson and Gauss-Seidel algorithms
   • Recursive competitive equilibrium and dynamic programming
     COMP: Value function iteration
   • Application: Welfare costs of distortionary taxation
2. The Representative Agent model with stochastic shocks
   • Stochastic competitive equilibrium
   • Stochastic dynamic programming
     COMP: Solving the stochastic model using value function iteration
   • The Linear-Quadratic Model and the certainty equivalence principle
     COMP: Solving the stochastic model using an LQ approximation
   • Application: Real and monetary business cycles
3. Introduction to models with heterogeneous agents
   • Competitive equilibrium and Pareto frontier
   • Stationary equilibrium and stationary distributions
   • Idiosyncratic shocks, risk sharing and market incompleteness
   • Application: Precautionary savings
Evaluation

The evaluation of this course will consist in: a midterm exam (covering topics 1 and 2), a final exam (covering all the course), three theory problem sets and a final computational project. The weight of each in the final grade will be:

- problem sets: 15%
- midterm exam: 25%
- final exam: 50%
- final project: 10%

The problem sets will be graded in a 0-1 basis (1 if reasonably well done, 0 otherwise). Solutions will be provided after each deadline. The final project is mandatory; i.e., not turning it will imply an incomplete and, eventually, an F.

Reading List


Additional Information:

A web page is available for the course. The address is:
http://www.eco.uc3m.es/~currutia/macro3.html

I will publish in this page the transparencies (in PDF format), the problem sets with the corresponding solutions (also in PDF format), and some programs (in Matlab). I might also include links to useful sites.