

## **ECON622 MACROECONOMICS II**

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TA :

### **Course Objectives:**

This course is devoted to studying economies where agents are heterogeneous. These models are helpful to analyze a wide range of questions pertaining to business cycles, income distribution, asset pricing, consumption insurance, labor supply, the aggregate and redistributive effects of policies, etc. We will start with some "aggregation theorems" to show that in some cases a representative agent still exists. Next, we will move towards economies with "incomplete markets" where agents can only borrow and save through a risk-free bond. We begin by characterizing in detail the individual problem. Next, we proceed to the description of the stationary equilibrium. Then, we study an incomplete-markets model with aggregate shocks. The second set of classes are devoted to extend the economies into continuous time model. The last set of classes will introduce economies with heterogeneous firms.

The aim of this course is to learn: 1) this important class of heterogeneous agents model, and 2) how to solve numerically for the equilibrium of these economies, a necessary step to use these models for quantitative research.

### **Useful Materials:**

Books:

1. Recursive Macroeconomic Theory, by Lars Ljungqvist and Tom Sargent
2. Recursive Methods in Economic Dynamics, by Stokey, Lucas
3. Applied computational economics and finance, by Miranda and Fackler

Software:

At least one software is required in this class: Matlab, Fortran and Python. I suggest the beginner should start with Matlab but NEED to learn fortran or Python at the end.

Websites that are useful to learn those Software are:

Matlab: Compecon toolbox for matlab,

<http://www4.ncsu.edu/~pfackler/compecon/toolbox.html>

Fortran: Introduction to computational economics using fortran,  
<http://fabian-kindermann.de/compecon/>

Python: Quantitative economics, <http://quant-econ.net/index.html>

**Assessment & Evaluation:**

Class participation	40%
Final exam	60%

We have one homework per week. Solutions are provided directly. No need to hand in.

**Course Schedule**

\*\*\*\*\* I Complete market \*\*\*\*\*

Lecture 1: Review the RA neoclassical growth model  
HW 1

Lecture 2: Heterogeneous agents in the complete market

\*\*\*\*\* II Single agent problem in an incomplete market \*\*\*\*\*

Lecture 3 : A single agent model under incomplete market: risk sharing and precautionary saving  
HW 2

Lecture 4: Numerical methods: Solving a single agent problem

Lecture 5: Coding: Solve a single agent problem (TA session)

\*\*\*\*\* III Stationary equilibrium in an incomplete market \*\*\*\*\*

Lecture 6: Aiyagari model  
HW 3

Lecture 7: A break for you to digest. I will provide you the code to solve Aiyagari model

Lecture 8: More on Aiyagari model

\*\*\*\*\* IV Extensions of heterogeneous agents model \*\*\*\*\*

Lecture 9: Transitional Dynamics and Krusell-Smith model  
HW4

Lecture 10: Life-cycle model

Lecture 11: Firm dynamics