Advanced Macroeconomics I (20.851)

Degree/study: ADE/ECO
Course: Third and fourth year
Term: Second
Number of ECTS credits: 5
Hours of student's dedication: 125
Language or languages of instruction: English
Professor: Andrea Caggese (andrea.caggese@upf.edu – office 20.220. Office hour: Monday 17:00-18:00)

1. Presentation of the subject.

The course focuses on models of medium and long run macroeconomic dynamics and their empirical implications.

2. Competences to be attained

General Competences

1. To read, understand and interpret academic texts in English an appropriate and reasoned manner.
2. To be able to justify positions with consistent arguments, as well as to defend them publically.
3. To be able to communicate proficiently, both orally and in writing, in English, to expert and non-expert audiences.
4. To be able to work in teams, actively participating in tasks and negotiating until reaching a consensus.
5. To develop the capacity to reason critically about controversial subjects.

Specific competences

1. To develop the capability to solve and analyze basic dynamic economic models.
2. To apply these models to understand the dynamics of the evolution of economies over time and their empirical implications.
3. To improve the ability to search information independently on key macroeconomic variables, to organize them and to relate them to the theories studied.

3. Contents

The structure of the course is based on the following four themes:

I.   The Solow Model
II. Economic Growth with Endogenous Savings
III. Economic Growth with Human Capital and Externalities
IV. R&D and Economic Growth

Detailed Outline

I. THE SOLOW MODEL

A. WHY THE SOLOW MODEL?

1. Focus on the accumulation of physical capital

2. Capital accumulation and savings alone cannot explain long-run growth

3. A dynamic general equilibrium model

4. Still, many things are left out of the Solow model

B. STATIC AND DYNAMIC GENERAL EQUILIBRIUM MODELS

1. A GE model is simply a model of the economy as a whole

2. Static GE models

3. Capital

4. The snapshot of an economy with capital as a production factor

5. From the static to the dynamic model

C. THE SOLOW MODEL AT A MOMENT IN TIME

1. A model of output and factor prices given factor stocks

    1. Preferences

    2. Production (constant returns, decreasing returns, and Inada; labor-augmenting technological progress)

    3. Market structure and equilibrium

2. The static equilibrium

    1. Labor market

    2. Rental market for capital

3. Summarizing the static equilibrium

D. SAVINGS, INVESTMENT AND THE CREDIT MARKET EQUILIBRIUM--OR FROM THE RENTAL PRICE OF CAPITAL TO THE REAL INTEREST RATE

3. Convergence

    1. Definition and mechanisms

    2. Was there convergence among today's rich countries?

    3. Convergence among regions

    4. Convergence world-wide after WW-II

    1. Cross-country convergence in the Solow model

    2. Conditional convergence

    5. Forecasting growth of the BRICS

        1. The who?

        2. Forecasts

II.   ECONOMIC GROWTH WITH ENDOGENOUS SAVINGS

A.   HOUSEHOLD SAVINGS BEHAVIOR

1. Keynesian theory

    1.   The Keynesian consumption function

    2.   Conceptual and empirical limitations

2. Permanent income theory

    1.   Basic idea and two-period model

    2.   Closed form solution in a simple case

    3.   3 and more periods

3. Optimal consumption and (savings) in continuous time

    1.   Finite horizon decision problem in continuous time

    2.   Intertemporal budget constraint

    3.   Rate of time preference (time discount rate)

    4.   First-order condition (optimality between adjacent points in time)

III.   ECONOMIC GROWTH WITH HUMAN CAPITAL AND EXTERNALITIES

A.   THE IMPORTANCE OF THE ROLE PLAYED BY CAPITAL IN PRODUCTION

1.   Decreasing returns to capital

2.   Convergence

3.   The effect of savings on long run income

B.   A SIMPLE MODEL OF ENDOGENOUS GROWTH

1.   The AK model

2.   The AK model and capital income shares

C.   EXTERNALITIES AND ENDOGENOUS GROWTH

1.   Capital income shares and the effect of capital on output

2.   Rivalry, excludability, and externalities

3.   Aggregate implications of capital externalities

D.   HUMAN CAPITAL AND ENDOGENOUS GROWTH

1.   Human capital and "broad capital"

   1. Similarities with physical capital

   2. Important differences

2.   Human capital externalities

   1. Empirical applications (externalities in cities; aggregate and individual return to human capital)

3.   Human capital and technological progress

IV.   RESEARCH&DEVELOPMENT AND ECONOMIC GROWTH

A.   A FRAMEWORK FOR ANALYZING GROWTH WITH RESEARCH AND DEVELOPMENT

1. Framework

2. The "Idea production function"

B.   THE CASE WITHOUT CAPITAL

1. Equilibrium dynamics

2. The balanced growth path and stability

C.   THE CASE WITH CAPITAL

1. Framework

2. Capital accumulation

3. Equilibrium dynamics and balanced growth paths

D.   APPLICATION: IDEAS AND POPULATION GROWTH

1. Population growth since 1 Million B.C

2. Population growth and subsistence; The Malthusian hypothesis

3. Exogenous technological change and population growth

4. Kremer's explanation for accelerating population growth

4. Assessment

Course evaluation will be based on the following criteria.

1. Continuous evaluation (January-March 2012):

Problem sets and seminars: 25% awarded according to the following scheme:

- **15 POINTS:** Handing in handwritten solutions before the deadline (see point 7 below). The professors of the seminars will grade the problem sets as: A: Excellent; B: Decent; C: Poor. You can work in groups but should end up writing up your own solution. If we find two students handing in two identical solutions, the two students will be penalized. **Solutions must be HANDWRITTEN. They have to be handed in the place (or places) indicated by the professor of each seminar group, before the deadline. Solutions sent by email are not allowed in any circumstance. Solutions NOT handwritten are not allowed in any circumstance.** Please be aware that I think your

chance of passing this course is almost zero if you do not try and solve the problems yourself. The grades are awarded as follows:

- o A: Excellent. This grade is given if at least 80% of the answers are correct, or if at least 40% of the answers are correct plus the student shows a good amount of effort in trying to solve all the problems.
- o B: Sufficient. This grade is given if at least 40% of the answers are correct, or if in any case the student shows a good amount of effort in trying to solve all the problems.
- o C: Insufficient. This grade is given in all other cases.

- **5 POINTS:** Active participation in the seminars (discussion of exercises and problems). IMPORTANT: STUDENTS MUST ACTIVELY PARTICIPATE TO SEMINARS IN THE SUBGROUP TO WHICH THEY ARE ASSIGNED, OTHERWISE NO POINT WILL BE AWARDED.

- **5 POINTS:** Solution of one problem at the blackboard. Students can volunteer during the seminar to solve problems at the blackboard. In case more than one student volunteers, the professor will choose randomly among those that did not do it yet. IMPORTANT: STUDENTS MUST SOLVE PROBLEMS IN THE SEMINARS IN THE SUBGROUP TO WHICH THEY ARE ASSIGNED, OTHERWISE NO POINT WILL BE AWARDED.

Final exam: 75 %.

- The final exam at the end of the quarter will cover all the contents of the course: the material presented in class, the problems discussed in seminars, and the recommended readings.

- To pass the course a minimum of 4 over 10 in the final exam is required (otherwise the grade of the final exam will also be the grade of the course, and problem sets/seminars will not be taken into account).

5. Bibliography and teaching resources

5.1. Basic bibliography

Advanced Macroeconomics, by David Romer, 4th edition (the most relevant chapters are 1-3).

5.2. Additional bibliography

Lectures on Macroeconomics, Olivier Jean Blanchard and Stanley Fischer, MIT press (1989)

Macroeconomics, Gregory Mankiw, 7th edition (2010)

5.3. Teaching resources

My lectures are based on slides, which will be made available on Moodle.

6. Methodology

The course will last 10 weeks. The professor will teach 20 classes of theory for the entire group. In addition there will be 6 seminars in smaller subgroups dedicated to deepening understanding of the class material and to discuss solutions to the problem sets assigned, with the students' active participation.

7. Activities Planning

WEEK 1	Lecture	7-Jan	
	Lecture	8-Jan	
WEEK 2	Lecture	14-Jan	
	Lecture	15-Jan	
WEEK 3	Lecture	21-Jan	
	Lecture	22-Jan	
WEEK 4	Lecture	28-Jan	Problem set 1, hand in by 29-January at 17
	Lecture	29-Jan	
	Seminars	28/1-1/2	Discuss Problem set 1
WEEK 5	Lecture	4-Feb	Problem set 2, hand in by 5-February at 17
	Lecture	5-Feb	
	Seminars	4-8-Feb	Discuss Problem set 2
WEEK 6	Lecture	11-Feb	Problem set 3, hand in by 12-Feb at 17
	Lecture	12-Feb	
	Seminars	11-15-Feb	discuss Problem set 3
WEEK 7	Lecture	18-Feb	Problem set 4, hand in by 19-Feb at 17
	Lecture	19-Feb	
	Seminars	18-22-Feb	discuss Problem set 4
WEEK 8	Lecture	25-Feb	Problem set 5, hand in by 26-Feb at 17
	Lecture	26-Feb	
	Seminars	25-1-Mar	discuss Problem set 5
WEEK 9	Lecture	4-Mar	Problem set 6, hand in by 5-Mar at 17
	Lecture	5-Mar	
	Seminars	4-8-Mar	discuss Problem set 6
WEEK 10	Lecture	11-Mar	
	Lecture	12-Mar	