

# Macroeconomics Under Climate Change I

3 ECTS

TERM 1

MANDATORY

## Professor

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Note: the syllabus is still being updated. This current version may be revised before the beginning of the class.

## Prerequisites to enroll

None.

## Overview and objectives

In this course, you will learn how the scientific evidence is being incorporated into macroeconomic models to understand the impacts of climate change and its costs. We will be learning about the models that are used to understand the impacts of climate change (the so-called integrated assessment models or IAMs), and how they are used to assess climate policy. The goal of the course is for students to have both qualitative and quantitative understanding of IAMs.

## Course outline

The course has lectures and hands-on sessions. During the course, we will go over the different elements that IAMs models incorporate, and we will build one IAM ourselves. The structure of the class reflects this goal. Each week we are going to study a particular element that goes into the macroeconomic model.

- Week 1 (9/21, 2 hours): course overview, the natural science part.
- Week 2 (10/11 & 10/14, 4 hours): the natural science part, practicum I.
- Week 3 (10/19, 2 hours): growth theory and empirics.
- Week 4 (10/26, 2 hours): externalities in public economics.
- Week 5 (11/9, 4 hours): natural resources, practicum II.
- Week 6 (11/23, 2 hours): endogenous technical change.
- Week 7 (11/30, 4 hours): measuring damages, building the IAM.

## Required activities

Class attendance, participation in the practical classes where we will work simulating models. Handing-in required assignments.

## Evaluation

Two homework assignments (that can be done in groups): 45%.

A final, multiple-choice test: 45%.

Class participation: 10%.

## Materials

We will follow Hassler, Krusell and Olvson book on "Climate and the Economy." In the course Classroom site, I will add specific, additional references for each topic.

## Competencies

- ☒ To (be able to) communicate with determination and in the English Language, the results and implications of the required analytical study using a language that the receiver can relate to.
- ☒ To work within a heterogeneous team of researchers as economic analyst using specific group techniques.
- ☒ To fit in diverse professional environments and varied types of collaborations in different professional projects.
- ☒ To possess and understand the knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.
- ☒ That students know how to apply the acquired knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study
- ☐ That the students be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, include reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
- ☒ That the students be able to communicate their conclusions and the knowledge and the ultimate reasons that sustain them to both, specialized and non-specialized publics in a clear and unambiguous way.
- ☒ That students possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
- ☒ To identify and apply the insights of the theory, the models, and the analytical tools of modern economy to its global dimension

- ☒ To understand and apply the quantitative methods used to solve complex problems of the economy.
- ☒ To evaluate, with theoretical and quantitative instruments, the complex realities of the economy to understand the way it works.
- ☒ To design the appropriate strategy to solve complex problems related to the economy.

### **Learning outcomes**

- ☒ Uses and rigorously applies the economic theory of the design and evaluation of public policies.
- ☒ Uses and applies the empirical tools of economic analysis to evaluate public policies.
- ☐ Identifies the institutional frameworks in which public policies are designed and implemented.
- ☐ Uses and applies econometric techniques for an applied analysis of financial market policies.
- ☒ Uses and applies the methods of numerical calculation and simulation techniques for macroeconomic problems and financial policy evaluation design.
- ☒ Empirically describes relevant phenomena from the macroeconomic point of view.
- ☒ Uses and rigorously applies economic theory, economic concepts and models to understand decision-making and the consequences of the energy transition in the short and long term and the analysis and monitoring of sustainability objectives.

- Applies empirical statistical and analytical tools to evaluate the costs and benefits of alternative energies and environmental regulation.
- Identify the institutional frameworks in which decisions for the energy transition are designed and implemented and learn how energy markets work and how they are organized and what are the opportunities and challenges of the energy transition.
- Identify the different specific fields of economics.
- Uses the theory, practice, fundamentals and applications of economic policies.