

Economics of Climate Change

UGRA_016574

Departments	Department of Economics, Finance & Accounting
Teaching Languages	English
ECTS	4
Teacher responsible	Omar Rachedi - omar.rachedi@esade.edu

Course Goals

This course introduces students to the economic analysis of climate change and equips them with the tools to evaluate climate-related public policies. Students will explore externalities, intergenerational equity, energy technologies, and carbon pricing mechanisms. Emphasis is placed on modeling, cost-benefit analysis, and real-world data analysis in R. By the end of the course, students will be able to critically assess the economic rationale, efficiency, and distributional impact of various decarbonization strategies.

Previous knowledge

Students should be comfortable with basic microeconomic principles, particularly market equilibrium, externalities, and public goods. Basic familiarity with calculus and economic modeling is recommended. No prior knowledge of climate science is assumed, though it is welcome

Prerequisites

Microeconomics/Macroeconomics
Introductory Econometrics or Statistics
Some prior experience with data analysis in R or another programming language is helpful but not required.

Teaching methodology

The course combines lectures on the economics of climate change with hands-on applications in R. Each session includes a data-based exercise designed to develop technical skills in modeling emissions, pricing carbon, simulating technology adoption, and analyzing policy instruments. The course culminates in a group final project where students assess the economic impact of a real-world climate policy. Class time emphasizes discussion, coding, and active application of concepts.

Description

Course contribution to

This course contributes to the program by equipping students with the ability to analyze one of the most urgent global challenges—climate change—through a rigorous economic lens. It strengthens their understanding of market failures, public policy design, and dynamic technological change in the

program

context of the energy transition. The course fosters advanced quantitative and analytical skills through modeling exercises and real-world data work in R, preparing students for roles in policy analysis, consulting, energy markets, and sustainable finance. It also develops critical thinking on the political economy and distributional aspects of climate action, enhancing the broader program's focus on responsible leadership and sustainable business.

Short description

This course explores the economics of climate change and decarbonization policy. It covers externalities, carbon pricing, energy technologies, cost-benefit analysis, and international climate agreements. Students apply economic modeling and data visualization techniques in R to assess climate policies and simulate key dynamics of the energy transition. The course combines theoretical foundations with hands-on analysis and culminates in a group policy evaluation project.

Activities

Group presentations

Final Group Project — students work in teams to conduct an economic evaluation of a low-carbon technology subsidy. The project requires both modeling and written policy analysis. It fosters teamwork and applied problem-solving.

Content

#	Topic
1	Climate Change as an Economic Problem Externalities, market failures, and public goods in the context of climate change. Economic rationale for intervention. Visualizing historical emissions trends and global temperature data.
2	Economic Modeling of Climate Risk Discounting future impacts, damage functions, and intergenerational ethics. Simulating present value of climate damages under different discount rates.
3	Industrial Technologies in the Energy Transition Cost structures and scalability of nuclear, hydrogen, renewables, batteries, and carbon capture. Comparing levelized cost of energy (LCOE) and capital costs across technologies.
4	Public Policy Instruments for Decarbonization Design and evaluation of carbon taxes, subsidies, feed-in tariffs, and performance standards. Modeling technology adoption in response to policy incentives.
5	Cost-Benefit Analysis for Climate Policy Applying cost-benefit analysis to climate interventions. Measuring costs, benefits, opportunity costs, and applying discounting. Building a basic CBA model for policy evaluation
6	Electricity Markets and Grid Integration Market design for variable renewable energy. Peak pricing, storage value, intermittency, and merit order effects. Simulating storage value in power markets.
7	Emissions, Abatement, and Carbon Valuation Marginal abatement cost curves, social cost of carbon, and emissions baselines. Estimating avoided emissions and visualizing abatement pathways.

#	Topic
8	International Climate Cooperation Paris Agreement, carbon clubs, border carbon adjustments (CBAM), and carbon leakage. Comparing CO intensities of trade and mapping climate policy exposure.
9	Distributional and Political Economy Aspects Who wins and loses from climate policies? Equity, resistance to carbon pricing, and the political economy of decarbonization. Visualizing the distributional impact of climate policies across income groups.
10	Innovation and Dynamic Policy Impacts Technology learning curves, innovation spillovers, and dynamic efficiency. Simulating cost reduction and innovation diffusion under different subsidy levels.

Assessment

Tool	Assessment tool	Category	Weight %
Written and/or oral exams	Final Exam	Ordinary round	50.00%
Group project		Ordinary round	40.00%
Participation in program activities	Class Active Participation	Ordinary round	10.00%
Written and/or oral exams		Retake	100.00%

PROGRAMS

BBA23-Bachelor of Business Administration (BBA) (Undergraduates: Business)

BBA23 Year 4 (Optative)

BBA23 Year 2 (Optative)

BBA23 Year 3 (Optative)

BBA23 Year 1 (Optative)

BBA25-Bachelor of Business Administration (BBA) (Undergraduates: Business)

BBA25 Year 3 (Optative)

BBA25 Year 1 (Optative)

BBA25 Year 2 (Optative)

DBAI23-Double Degree in Business Administration and Artificial Intelligence for Business (Undergraduates: Business)

DBAI23 Year 2 (Optative)

DBAI23 Year 3 (Optative)

DBAI23 Year 1 (Optative)

DBAI23 Year 4 (Optative)

DBAI25-Double Degree in Business Administration and Business and Artificial Intelligence (Undergraduates: Business)

DBAI25 Year 4 (Optative)

DBAI25 Year 2 (Optative)

DBAI25 Year 3 (Optative)

G114S-Global Governance Exchange Program (Undergraduates: Law)

G114S Year 1 (Mandatory)

GBD20-Double Degree in Business Administration and Law (Undergraduates: Law)

GBD20 Year 1 (Mandatory)

GBD23-Double Degree in Business Administration and Law (Undergraduates: Law)

GBD23 Year 4 (Mandatory)

GBD23 Year 1 (Mandatory)

GDL20-Double Degree in Law and Global Governance, Economics and Legal Order (Undergraduates: Law)

GDL20 Year 3 (Optative)

GDL20 Year 4 (Optative)

GDL20 Year 1 (Optative)

GDL23-Double Degree in Law and Global Governance, Economics and Legal Order (Undergraduates: Law)

GDL23 Year 1 (Optative)

GDL23 Year 3 (Optative)

GDL23 Year 4 (Optative)

GEL19-Bachelor in Global Governance, Economics and Legal Order (Undergraduates: Law)

GEL19 Year 3 (Optative)

GEL19 Year 4 (Optative)

GEL19 Year 1 (Optative)

GEL23-Bachelor in Global Governance, Economics and Legal Order (Undergraduates: Law)

GEL23 Year 1 (Optative)

GEL23 Year 3 (Optative)

GEL23 Year 4 (Optative)