UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

# Environmental and Energy Economics

**2526-1-F7503Q005**

## Aims

Environmental and energy economics enriches scientific education by providing tools to address environmental problems in a more comprehensive, concrete, and action-oriented way. It is a key component in becoming more effective and influential professionals in the field of sustainability.
In this regard, the aim of the course is to provide students with economic knowledge and skills that enable them to understand the relationship between the economy and the environment, as well as the functioning of the main energy markets.
Environmental economics helps assess the true costs of pollution, biodiversity loss, and climate change—costs that are often not reflected in market prices (negative externalities). This allows for the promotion of more sustainable management of natural resources and the development of solutions based on economic instruments (e.g., environmental taxes, emission permits, "green" subsidies). Understanding these aspects can contribute to the design of effective environmental policies through cost-benefit analysis of different options, such as: renewable energy vs. fossil fuels, protection of natural areas, and investments in clean technologies.

Energy economics is crucial for understanding: the functioning of energy markets, the environmental impacts of different energy mixes, and the dynamics behind the energy transition (renewables, efficiency, decarbonization).
Economic knowledge supports the integration of environmental, economic, and social dimensions, offering a comprehensive view of sustainable development, which is at the heart of the 2030 Agenda goals.

Learning the main methodologies for environmental valuation and damage control is aimed at enabling students to critically understand and analyze, also with a proactive mindset, the evolving energy and environmental policies at both national and international levels, developing independent judgment and specific communication skills.

Students will be expected to learn how to analyze key data sources and target indicators of energy and environmental policies.

## Contents

The course consists of two fundamental parts: the first one focuses on energy economics, starting from the theory of exhaustible resources (based on the marginalistic and neoclassical economic theory), with special reference to the main determinants of energy demand, to the stock sources price formation, to the difference between reserves and resources, as well as to the fundamental national and international energy policy issues.

According to the latter issue, the recent energy markets liberalization process, its outcomes and constraints will be analysed, together with the main initiatives aimed at promoting energy efficiency and an increasing recourse to renewable energy sources.

Features and functioning of power, oil and gas markets, will be highlighted, paying particular attention to access pricing models to energy transport and distribution essential facilities.

The second part of the course will be devoted to the main issues of environmental economics with reference to the basic concepts of externalities, market failures, public goods and sustainable development. Particular emphasis will be devoted to the evaluation methods of environmental assets, on Cost Benefit Analysis (CBA) and on the different tools available to the policymaker for solving ecological problems through the markets.

## Detailed program

Introduction and methods

1. The current energy context
2. Microeconomics (consumer, firm and markets)
3. Market failures and interventions (externalities, public goods, natural monopoly)
4. Investment and profitability

Resource economics

1. Reserves and resources
2. Renewable and non-renewable sources
3. Pricing of the stock energy sources

Energy Economics

1. Oil market
2. Gas market
3. Electricity market platforms

Environmental economics

1. Economics and the environment
2. Sustainable development
3. Kyoto protocol and climate change
4. Environmental markets and taxation
5. Economic valuation of environmental goods

## Prerequisites

None

## Teaching form

24 two-hour lectures, in person, Delivered Didactics, (6 CFU)
8 two-hour e-learning lectures, Delivered Didactics (2 CFU)

## Textbook and teaching resource

References:

Energy economics: P. Zweifel, A. Praktiknjo, G. Erdmann, Energy Economics. Theory and Applications, Springer, 2017.

Environmental economics: R.K. Turner, D.W. Pearce, I. Bateman, Economia ambientale, Il Mulino, 2003.

Supplementary online material will be provided on the e-learning platform

## Semester

Second term

## Assessment method

The exam will be in viva form as an interview on the topics covered. The interview aims at uderstanding the student's ability to deal with economic principles, in general and applied to environmental and energy markets.

The knowledge required to sustain the test are represented by those acquired during the course and based on the teaching material provided.

Students may submit a written essay on a topic analyzed during classes based on new research material.

The assessment will be based on the completeness of the preparation, on the degree of understanding of the analyzed issues and of their relationships, on the ability to grasp, through the offered theoretical framework, the main concrete issues and dynamics underway on the markets, currently subject of international scientific debate. Adequate weight will also be given to the candidate's language skills and exhibition capacity.

## Office hours

Monday at 15, room 3076, building U6- 3rd floor

Online meetings can be arranged upon request.

## Sustainable Development Goals

AFFORDABLE AND CLEAN ENERGY | RESPONSIBLE CONSUMPTION AND PRODUCTION | CLIMATE ACTION