UAB
Universitat Autònoma de Barcelona

Environmental Economics

2026/2027

Code: 102472
Credits: 6

Degree programme	Type	Course
Economics	OP	3
Economics	OP	4

Contact lecturer

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Group languages

You can consult this information at the end of the document.

Prerequisites

Not having taken, nor being enrolled in, the course Economics of Natural Resources and Climate Change.

Objectives

The objective of the subject is twofold, on the one hand, to understand the basic concepts of economics that must allow us, on the other, to understand human systems as open systems for the entry of energy and materials and the exit of waste. In other words, the biophysical functioning of economies is studied, which is known as "social metabolism" and the role that natural resources have in maintaining the economic system.

The course also studies the application of economic theory to the analysis and management of natural resources. Decisions on renewable and exhaustible natural resources and on pollution can be based on the balance of monetary costs and benefits. But this approach has limitations. For this reason, the alternative of multi-criteria evaluation of resource management decisions is also proposed.

Learning outcomes

1. Use basic optimisation tools and the game theory, and include these elements in a theoretical model.
2. Identify the basic elements that characterise the organisation of a market.
3. Identify the consequences of the existence of information asymmetry among different economic agents on the way in which these organise themselves and on the efficiency of the relationship they establish.
4. Consider formal models which can be used to study situations with information asymmetry between the parts.
5. Solve the models formulated to obtain empirically stable predictions.
6. Analyse the operating conditions of markets and other forms of social interaction.
7. Identify the conditions and processes that generate externalities as well as the problems posed by public goods.
8. Propose the optimum design of the institutions regulating the markets and of its equipment.
9. A capacity of oral and written communication in Catalan, Spanish and English, which allows them to summarise and present the work conducted both orally and in writing.
10. Make decisions in situations of uncertainty and show an enterprising and innovative spirit.
11. Organise work, in terms of good time management and organisation and planning.
12. Demonstrate initiative and work independently when required.
13. Capacity to adapt to changing environments.

14. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
15. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
16. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
17. Students must develop the necessary learning skills in order to undertake further training with a high degree of autonomy.
18. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.

Contents

1. Introduction. The economy as an open subsystem within the biosphere

- Main economic figures and aggregates
- The income cycle and the generation of added value
- Natural resources in the economic process
- The laws of thermodynamics and their economic interpretation
- The arrow of time and evolution.

Readings: Common and Stagl 2005: 1-6, 102-105, 136-159, 362-379;Harris 2023, Martínez-Alier 2023, Puig Ventosa and Martínez Sánchez 2023, Villarraga 2023.

2. Monetary evaluation and the environment

- Ecological value and economic value
- Families of economic valuation methods
- Total economic value
- Discount rate

Readings: Common and Stagl 2005: 289-304, Harris and Roach 2017 Chapter 6.

3. Instruments of environmental economic policy

- Externalities
- Optimal level of pollution
- Internalization of externalities
- Pigou and green taxation
- Coase and the emission rights market
- Payment for environmental services

Readings: Common and Stagl 2005: 402-435, Corbera and Izquierdo-Tort 2023.

4. Cost-benefit analysis

- Economic and political democracy
- Arrow's impossibility theorem
- Kaldor-Hicks compensation criterion
- Relationship between efficiency and equity
- Risk, uncertainty and irreversibility

Readings: Munda 1996, Harris and Roach 2017 Chapter 7.

5. Multi-criteria evaluation

- Methodological foundations (substantive and procedural rationality, complexity and post-normal science).
- Structuring of a multi-criteria problem (alternatives and criteria, weighting of the criteria).
- Main discrete multi-criteria approaches (Utility approach, MAUT; Improvement methods; NAIADE).
- Examples

Readings: Munda 2004, Munda 2023, Funtowicz and Ravetz 2023.

6. Ownership and access to natural resources

- Typology of property rights and their relationship with the management of natural resources
- Governance of the Commons: Theory and Examples. Hardin's Tragedy of the Commons
- Processes of access and exclusion to natural resources
- Examples: global commons (sea and atmosphere), biopiracy, land-grabbing

Readings: Harris and Roach 2017 Chapter 4.

7. Analysis of non-renewable resources

- Resource base and reserves
- The Hubbert curve

- Hotelling's rule: optimal resource extraction path
- Backstop technologies
- The rule of El Serafy
- EROI or energy rate of return on energy investment
- Nuclear energy, waste, time and discount

Readings: Harris and Roach 2017 Chapter 5, Harris and Roach 2017 Chapter 17, Espinoza et al., 2019, Melgar and Hall 2023, Kerschner 2023.

8. Analysis of renewable resources

- Sustainable performance. Biological vs economic models
- Forest economics: technical forestry shift; Faustmann's rule; forest environmental services
- Fisheries economics: biological model and economic model

Readings: Harris and Roach 2017 Chapter 18, Harris and Roach 2017 Chapter 19.

9. Trade and environment

- Determinants of trade: absolute and relative advantages
- Governance of international trade (WTO)
- Environmental implications of international trade
- Unequal exchange, unequal ecological exchange, and unequal caloric exchange

Readings: Common and Stagl 2005: 445-481, Falconí et al., 2017, Ramos-Martin et al., 2017, Pérez-Rincón 2023.

10. Economics and governance of biodiversity

- The timeline of biodiversity governance: from the Convention on Biological Diversity (1992) to the Nagoya Protocol (2010)
- The generation of value from biodiversity (appropriation mechanisms)
- Nagoya Protocol and the Multilateral System of Access to Genetic Resources
- Fair and equitable distribution derived from access to genetic resources: monetary and non-monetary benefits

Readings: Common and Stagl 2005: 521-539, Níjar 2011.

11. Economics and governance of climate change

- Greenhouse effect and global warming
- Climate change governance (UNFCCC and IPCC)
- Kyoto Protocol, Paris Agreement, National Communications and NDC
- Compliance mechanisms: emissions markets, clean development mechanism, joint implementation.

Readings: Common and Stagl 2005: 482-517,Falconí et al., 2019.

12. Analysis of the metabolism of societies

- Endosomatic and exosomatic energy consumption
- Exosomatic evolution of societies (Peak of oil)
- Material Flow Analysis
- Energy analysis, energy accounting, eMergy, exergy
- Multiscale Analysis of the Metabolism of Societies (MuSIASEM)

Readings: Giampietro 2023a, Giampietro 2023b, Giampietro 2023c, Velasco-Fernández et al. 2015, Krausmann 2023.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Tutorials and follow-up of the work to be carried out	7.5	0.3	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Search for information	17	0.68	12
Lecture	32.5	1.3	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Reading and studying theory	70	2.8	2, 3, 5, 6, 9, 11
Practical sessions: Development of group work, presentation and discussion in class	17	0.68	5, 6, 9, 10, 11, 12

1. Master class and guided debates

The teacher will perform an analytical conceptualization and an updated synthesis of each of the study topics shown in the teaching units. The aim of this activity is to facilitate the transmission of knowledge and motivation for the analysis of the relationship between human activity and the environment, which are focused in order to promote active and cooperative learning.

2. Practical sessions

The practical sessions will consist of presentations and the semi-structured discussion that defines the group. This activity will also serve to relate the fundamental concepts of the subject and give proposals for resolving conflicts both from the perspective of Environmental Economics and from the perspective of Ecological Economics.

3. Tutorials

The learning process and acquisition of skills will be supervised by the teacher through individual and / or group tutorials. The teacher will be available to students to resolve doubts and follow the evolution of the aforementioned process of learning and acquisition of skills of students.

4. Virtual Campus of the subject

Inface-to-face teaching, the Virtual Campus is a useful tool, so that students have a complementary space where they can access different types of materials that the teacher considers basic to advance in the learning process of the subject. To access it, all you have to do is go to the UAB website and there you will find the link, or directly to the website of the virtual campus (https://cv.uab.cat/portada/ca/).

5. Use of AI

Model 2 - Restricted Use: For this subject, the use of Artificial Intelligence (AI) technologies is permitted exclusively in bibliographic searches and correction of texts or translations. The student must identify which parts have been generated using this technology, specify the tools employed, and include a critical reflection on how these tools have influenced the process and the final result of the activity. The lack of transparency in the use of AI in this assessable activity will be considered a breach of academic honesty. It may result in a partial or total penalty for the activity, or more severe sanctions in serious cases.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Final Essay	30	2	0.08	5, 6, 7, 8, 9, 10, 14
First partial exam	35	2	0.08	1, 2, 3, 4, 12, 13, 17, 18
Second partial exam	35	2	0.08	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16

The completion of assessment activities is subject to the provisions set out in this course guide and in the " Policy of the School of Economics and Business on the Detection of Irregularities during Assessment Activities ", which regulates the conditions under which assessment tasks are conducted and the procedures applicable in cases where indications of irregularities are detected. Students are encouraged to consult the policy.

CONTINUOUS EVALUATION

The evaluation of the subject will be based on a continuous evaluation of the process of acquisition of knowledge and skills by the student and will consist of:

- 2 partial knowledge exams that may combine multiple choice and thematic questions and that will count for 35% of the final grade each.

- A final essay, which will count for 30% of the final grade.

Students who do not submit one of the assignments, and/or do not attend one of the partial exams will have a final grade of \"NOT ASSESSABLE\"

Students may request a review of their final grade at the session established for this purpose, and communicated together with their final grades.

COMPREHENSIVE EVALUATION

By requesting the comprehensive evaluation the student waives the option of continuous evaluation.

The comprehensive evaluation must be requested at the Academic Management (Gestió acadèmica) of the Campus where the degree/master's degree is taught. The request must be filed according to the procedure and the deadline established by the administrative calendar of the Faculty of Economics and Business.

- *Student attendance is mandatory on the day of the comprehensive assessment. The date will be the same as that of the final exam of the semester as per the evaluation calendar published by the Faculty of Economics and Business and approved by the Faculty's Teaching and Academic Affairs Committee. The duration of the comprehensive assessment must be specified in the characteristics of such activity.*
- *100% of the evaluation evidences must be handed in by the student on the day of the comprhensive assessment.*
- *The evaluation evidences carried out in person by the student on the same day of the comprehensive assessment must have a minimum weight of 70%.*

Evidence Type	*Weight in the final assessment (%)*	*Duration of the activity*	*Is the activity that corresponds to this evaluation evidence to be carried out in person on the date scheduled for the comprehensive evaluation? (YES/NO)*
Exam	*70%*	*3h*	*Yes*
Essay	*30%*		*No*
TOTAL	*100%*		

Students who do not submit the assignment, and/or do not attend the exam, will have a final grade of \"NOT ASSESSABLE\"

The review of the final grade follows the same procedure as for continuous assessment.

RESEAT

For the retake procedure, no distinction is made between students who have followed the continuous evaluation and those who have opted for the comprehensive evaluation. All will be re-assessed using the same test or evaluation evidence. Suppose students do not pass the course, either through the continuous evaluation or the comprehensive evaluation. In that case, they will have another opportunity to pass the course through the reseat exam, which will be held on the date set by the degree coordination. In this test, you can recover 70% of the grades corresponding to the theory and seminars. The written assignment will not be recoverable. If a minimum grade of 3 is achieved, this grade will be averaged with the grade obtained in the written essay, taking into account the 70% weighting for the exam and 30% for the essay.

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Software

There is no need for specific software.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through

this link. To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	8	English	first semester	morning-mixed
(PAUL) Classroom practices	8	English	first semester	morning-mixed