Universitat Autònoma de Barcelona

2021/2022

Economics of Natural Resources and Climate Change

Code: 104653
ECTS Credits: 6

Degree	Type	Year	Semester
2501573 Economics	OT	3	2
2501573 Economics	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

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Use of Languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: Yes

Prerequisites

They have not been established. The contents are complementary to the subject Economics of the Environment.

Objectives and Contextualisation

The objective of the subject is twofold, on the one hand, to understand the basic concepts of economics that have to 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.

Competences

Economics

- Analyse quantitative and qualitative information referring to economic phenomena and variables.
- Capacity for adapting to changing environments.
- Identify the environmental and social impacts associated with economic activity.
- Lead multidisciplinary and multicultural teams, implementing new projects and coordinating, negotiating and managing conflicts.
- Organise the work in terms of good time management, organisation and planning.
- Select and generate the information necessary for each problem, analyse it and take decisions based on that information.

Learning Outcomes

1. 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.
2. Analyse the different interpretations and solutions considered to deal with the problems associated with the sustainability of economic systems, from different theoretical perspectives.
3. Apply the main methods to assess projects.
4. Capacity to adapt to changing environments.
5. Create transverse and longitudinal tables of demographic behaviour and other social phenomena, and interpret the main synthetic indicators used.
6. Examine some of the consequences of demographic fluctuations and the changes in the age structure on the labour market and the structure of the demand of goods and services.
7. Identify the energy and food changes that have taken place during the contemporary economic growth.
8. Identify the main current environmental problems, and their relationship with population growth and the current models of economic development.
9. Know how to correctly use the analytical concepts of ecological economy, and the instruments of environmental economic policy.
10. Lead multidisciplinary and multicultural teams, implement new projects, coordinate, negotiate and manage conflicts.
11. Organise work, in terms of good time management and organisation and planning.
12. Perform an integrated analysis of the economic, demographic, social and ecological variables, on the basis of different historical experiences.
13. Recognise the effects of age, generation and momentum on demographic and social behaviour.
14. Recognised the biophysical aspects related to the economic activity.
15. Relate the international economic and ecological aspects in the different phases of contemporary economic growth.
16. Select and generate the information needed for each problem, analyse it and make decisions based on this information.
17. Understand the economic and political debates about the evolution of demographic growth and migration.
18. Use standardisation methods to isolate the effects of structure on the added indicators.

Content

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.

2. Monetary evaluation and the environment

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

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

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

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

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

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

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

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

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 derivedfrom access to genetic resources: monetary and non-monetary benefits

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.

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)

Methodology

Teaching will be offered on campus for all the group.

The proposed teaching methodology may undergo some modifications according to the restrictions imposed by the health authorities on on-campus courses.

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.

At the same time, short readings will be proposed during the course (around one every two classes), made mostly within the teaching schedule, in order to delve into certain concepts, place theories in current socio-environmental contexts, and generate a useful debate. among the attendees that allows to raise also the doubts, to apply theories and concepts and to consolidate knowledge.

2. Practical sessions

The practical sessions will consist of presentations of group work 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.

Also, during the process of elaboration of the works there will be at least a tutorial of presentation of the tasks carried out, in the middle of the process of elaboration of the work, in order to guarantee that the students take the maximum profitof the same and the subsequent discussionwith the rest of the students may be more fruitful.

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/).

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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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes and class debates	32.5	1.3	12, 4, 13, 7, 10, 11, 15
Practical sessions: Development of group work, presentation and discussion in class	17	0.68	8, 11, 15, 16
Type: Supervised			
Tutorials	15	0.6	3, 4, 1, 5, 6, 14, 16, 9, 18
Type: Autonomous			
Reading and theory study	68	2.72	2, 5, 13, 17, 6, 14, 16, 9, 18
Search for information	12.5	0.5	4, 5, 11, 16, 18

Assessment

The proposed evaluation activities may undergo some changes according to the restrictions imposed by the health authorities on on-campus courses.

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

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

- A final essay, which will count 30% of the final grade and may be presented in class for evaluation by the teacher and among peers.

Calendar of evaluation activities

The dates of the different assessment tests (partial exams, assignments and discussion sessions ...) will be announced well in advance during the semester.

The date of the second exam of the subject is scheduled in the calendar of evaluation of the Faculty.

"The calendar of evaluation activities may not be modified, unless there is an exceptional and duly justified reason why an assessment act cannot be carried out. In this case, the persons responsible for the qualifications, after consulting the teachers and students affected, will propose a new program within the corresponding school period. "

Section 1 of Article 115. Calendar of evaluation activities (UAB Academic Regulations)

Students of the Faculty of Economics and Business who, in accordance with the previous paragraph, need to change an evaluation date must submit the application by filling in the document Request for rescheduling the test: https://eformularis.uab.cat / group / deganat_feie / reprogramming-tests

Procedure for reviewing exams

Coinciding with the final exam will be announced the day and medium on which the final grades will be published. In the same way, the procedure, place, date and time of the revision of exams in accordance with the regulations of the University will be informed.

Second-chance Examination

"To participatein the second-chance examination students must have been previously assessed in a set of activities that represent a minimum of two-thirds of the total grade of the subject or module."

Section 3 of Article 112. Second-chance examination (UAB Academic Regulations).

Students have obtained an average grade of between 3.5 and 4.9. The date of this test will be scheduled in the calendar of examinations of the Faculty. The student who presents and passes it will pass the subject with a grade of 5. Otherwise he will keep the same grade.

Irregularities in evaluation acts

Without prejudice to other disciplinary measures deemed appropriate, and in accordance with current academic regulations, "in the event that the student commits any irregularity that may lead to a significant variation in the grade of an assessment act. , this assessment act will be graded with 0, regardless of the disciplinary process that may be instructed in it. 0 ".

Section 10 of Article 116. Results of the evaluation. (UAB Academic Regulations)

The proposed evaluation activities may undergo some changes according to the restrictions imposed by the health authorities on on-campus courses

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Final essay	30	1	0.04	12, 2, 3, 4, 1, 5, 13, 17, 6, 7, 8, 10, 11, 14, 15, 16, 9, 18
First partial exam	35	2	0.08	12, 2, 4, 7, 8, 10, 11, 15
Second partial exam	35	2	0.08	3, 4, 1, 5, 13, 17, 6, 11, 14, 16, 9, 18

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Software

There is no need for specific software.