

**Human Uses of the Earth System**

Code: 102837  
ECTS Credits: 3

Degree	Type	Year	Semester
2501915 Environmental Sciences	OB	1	2

**Contact**

Name: Jesús Ramos Martin  
Email: [jesus.ramos@uab.cat](mailto:jesus.ramos@uab.cat)

**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Teachers**

Xavier Cusso Segura  
Marc Gavalda Palacín

**Prerequisites**

They have not been established

**Objectives and Contextualisation**

Contextualization

The subject Human Earth Uses of the Earth System (UHST) belongs to the subject "Economics for the environmental sciences" of the Degree in Environmental Sciences taught by the Faculty of Sciences. This subject concentrates all the subjects of economics, that are distributed by professors of the Faculty of Economy and Company.

Specifically, UHST is part of the block of basic and compulsory basic education subjects programmed in the field of environmental sciences.

The main purpose of this first group of subjects is to provide students with the knowledge and the primary analytical and methodological tools to begin to develop cross-curricular competencies in the area of environmental science studies.

In this sense, UHST contributes essentially to the process of learning and learning of the 1st Course because it allows to examine the relationship between human systems and the Earth system. In particular, we explore the biophysical analysis of the economic process, in what use humans use the different resources and services that the Earth system offers us.

In addition, it participates in the professional training of the students given that it fosters learning in a series of general competences (among them, the ability to reason critically and improve self-employment strategies), transversal (for example, to know how to select and generate the information necessary to understand the economic dynamics of the present and its relation to the environment and the use of natural resources) and specific (to distinguish the biophysical aspects of human activity and to identify and analyze the environmental

impacts of economic activity) that will be very useful for future professionals in the analysis, conservation and management of the environment and natural resources.

### Training objectives

The objective of the subject is to help understand human systems as systems open to the entrance of energy and materials, and to the exit of waste. That is, the functioning of "social metabolism" and the role that natural resources play in the maintenance of the economic system are studied. A fundamental factor of analysis will be, therefore, the population, its evolution and the impact on the environment.

In general, he proposes developing criteria to answer questions such as 'What forms of use and appropriation of the environment are better for individuals and society and the rest of living organisms? ', 'How to take stock of economic benefits and environmental impacts? '. In short, the course seeks to show how the environmental sciences have an interdisciplinary and integrated vision of our world and integrate biophysical and socio-economic components in the environment.

At the end of the course the student will have a clearer idea of:

- The basic literature of the methods and concepts presented;
- The relationship between the economic process of human systems and the land system, as well as the different approaches used to analyze this interaction.
- The dependence of the economic system on the biophysical limits of the planet

### Competences

- Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
- Analyze and use information critically.
- Collect, analyze and represent data and observations, both qualitative and quantitative, using secure adequate classroom, field and laboratory techniques
- Demonstrate adequate knowledge and use the tools and concepts of the most relevant social science environment.
- Demonstrate concern for quality and praxis.
- Demonstrate initiative and adapt to new situations and problems.
- Teaming developing personal values regarding social skills and teamwork.
- Work autonomously

### Learning Outcomes

1. Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
2. Analyze and use information critically.
3. Analyze the political processes of environmental conservation internationally.
4. Critically analyze basic environmental science literature in Catalan, Castilian and English.
5. Demonstrate concern for quality and praxis.
6. Demonstrate initiative and adapt to new situations and problems.
7. Describe and analyze the process of change in the natural environment.
8. Distinguish the biophysical aspects (resource use and waste generation) related to the process of economic activity.
9. Identify and analyze the different instruments of environmental policy, and quantitative limits, environmental taxes or trading systems of resource use rights.
10. Identify environmental and social impacts associated with human activity.
11. Observe, recognize, analyze, measure and adequately represent economic processes applied to environmental sciences.
12. Properly use the analytical concepts of environmental science.
13. Recognizing the effects of human activity on the environment.

14. Scientifically describe the major environmental problems of today (loss of biodiversity, climate change, desertification).
15. Teaming developing personal values regarding social skills and teamwork.
16. Work autonomously

## Content

### 1. The Economy as an open system

Neoclassical Economics  
Ecological Economics

Basic reading: Martínez-Alier and Roca pp. 11-21.

### 2. Sustainable development and macroeconomic accounting

Economic growth and sustainable development

Environmental criticisms of macroeconomic accounting

Attempts to build an ecologically correct GDP

Sustainability weak and strong

Monetary and biophysical indicators of sustainability

Basic Reading: Martínez Alier y Roca Págs. 66-101; 367-388; 409-420.

Complementary readings: Azqueta 197-236; Jacobs 363-390; Carpenter 329-428.

### 3. Population and natural resources

The environmental impact of population growth

The notion of "load capacity". Is it applicable to the human being?

The endosomatic and exosomatic use of energy by humans

The dematerialization of the economy

Poverty relationship - environmental degradation

Basic Reading: Martínez Alier y Roca Págs. 388-408; 421-440.

Complementary Reading: Azqueta 337-362; Jacobs 65-72; Carpenter 70-82.

### 4. Power, inequality and environmental degradation

- Economic power and corporate power
- Financing of the planet
- Ecologically unequal exchange
- Ecological debt
- Ecologism of the poor

Basic Reading: Martínez-Alier, 2004. Pages. 26-33; 324-340. Fernández-Durán, 2014. Pages: 11-84.

### 5. Socio-economic metabolism of societies

Types of systems

The laws of thermodynamics

Economies as open systems

Consumption of materials in economies

Materials Flow Analysis (AFM)

Basic Reading: Ramos Martin 2003a

Complementary readings: Carpenter (2003); Carpenter (2005): 113-159.

## 6. Energy flows and evolution of societies

Types and sources of energy

Exosomatic evolution of societies

Importance of energy in the economic process

Instruments of measurement of energy metabolism

Basic Reading: Ramos Martin 2003b; Ramos Martin 2004.

Complementary readings: Eisenmenger and others 2007

## 7. Oil Economics

The era of cheap oil

Life cycle of hydrocarbons

Political ecology of energy conflicts

Peak oil and energy crisis

Proposals for energy transition

Basic Reading: Fernández-DuránGonzález, La Espiral de la Energía, Libros en Acción, 2nd edition, Madrid, 2018

Complementary readings: Gavalda, M., La Recolonización, Icaria, 4a ed. , Barcelona, 2006; Gavalda, M., Amazonian Gas, Icaria, Barcelona, 2013.

## 8. Climate Change

Historical evolution of the climate challenge: from negationism to late mass

Geopolitics of climate change: IPPC, Stern Report, Kyoto, Paris ...

Human ecology of climate change: environmental refugees

Decarbonization of the economy

Recommended readings: Monbiot, G., Calor. How to stop global warming, RBA, Barcelona, 2008; Klein, N., This changes everything, Paidós, Barcelona, 2015.

## Methodology

### 1. Master class

The teacher will perform an analytical conceptualization and an updated synthesis of each of the subjects of study shown in the four didactic units. The objective of this activity is to facilitate the transmission of knowledge and the 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

They are structured based on a research work on environmental conflicts and the relationships of the actors involved. With these activities the students will not only consolidate the knowledge learned in the master classes but will learn to do individual and group research, analyze information, synthesize it, defend it, and discuss it.

## 3. Tutorials

The process of learning and acquisition of competences will be supervised by the teacher through individual and / or group tutorials. The teacher of the subject will be available to the students to solve the doubts and follow the evolution of the mentioned process of learning and acquisition of competences of the students.

## 4. Virtual campus of the subject

In face-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 essential to advance in the learning process of the subject. To access it you just have to go to the website of the UAB and there you will find the link (<http://www.uab.es/interactiva/default.htm>), or be directly on the campus webpage virtual (<https://cv2008.uab.cat/>).

Thematic debates will be held at the Virtual Campus where students will participate by providing positions and content on different issues related to economics, the environment and energy.

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			
Solving problems classes (research work environmental dispute)	10	0.4	4, 2, 5, 14, 7, 10, 1, 16, 15
Teaching master class	15	0.6	4, 14, 8, 10, 13
Type: Supervised			
Preparation of practical presentations following the teacher's guidelines	10	0.4	4, 2, 14, 10
Tutoring	3	0.12	2, 5, 1, 16
Type: Autonomous			
Continuous assessment	2	0.08	2, 6, 5, 9, 11, 1, 16, 12
Participation in the Virtual Campus Debates	5	0.2	2, 14, 7, 8, 11, 13, 16, 12
Reading and theory study	15	0.6	2, 16
Search information	3	0.12	2, 16, 15
Teaching laboratory preparation	4	0.16	4, 2, 5, 14, 8, 10, 13, 1, 16, 15, 12

## Assessment

The evaluation of the subject will be based only on the continuous evaluation of the process of acquisition of knowledge and competences on the part of the student. there is no possibility of submitting to the final examination of recovery if at least the two tests of knowledge have not been done.

The assessment will consist of:

- A single proof of knowledge that will be able to combine the test and thematic questions, and that will be worth 30% of the final grade.
- A practice note (40%) related to the applied work consisting of an oral presentation and a written work (in the form of poster or dossier) per group. The results will be presented in the Seminar of Political Ecology. This part will have a value of 40% of the final grade. The Virtual Campus will host a document explaining the practical activity and the written work, which will serve to direct the work of the students.
- A second individual proof of knowledge that will be able to combine the test and thematic questions, and that will be worth 30% of the final grade.

In order to be able to make average of the different tests of the continuous evaluation it is necessary to remove a minimum of a 3.5 (out of 10) in each one of the tests.

The students who have suspended the continuous assessment will have the right to a theoretical final exam. In order to be able to present itself to the recovery the student must have been previously evaluated in a set of activities whose weight equals to a minimum of 2/3 of the total grade of the subject. Evaluation activities that can be recovered are the two individual tests only (the practice note has no possibility of recovery). Only continuous assessment can be followed.

"Not assessable" is considered as a student who has not followed the continuous assessment.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Participation in the Environmental Conflict Seminar and publication of an article in the Seminar web page	40%	4	0.16	4, 2, 6, 5, 14, 13, 1, 16, 15
Proof of knowledge (2 x 2 hour) at the mid term and at the end of the course	30% each one	4	0.16	4, 3, 2, 14, 7, 8, 10, 9, 11, 13, 1, 12

## Bibliography

Martínez Alier, J., Roca, J. (2002, reimpresión de 2006). Economía ecológica y política ambiental , Fondo de Cultura Económica, Mexico, 493 p. Biblioteca CC.SS. E17.80 Mar , Biblioteca Ciencias 504.03 Mar

Azqueta, D. (2002). Introducción a la Economía Ambiental , McGraw Hill Profesional, Madrid, 420 p. Biblioteca CC.SS. E17.80 Azq . Biblioteca Ciències 504.03 Azq

Carpintero, O. (2003): " Los requerimientos totales de materiales de la economía española : una visión a largo plazo: 1955-2000", Economía industrial , No 351: 27-58.  
<http://www.mityc.es/Publicaciones/Publicacionesperiodicas/EconomiaIndustrial/RevistaEconomiaIndustrial/351/E>

Carpintero, O. (2005). El metabolismo de la economía española. Recursos naturales y huella ecológica (1955 - 2000) . Fundación César Manrique, Lanzarote, 636 p. Llibre complet disponible a:  
<http://www.fcmanrique.org/recursos/publicacion/elmetabolismo.pdf>

Fernández-Durán y González, La Espiral de la Energía, Libros en Acción, 2ª edición, Madrid, 2018  
<https://www.ecologistasenaccion.org/29055/libro-en-la-espiral-de-la-energia/>

Gavaldà, M., La Recolonización, Icaria, 4<sup>a</sup> ed. , Barcelona, 2006

Gavaldà, M., Gas Amazónico, Icaria, Barcelona, 2013. Biblioteca Ciència i Tecnologia 504:62 Gav

Eisenmenger, N., Ramos-Martin, J., and Schandl, H. (2007): "Análisis del metabolismo energético y de materiales de Brasil, Chile y Venezuela ", Revista Iberoamericana de Economía Ecológica, Vol. 6: 17-39.  
<http://www.redibec.org/ccount/click.php?id=32>

Jacobs, M. (1997). La economía verde . Icaria Editorial, Barcelona, 431 p. Biblioteca CC.SS E17.80 Jac 5

Pearce, D., Turner, K. (1995). Economía de los recursos naturales y del medio ambiente . Colegio de Economistas de Madrid Celeste, 448 p. Biblioteca CC.SS. E17.80 Pea , Biblioteca Ciències 504.03 Pea

Ramos-Martin, J. (2003a): "Empirismo en economía ecológica: una visión desde la teoría de sistemas complejos ", Revista de Economía Crítica. Vol. 1: 75-93.  
[http://revistaeconomiacritica.org/sites/default/files/revistas/n1/5\\_empirismo.pdf](http://revistaeconomiacritica.org/sites/default/files/revistas/n1/5_empirismo.pdf)

Ramos-Martin, J. (2003b): " Intensidad energética de la economía española: una perspectiva integrada ", Revista de Economía Industrial . Number 351(III): 59-72.  
<http://www.mityc.es/Publicaciones/Publicacionesperiodicas/EconomiaIndustrial/RevistaEconomiaIndustrial/351/E>

Ramos-Martin, J. (2004). La perspectiva biofísica de la relación home-natura: Economía Ecológica, a J. Valdivielso (Ed.), Les dimensions socials de la crisi ecològica , Edicions UIB, Palma de Mallorca, 316 p. Biblioteca CC.SS E17.01 Dim . [http://personales.ya.com/jesusramos/pdf/jramos\\_valdivielso.pdf](http://personales.ya.com/jesusramos/pdf/jramos_valdivielso.pdf)

Romero, C. (1997). Economía de los recursos ambientales y naturales , Alianza , Madrid, 214 p. Biblioteca CC.SS. E17.80 Rom , Biblioteca Ciències 504.03 Rom

Turiel, A. (2020), Petrocalipsis, Crisis Energética Global y cómo (no) la solucionaremos, Alfabeto, Madrid. Biblioteca Ciències (04)62 Tur

#### Recursos electrònics

#### Llibres

Costanza, R., Cumberland, J.H., Daly, H., Goodland, R., Norgaard, R.B. (1997). An Introduction to Ecological Economics . St. Lucie Press and International Society for Ecological Economics. Llibre complet disponible a: [http://www.eoearth.org/article/An\\_Introduction\\_to\\_Ecological\\_Economics\\_\(e-book\)](http://www.eoearth.org/article/An_Introduction_to_Ecological_Economics_(e-book))

Naredo, J.M., Parra, F. (Eds)(2002). Situación diferencial de los recursos naturales españoles . Fundación César Manrique, Lanzarote, 337 p. Llibre complet disponible a: <http://www.fcmanrique.org/recursos/publicacion/situaciondiferencial.pdf>

Jevons, W.S. (1865, 1866 2nd edition revised). The Coal Question . London: Macmillan and Co. Llibre complet disponible a: [http://www.eoearth.org/article/The\\_Coal\\_Question\\_\(e-book\)](http://www.eoearth.org/article/The_Coal_Question_(e-book))

Millennium Ecosystem Assessment Synthesis Reports - [http://www.eoearth.org/article/Millennium\\_Ecosystem\\_Assessment\\_Synthesis\\_Reports](http://www.eoearth.org/article/Millennium_Ecosystem_Assessment_Synthesis_Reports)

Ecological Economics Enciclopedia - [http://www.ecoeco.org/education\\_encyclopedia.php](http://www.ecoeco.org/education_encyclopedia.php)

#### Revistes

Revista Sostenible? De la Càtedra UNESCO de Sostenibilitat de la UPC - <https://e-revistes.upc.edu/handle/2099/1208>

Revista Iberoamericana de Economía Ecológica - <http://www.redibec.org/revibec.html>

Revista Medi Ambient, Tecnologia i Cultura (Generalitat de Catalunya) - [http://mediambient.gencat.net/cat/el\\_departament/revista/](http://mediambient.gencat.net/cat/el_departament/revista/)

Revista Ecología Política. - <https://www.ecologiapolitica.info/>

Cursos on-line i material adicional

Introduction to Ecological Economics. The University of Vermont. On-line course:  
<http://metacourses.org/ecologicaleconomics/>

Ecological Economics. Nebraska University. On-line course:  
<http://agecon.unl.edu/lynne/evolecon/evoleconsyllabus.htm>

EMergy <http://www.emergysystems.org/>

Material Flow Accounting - MFA <http://www.materialflows.net/index.php>

Programes de televisió

Notícies de Medio Ambiente (TVE) - <http://www.rtve.es/noticias/medio-ambiente/>

El Medi Ambient (TV3) - <http://www.tv3.cat/elmediambient>

Espai Terra (TV3) - <http://www.tv3.cat/espaiterra>

El Escarabajo Verde (TVE) - <http://www.rtve.es/television/escarabajo/>

Terra Verda (TVE) - <http://www.rtve.es/television/terraverda/>

Racons de Verd (TVE) - <http://www.rtve.es/television/racons-de-verd/>

La Xerrada ( La Mosca Tv) - <https://lamosca.tv/category/programes/taularodona/>

Webs institucionals

OECD Environment - <http://www.oecd.org/env/>

World Bank - Environment <http://www.worldbank.org/environment>

European Environment Agency - <http://www.eea.europa.eu/>

Ministerio de Medio Ambiente y Medio Rural y Marino - <http://www.marm.es/>

Departament de Medi Ambient - <http://mediambient.gencat.cat/>

Observatorio de la Sostenibilidad en España - <http://www.sostenibilidad-es.org/>

Consell Assessor per al Desenvolupament Sostenible - <http://www.gencat.cat/cads>

Associacions científiques

Societat Internacional d'Economia Ecològica (ISEE): <http://www.ecoeco.org>

Societat Europea d'Economia Ecològica (ESEE): <http://www.euroecolecon.org>

Xarxa Iberoamericana d'Economia Ecològica (REDIBEC): <http://www.redibec.org>

Xarxa d'Economia Ecològica a Espanya (REEE): <http://www.ecoeco.es/>

Associació Hispano-Portuguesa d'Economia dels Recursos Naturals (AERNA): <http://www.aerna.org>

## Software



Text editor: OpenOffice, LibreOffice, Word,...

Spreadsheet: OpenOffice, LibreOffice, Excel...

Slide Show: OpenOffice, LibreOffice, PowerPoint,...

On line meetings: Teams, Zoom, Jitsi Meet