

Water, Energy and Land Management

Code: 43063
ECTS Credits: 9

2025/2026

Degree	Type	Year
Interdisciplinary Studies in Environmental, Economic and Social Sustainability	OT	0

Contact

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

Oral and written English skills

Objectives and Contextualisation

This is a 9 ECTS optional subject from the specialisations in "Science and management of Global Change" and "Ecological Economics". The subject aims to introduce students to current debates on the management of water and energy resources, emphasizing the territorial dimension.

The course will pay special attention to the different water and energy management models (supply-demand; public-private; centralized-decentralized); the different technologies used; its environmental, social and territorial impacts and the unequal power relations regarding energy systems and the water cycle. The subject addresses these issues at different scales and with case studies from different parts of the planet.

Through readings of selected materials, lectures and class presentations and discussions, students are expected to gain a basic and robust knowledge of water and energy management.

Competences

- Apply knowledge of environmental and ecological economics to the analysis and interpretation of environmental problem areas.

- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Work in an international, multidisciplinary context.

Learning Outcomes

1. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
2. Know different models for managing water and energy, especially at the regional level.
3. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
4. Understand new forms of water and energy governance.
5. Understand the main territorial, social and environmental conflicts associated with water and energy management.
6. Work in an international, multidisciplinary context.

Content

Block I - The Water Cycle

1. Introduction: planning, water and energy

- The water-energy nexus
- Water planning and management
- From the hydrological cycle to the hydrosocial cycle
- Virtual water

2. Water governance and the politics of scale

- Scalar effects and multilevel governance
- Centralized and decentralized models in water management
- Participatory water governance
- Water and risk

3. Water supply

- Large scale conventional hydraulic technology: reservoirs and water transfers
- Large scale alternative hydraulic technology: desalination and water reuse

4. Water demand

- Demand management
- Decentralized water resources: groundwater, greywater and rainwater
- Water and tourism

5. Commodification, social protection and emancipation

- Privatization and municipalization
- Water poverty and water as a social need
- Integrated water management in cities: the liberal vs the emancipatory view

Block II - Energy Systems

6. Basic concepts of energy use

7. Geopolitics of energy

8. Historic review of energy uses

9. Energy systems

- Definition and importance
- Properties
- Multilevel governance

10. Energy supply chain

- Fossil fuels
- Electricity

11. Energy transition and future energy systems

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	18.5	0.74	2, 5, 4
Practical exercises	11	0.44	3, 1, 6
Seminars	20	0.8	2, 5, 4, 3, 1, 6
Type: Supervised			
Assigned readings	15	0.6	2, 5, 4, 1
Course works	22	0.88	2, 5, 4, 1, 6
Tutorship	3	0.12	3
Type: Autonomous			
Information research	36	1.44	2, 1, 6
Personal study	40	1.6	2, 5, 4
Readings	55	2.2	2, 5, 4

The following activities will be carried out:

a) Lectures. In some sessions we will have an invited speaker.

b) Seminars: a brief introduction to the specific topic given by the instructor followed by the presentation of assigned readings by students, the group discussion of the main points discussed in the readings, and a final conclusion coordinated by the instructor. Students are expected to read the assigned materials; prepare and guide discussions and participate actively in the debates.

c) Exercises: some practical exercise will be carried out at class, including individual and cooperative work.

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	Weighting	Hours	ECTS	Learning Outcomes
Class participation (includes exercises)	10 %	0	0	3, 1
Energy course work	25 %	0	0	2, 5, 4, 3, 1, 6
Oral presentations (seminar)	30%	4.5	0.18	2, 5, 4, 1, 6
Water course work	25 %	0	0	2, 5, 4, 3, 1, 6

- Class participation (20%): on the basis of practical exercises carried out at class.
- Oral presentations (30%): from the assigned readings.
- Water course work (25%): the instructor will give the details at the beginning of the course.
- Energy course work (25%): the instructor will give the details at the beginning of the course.

At the time of carrying out each assessment activity, the teacher will inform the students of the date of review of the grades.

Not assessable. Anyone who has not completed and delivered the coursework is considered non-evaluable. Undelivered activities will be graded as zero (0).

Plagiarism. In the event that the student commits any irregularity that could 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 instituted. In the event that several irregularities occur in the evaluation acts of the same subject, the final grade for this subject will be 0.

Single Assessment: This module does not offer the Single Assessment modality, in accordance with the coordination of the master and with the Dean's Office of the Faculty of Sciences.

Recovery. Activities related to class participation and oral presentation of assigned readings cannot be recovered. In the event that the coursework has been suspended, it may be recovered by submitting it again on the date established by the teacher. The maximum recovery grade is 5. Activities in which irregularities have been detected (plagiarism, copying, improper use of AI, etc.) will not be recovered.

Use of AI

Restricted Use: For this subject, the use of Artificial Intelligence (AI) technologies is permitted exclusively in support tasks, such as bibliographic or information searches, text correction or translations. The student must clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how these 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 lack of academic honesty and may lead to a partial or total penalty in the grade of the activity, or greater sanctions in serious cases.

Bibliography

The Water Cycle

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Energy Systems

- Abramky, Kolya. (Ed.). (2010). *Sparking A Worldwide Energy Revolution. Social Struggles in the Transition to a Post-Petrol World*. Edinburgh: AK Press.
- Boyle, Godfrey. (Ed.). (2012). *Renewable Energy: Power for a Sustainable Future* (3rd ed.). Oxford: Oxford University Press and Open University
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- Scheer, Hermann. 2011. Imperativo energético. Barcelona: Icària
- Scheer, Hermann. 2009. Autonomía energética. Barcelona: Icària
- Valero Delgado, Alicia; Valero Capilla, Antonio. Calvo Sevillano, Guiomar (2021). Thanatia. Límites materiales de la transición energética. Prensas de la Universidad de Zaragoza

Software

No required software

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(TEM) Theory (master)	1	English	second semester	afternoon