

University Master's Degree in Master in Interdisciplinary Studies in Environmental, Economic and Social Sustainability

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A1: Interdisciplinary Concepts of Environmental, Economic and Social Sustainability: Theory and Practice of Interdisciplinarity

Number of ECTS credits	3
Typology	OB
Temporary organization	1.1
Learning outcomes of the SUBJECT	Knowledge: KA01: Describe the complexity of the interdisciplinary perspective in sustainability, by analysing its need and the existing barriers to its practice, differentiating between interdisciplinary and transdisciplinary approaches. (KT01) KA02: Define the different approaches to co-production in environmental studies by integrating the values, assumptions, methodologies and practices of the academic and non-academic groups involved. (KT01) Skills: SA01: Apply principles of systems thinking to analyse the interaction between environmental, social and economic subsystems, critically assessing the different existing assumptions. (ST01) SA02: Independently select relevant scientific and technical information for the contextualization and substantiation of interdisciplinary projects. (ST03) SA03: Apply co-production tools in interdisciplinary or transdisciplinary contexts, determining possible strategies based on the collective definition of the challenges to be addressed. (ST06) Competencies: CA01: Analyse complex socio-environmental problems to support critical judgments on sustainability, understanding and contextualising the plurality of existing perspectives. (CT01) CA02: Critically evaluate the conclusions of interdisciplinary analyses in environmental studies. (CT06) CA03: Demonstrate ethical responsibility and respect for diversity in interdisciplinary contexts by applying the concepts and theories of co-production in environmental, economic and social sustainability. (CT08)

Prerequisites

No prior knowledge is required

Objectives

General Objective

To analyse and apply interdisciplinary and transdisciplinary approaches in environmental sciences in order to critically address complex problems related to sustainability and global change.

Specific Objectives

To analyse the historical, philosophical and epistemological foundations of interdisciplinarity and transdisciplinarity, and to assess their relevance within the framework of sustainability science.

To identify and critically evaluate the values, implicit assumptions and epistemological pluralism present in environmental research, as well as the challenges associated with framing complex or wicked environmental problems.

To understand and apply the principles of transformative learning, integral systems thinking and the spheres of transformation in order to interpret processes of individual, collective and institutional change oriented towards sustainability.

To analyse and compare different approaches to knowledge co-production in global change research through the study of transdisciplinary research case studies, and to assess their methodological, social and political implications.

Contents

- Introduction to the history and theory of interdisciplinarity/transdisciplinarity in research on environmental, economic, and social sustainability.
 - Historical evolution of interdisciplinary and transdisciplinary approaches in the scientific field.
 - Main theoretical frameworks and key concepts applied to sustainability.
 - Relevance of these approaches for addressing complex socio-environmental problems.
- The different approaches to co-production in research in the field of environmental, economic, and social sustainability.
 - Definition and typologies of knowledge co-production.
 - Role of scientific, institutional, and social actors in collaborative research processes.
 - Advantages and challenges of co-production in sustainability projects.
- • Review and preparation of practical co-production experiences.
 - – Analysis of real cases of co-production in different territorial contexts.
 - – Identification of good practices and success factors.
 - – Design of practical experiences adapted to specific research projects.

Activities and Methodology

TIPO	TÍTULO	HORAS	RAs
Guided	Oral presentations by the lecturer	5	KA01, KA02
Guided	In-class debates	3	SA01, SA03, CA01
Guided	Reading presentation	3	SA01, SA02
Guided	Activity – Protected natural areas	5	KA01, SA01
Guided	Response to the reading question	2	KA01, KA02, CA01, CA02
Supervised	Essay writing	9	SA01, SA02, SA03, CA03
Supervised	Tutorials	1	CA02
Autonomous	Readings and information search	30	SA02

Autonomous	Individual study	17	KA01, SA02, CA01
Guided	Oral presentations by the lecturer	5	KA01, KA02

Students will be required to read, summarize, and prepare a brief presentation of an assigned reading for each session of this part. Each session will begin with a short introduction to the specific topic given by the instructor. A jigsaw methodology will then be used to present and discuss the assigned readings, followed by a group discussion of the main points addressed in the readings. Finally, students will individually complete a questionnaire based on the topics covered.

Assessment

Continuous Assessment Activities

TÍTULO	PESO (%)	HORAS	RAs
Response to the reading question	40%	0.5	KA01, KA02, CA01, CA02
Essay	50%	0	SA01, SA02, SA03, CA03
Class participation	10%	0	SA01, SA02, SA03, CA01, CA02, CA03

Continuous Assessment

Course assessment will be based on responses to reading questions completed in class (40% of the final grade), a group essay completed at home (50%), and participation in the classroom (10%).

If a student does not obtain a minimum final grade of 5, they may retake the essay by submitting a new individual essay to be completed on the date agreed upon on the first day of class. Reading questions and the participation grade are not recoverable.

Single Assessment

This module does not offer the Single Assessment option, in accordance with the coordination of the degree program and the Dean's Office of the Faculty of Sciences.

This module allows the use of Artificial Intelligence (AI) technologies exclusively for bibliographic research or information searching and text editing tasks. Students must: (i) identify the parts that have been generated using AI; (ii) specify the tools used; and (iii) include a critical reflection on how these tools have influenced both the process and the final outcome of the activity. Lack of transparency in the use of AI in this assessable activity will be considered a breach of academic honesty and will result in the activity being graded with a 0 and deemed non-recoverable, or in more severe sanctions in serious cases.

Plagiarism

Copying or plagiarism in any type of assessment activity constitutes a serious offense and will be sanctioned with a grade of 0, with no possibility of retaking, whether it is an individual or group assignment (in the latter case, all group members will receive a 0). If, during an individual in-class assignment, the instructor detects that a student is attempting to copy or use any type of document or device not authorized by the faculty, the student will receive a grade of 0, with no option for recovery. An assignment, activity, or exam will be considered “copied” when it reproduces all or a significant part of another student’s work. A work or activity will be considered “plagiarized” when a portion of another author’s text is presented as one’s own without citing the sources, regardless of whether the original sources are in print or digital format.

Not Assessable

If a student has not submitted more than 30% of the assessment activities, they will be considered “not assessable.”

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Software

There is no specific software for this module.

A2: Interdisciplinary Concepts of Environmental, Economic and Social Sustainability: Interdisciplinary Project

Number of ECTS credits	9
Typology	OB
Temporary organization	1. Annual
Learning outcomes of the SUBJECT	Knowledge: KA03: Relate the application of the principles of industrial ecology with waste management in the design of interdisciplinary sustainability projects. (KT02, KT03) KA04: Explain the dimensions of global change and its impacts on the approach to problems and solutions in sustainability projects in various ecosystems and natural spaces. (KT04, KT05) KA05: Describe how the frameworks of ecological economics and political ecology determine the analysis and proposal of interventions in interdisciplinary projects. (KT06, KT07) Skills: SA04: Develop diagnostic and planning methodologies for the conceptualisation and design of interdisciplinary projects in the field of environmental, economic and social sustainability. (ST01) SA05: Apply tools and methodologies, such as spatial and statistical analysis, in the execution of an interdisciplinary project based on a real territorial challenge of sustainability. (ST02) SA06: Select the relevant actors for the execution of interdisciplinary projects in sustainability. (ST07) Competencies: CA04: Work collaboratively in multidisciplinary and international teams to address complex sustainability challenges, integrating the ethical, social and gender perspective. (CT04) CA05: Communicate the results of sustainability projects, adapting the message to different audiences. (CT05)

Prerequisites

There are no prerequisites.

Objectives

The main objective of the course is to provide students with an integrative and critical view of the theoretical and methodological foundations of ecological economics, industrial ecology and global change, enabling them to analyse and intervene in complex sustainability issues from an interdisciplinary perspective. First, the course aims for students to understand the fundamental principles of ecological economics, including social metabolism, ecological distribution conflicts, and proposals for degrowth and environmental justice, in order to diagnose sustainability problems through a critical and contextualised approach. Second, the course seeks to introduce the key concepts of industrial ecology, such as the circular economy, life cycle assessment, ecodesign and material flow management, making it possible to evaluate anthropogenic systems and propose strategies to minimise their negative impact on the planet. Third, it aims for students to analyse the dimensions of global change, with special attention to the dynamic interactions between climatic, biological and anthropogenic components across multiple temporal and spatial scales, assessing terrestrial systems through the study of vegetation, land use and socioecological transformations. Finally, the course aims to develop methodological skills for the design and implementation of applied projects in interdisciplinary teams, integrating territorial analysis tools and intervention proposals based on real-world environmental, economic and social sustainability challenges.

Contents

Methodological:

Design and implementation of an applied project in interdisciplinary teams. Application of analysis methodologies and intervention proposals in the territory. Development of use cases based on real territorial challenges and an interdisciplinary approach, integrating the key concepts of the three specialisations of the master's programme.

Advanced:

Main concepts related to industrial ecology for evaluating anthropogenic systems and minimising their negative effect on the planet. An interdisciplinary approach to the subsystems that make up terrestrial systems, with special attention to the detailed analysis of the dynamic interactions between their climatic, biological and anthropogenic components across multiple temporal and spatial scales. The importance of assessing terrestrial systems through the study of vegetation and changes in land use is highlighted, offering a comprehensive understanding of the dynamics that drive global processes. Environmental policy instruments. Main concepts developed by ecological economics theory and political ecology to diagnose sustainability problems from an interdisciplinary and critical point of view.

During the course, a 3-day field trip will be organised to work on the concepts explained in class and to develop the case studies for which a written assignment and a presentation must be completed at the end of the course. This part of the programme will take place outside the UAB and far from its campus (250 km) and will be compulsory. The experience will offer the opportunity to gain an integrated view of the socioecological aspects operating in high mountain areas and to attend explanations about projects currently being carried out in the area, while participating students get to know one another better and begin to collaborate and work together. The activities will take place in one of the natural spaces that the Fundació Catalunya-La Pedrera (FC-LP) dedicates to teaching and research, MónNatura Pirineus in Planes de Son (<https://fundaciocatalunya-lapedrera.com/es/espacios-naturaleza/monnatura-pirineus>).

Training Activities and Methodology

TYPE	TITLE	HOURS	LOs
Directed	Lectures supported by ICT (including some formative assessment activities)	42	KA03, KA04, KA05
Directed	Field trip	21	KA03, KA04, KA05, SA04, SA05, SA06, CA04
Supervised	Individual and group work supervised by the teaching staff (field trip recap)	33	KA03, KA04, KA05, SA04, SA05, SA06, CA04, CA05
Autonomous	Completion of activities (final assignment and presentation) and personal study	123	KA03, KA04, KA05, SA04, SA05, SA06, CA04, CA05

Assessment

Continuous assessment activities

TITLE	WEIGHT (%)	HOURS	LOs	Type
Prior knowledge test before the field trip (individual)	40%	3	KA03, KA04, KA05	Assessment
Course assignment (group)	20%	0	KA03, KA04, KA05, SA04, SA05, SA06, CA04	Autonomous
Presentation of the course assignment (group)	40%	3	KA03, KA04, KA05, SA04, SA05, SA06, CA04, CA05	Directed

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Software

GIS software (MiraMon).

A3: Interdisciplinary Concepts of Environmental, Economic and Social Sustainability: Communication and Scientific Dissemination (TBD)

Number of ECTS credits	3			
Typology	OB			
Temporary organization	1.2			
Language	English			
Modality	Face-to-face			
Contents of the subject	Methodological: Scientific communication and dissemination of science. Advanced: The sessions include general training activities on concepts and resources for scientific communication and dissemination, as well as more specific activities that can be applied later, on the one hand, in the interdisciplinary project in teams of several students and, on the other hand, in the individual TFM project. The type of training activities include readings, short writing and design for communication and scientific dissemination, academic debates and oral presentations with the support of PPT and other media. Students will be encouraged to link their oral presentations with the Sustainable Development Goals (SDGs) of the UN's 2030 Agenda or with other ways of promoting sustainability.			
Learning outcomes of the SUBJECT	Knowledge: KA06: Define the theories, concepts and resources of scientific communication and the dissemination of science in environmental studies. (KT08) KA07: Define ethical principles in the communication and dissemination of scientific information. (KT08) Skills: SA07: Prepare clear and precise scientific texts in the field of environmental studies, adapted to different formats and purposes of academic publication. (ST04) SA08: Design effective oral presentations on sustainability issues by making the presentation for specialized academic audiences. (ST04) SA09: Use digital tools and platforms for the dissemination and exchange of scientific knowledge. (ST04) SA10: To autonomously use resources and methodologies for scientific communication and dissemination in the field of sustainability. (ST05) Competencies: CA06: Effectively communicate research results and environmental management strategies to specialized and non-specialized audiences by adopting a critical and inclusive approach. (CT05) CA07: Demonstrate ethical responsibility in scientific communication and dissemination on environmental, economic and social sustainability. (CT08)			
Training Activities		Directed	Supervised	Autonomous
	Hours	18	10	47
	% face-to-face attendance	100%	10%	0%

A4: Industrial Ecology

Number of ECTS credits	9
Typology	OP (Compulsory Specialty)
Temporary organization	1.1
Learning outcomes of the SUBJECT	Knowledge: KA08: Describe the fundamental concepts of industrial ecology and their application to the study of productive and urban systems. (KT01) KA09: Define the principles, tools and methodologies of Life Cycle Assessment (LCA) and its application in the environmental assessment of products and processes. (KT02) KA10: Explain the methodology of Material Flow Analysis (MFA) and its application at different scales. (KT02) Skills: SA11: Manage Life Cycle Analysis (LCA) and Material Flow Analysis (MFA) software to quantify the environmental impacts of products and processes. (ST02) SA12: Analyse production systems in the context of industrial ecology, selecting the most appropriate methodologies for this purpose. (ST08) Competencies: CA08: Design innovative strategies and proposals in industrial ecology to solve current environmental challenges. (CT02) CA09: Develop sustainable management solutions in production systems, applying Life Cycle Assessment (LCA) for the assessment of environmental impacts. (CT03) CA10: Demonstrate ethical responsibility in the design and implementation of industrial ecology solutions. (CT08)

Prerequisites

Prior knowledge is not necessary

Objectives

This course is an introduction to the field of Industrial Ecology (IE) as a multidisciplinary effort to evaluate anthropogenic systems, minimizing their negative effect on our planet. The students are taught the methods, tools, and strategies within IE, aiming to recreate our industrial system in such a way that it can be sustainable and in harmony with the rest of the natural ecosystem. To achieve this general objective, we will learn about:

- the concepts of IE, its framework as a multidisciplinary area of research based on systems theory;
- Material Flow Analysis (MFA), which can be applied to different systems, such as a product, process, or region.
- the concepts of urban metabolism, carbon footprint, including differences in scope, results, and policy implications.
- process-based approach, MFA-LCA (or Material Flow Analysis coupled with Life Cycle Assessment) and EIO-LCA (or Economic Input-Output coupled with Life Cycle Assessment); the fundamentals of these approaches will be applied to various analyses (e.g., GHG, pollution, water, land, toxics, materials use, etc.)
- the concept of Life Cycle Assessment (LCA), its applications and the global framework for its use.
- the main steps of LCA (i.e., goal and scope definition, inventory analysis, impact assessment and interpretation) and their application to different real-life cases, such as products or services.

- the use of LCA software (SimaPro) and its basic functionalities to calculate the environmental impacts of a system.
- the concept of exergy in the context of thermodynamics in systems theory and its applications

Contents

The topics covered in this course are:

- Topic 1: Concepts of Industrial Ecology as an area of multidisciplinary research. Some of these concepts are: systems theory, resource consumption and socioeconomic metabolism.
- Topic 2: Material Flow Analysis (MFA) methodology and its application to different systems such as at the product, process, or region level, from urban to industrial systems.
- Topic 3: Life Cycle Assessment (LCA) methodology for products and processes for the assessment of environmental impacts and the analysis of improvements. Concepts of attributional and consequential LCA, scenario and sensitivity analysis, and application of programs and databases to case studies. The use of the SimaPro software and ecoinvent databases takes place in practical sessions applied to case studies.
- Topic 4: EIO-LCA methodology (or Economic Input-Output coupled with Life Cycle Assessment) for the environmental assessment at the sectorial level.
- Topic 5: Application of thermodynamics to Industrial Ecology, such as the concept of exergy to determine the efficiency of a system.

Activities and Methodology

TIPO	TÍTULO	HORAS	RA's
Directed	1. Theory sessions	34	KA08, KA09, KA10
Directed	2. Practical sessions dedicated to LCA software	18	KA09, SA11, SA12
Supervised	1. Elaboration of the LCA project and problem resolution	50	CA08, CA09, CA10
Supervised	2. Resolution of practical exercises	10	SA12, CA08
Autonomous	1. Preparation of readings and presentations	15	KA08, KA09
Autonomous	2. Individual practical exercises related to MFA, LCA and EIO	20	SA12, CA10
Autonomous	3- Development of the LCA project in teams and autonomously	70	CA08, CA09, CA10

Assessment

Continuous Assessment Activities

TITLE	WEIGHT (%)	HOURS	RA's
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1. Final exam	50%	2	KA08, KA09, KA10, SA12
2. Presentation of the LCA project	30%	2	SA11, CA08, CA09, CA10
3. Practical LCA exercises	10%	2	SA12, CA09
4. Practical EIO exercise	10%	2	SA12

Regular assessment

The course assessment is achieved by solving and submitting practical exercises (20% of the final grade), preparing and orally presenting a group project (30%) and a final exam (50%). It is mandatory to complete all assessable activities to pass the course.

The student is only eligible for retake exam if they have done the following:

- Submission of all course assignments that are requested in class and submitted through the Moodle space.
- Attendance at the final exam.
- Participation in group work during the course.
- Participation in the LCA project and presentation of the project at the end of the course.

The student will only be able to retake with a second final exam opportunity, and the final grade for the subject will not be higher than a 6.

Copies and plagiarism

In the event that the student makes any irregularity that could lead to a significant variation in the grade of an assessment act, this assessment act will be graded 0, regardless of the disciplinary process that may be instructed. In the event that several irregularities occur in the assessment acts of the same subject, the final grade for this subject will be 0. Those assessment acts in which there have been irregularities are not recoverable.

Use of AI

In this course, the use of Artificial Intelligence (AI) technologies is not allowed in any of its phases. Any work that includes fragments generated with AI 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.

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Software

The student will have access to the SimaPro software for educational use only in the Faculty's computer labs. Any fraudulent use of the software will be penalized.

A5: Waste Management (TBD)

Number of ECTS credits	6
Typology	OP (Compulsory Specialty)
Temporary organization	1.1
Language	English
Modality	Face-to-face
Contents of the subject	<u>Block 1.</u> Linear economy. Context of the economic model and its externalities. Origin and typology of urban and industrial waste and current management systems. - Waste in the linear economy: characteristics and potential impacts - Classification systems for different types of urban and industrial waste according to European framework regulations. - Urban solid waste collection systems and their transport: typologies, characteristics, advantages and disadvantages - For the following treatment systems, analysis of: Origin and inflow and outflow of materials and waste, types of treatment systems and characteristics and potential applications of the resulting materials - Landfills. Includes estimation of its emissions (modelling with Landgem among others) - Incineration (energy recovery) <u>Block 2.</u> Sustainable management of materials at urban and industrial level. Circular economy. Characteristics of circular models and their potential for impact on externalities. - Waste in the recycling economy and in the circular economy. Quantitative, economic and environmental impacts. - Product design and business model characteristics relevant to the minimization of waste and generation of valuable secondary materials. - For the following treatment systems, analysis of: Origin and inflow and outflow of materials, types of treatment systems and characteristics and potential applications of the resulting materials - Wastewater Treatment - Anaerobic digestion - Composting - Plants for the selection and recycling of containers and packaging, glass and other types of inorganic materials (e.g. construction waste). - Visit (potentially virtual) to the Composting and Anaerobic Digestion Plant - Inorganic Materials Recycling Case Study Seminar (Potentially Virtual) for a Next High-Value Application - References and tools in relation to ecodesign, industrial ecology or biomimetics and impact measurement
Learning outcomes of the SUBJECT	Knowledge: KA11: Explain the origin, typology and flows of waste, as well as the basic operations for its management and use within the framework of the linear economy. (KT03) KA12: Describe the principles of the circular economy and distinguish its models and the potential for impact on the sustainable management of urban, agricultural and industrial materials. (KT03) KA13: Define the characteristics and emissions associated with waste treatment systems, both in the framework of the linear economy (landfills, incineration) and circular economy (wastewater treatment, anaerobic digestion, composting). (KT03) Skills: SA13: Evaluate the possibilities of reducing environmental impacts and greenhouse gases (GHG) through the application of new technologies, methodologies and systems for waste management and use. (ST01) SA14: Select the relevant actors in the waste management value chain for the design of circular economy strategies. (ST07) Competencies:

	CA11: Develop sustainable management solutions in the waste sector, applying environmental assessment tools. (CT03) CA12: Work in interdisciplinary and international teams to address complex challenges in sustainable materials and waste management. (CT04) CA13: Propose measures to reduce economic, territorial and gender inequalities associated with waste management. (CT07)			
Training Activities		Directed	Supervised	Autonomous
	Hours	36	20	94
	% face-to-face attendance	100%	10%	0%

A6: Global Change

Number of ECTS credits	9
Typology	OP (Compulsory Specialty)
Temporary organization	1.1
Learning outcomes of the SUBJECT	Knowledge: KA14: Describe the drivers and types of impacts of global change at various temporal and spatial scales on terrestrial and marine ecosystems. (KT04) KA15: Relate the interaction between global change and climate change as interconnected forces of change. (KT01) KA16: Illustrate the manifestations of global change through examples related to land use, biodiversity conservation, and global carbon and water cycles. (KT04) Skills: SA15: Apply methodologies for the exploration and analysis of the impacts of global change on terrestrial and marine ecosystems. (ST01) SA16: Manage specialized programs for the management and analysis of information on global change to inform the understanding and analysis of its impacts. (ST02) SA17: Analyse the functioning of the planet in order to interpret environmental changes according to different spatial and temporal scales. (ST08) Competencies: CA14: Develop sustainable management solutions, based on the assessment of environmental impacts by applying climate scenarios. (CT03) CA15: Communicate findings on the impacts of global change clearly and unambiguously to specialist and non-specialist audiences, both orally and in writing. (CT05)

Prerequisites

Be taking the GIS course or have GIS knowledge/skills

Aims

Comprising the biological, physical and social processes related to the Global Change, and the six complex interactions, it represents one of the most urgent scientific and social issues of today. This complexity is exacerbated by the urgent need to develop effective solutions to mitigate the negative impacts of these changes. This course examines the diverse impacts of Global Change at various spatial and temporal scales, with a primary focus on both terrestrial and marine ecosystems, as well as its effects on human societies and the corresponding social responses.

Contents

The contents of the subject include:

- The connection of the main drivers and types of impacts related to global change at various temporal and spatial scales.
- The exploration of impacts at different spatial and temporal scales in both terrestrial and marine ecosystems.
- The study of interaction with another force of change is climate change.

- Analysis based on examples related to the use of the sun, the conservation of biodiversity, or the global carbon and water cycle.

The course is organized as follows:

Submodule 1: Global Terrestrial Change

1. Introduced the interdisciplinary approach to the Global Change.
2. Respond locally to global changes and in globalization: changes in uses and shelters from the sun. Forestry management as a key factor in global change.
3. Sustainable forest management and revaluation.
4. Forest health.
5. Oral presentations.

Submodule 2: Marine Global Change

1. Introduced to the ocean, climate and global change. The disruption of the carbon cycle and its consequences on marine ecosystems and biogeochemistry.
2. Cumulative pressures on the marine system centered on marine pollution, marine debris and microplastics.
3. Consider different temporal scales of global changes from historical marine ecology and paleoconstructions. Debate on the new trend in the blue economy focused on blue carbon. Protected Marine Areas, ocean conservation and restoration.
4. Oral presentations.

Submodule 3: Field trip about new trends in the conservation of Mediterranean landscapes (Biosphere Reserve and Natural Park of Montseny).

Training activities and methodology

TYPE	TITLE	HOURS	RAs
Directed	Master classes with ICT support (including some training assessment activities)	43	KA14, KA15, KA16, SA15, SA17, CA14
Directed	Field trip (PCAM)	7	KA16, SA15, SA17, CA14
Directed	Laboratory practices guided by professors. Guidelines for the follow-up and development of practices (PAUL)	4	SA15, SA16, SA17
Supervised	Tutorized individual and team work (field trip recap).	35	KA14, KA15, KA16, SA15, SA16, SA17, CA14, CA15
Autonomous	Reading articles, books and studying the articles provided for the final exam	96	KA14, KA15, KA16, SA15, SA16, SA17, CA14
Autonomous	Preparation of oral presentations	40	CA15

Evaluation

Continuous assessment activities

TITLE	WEIGHT (%)	HOURS	RAs	Type
Oral presentations (two presentations)	30%	6	KA14, KA15, KA16, SA15, SA16, SA17, CA14, CA15	Directed
Classwork	20%		KA14, KA15, KA16, SA15, SA16, SA17, CA14, CA15	Autonomous
Final exam	50%	3	KA14, KA15, KA16, SA15, SA17, CA14	Evaluation

Literature

Terrestrial Global Change

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Software

GIS software (MiraMon)

A7: Analysis and Management of Natural Landscapes

Number of ECTS credits	6
Typology	OP (Compulsory Specialty)
Temporary organization	1.1
Learning outcomes of the SUBJECT	Knowledge: KA17: Describe the different types of natural spaces (marine and/or terrestrial) in relation to their ecological, social and economic characteristics. (KT05) KA18: Define the factors and effects of global change on natural spaces considering their ecological, social and economic dimensions. (KT04) KA19: Appropriately select management tools for the protection of natural spaces, considering their application in various territorial and socio-environmental contexts. (KT01) Skills: SA18: Independently select relevant scientific information on natural areas for decision-making in their management. (ST03) SA19: Select the key actors in the management and conservation of natural spaces. (ST07) Competencies: CA16: Design innovative strategies and proposals for the sustainable management of natural spaces. (CT02) CA17: Work effectively in a multidisciplinary context in natural space management projects. (CT04) CA18: Propose sustainable management measures that promote territorial equity and reduce barriers to access to natural spaces. (CT07)

Prerequisites

It is recommended that students have basic knowledge of environmental sciences and be able to follow classes taught in English.

Objectives

- To analyze landscape as an expression of the natural and social history of territories.
- To understand the historical evolution of nature conservation and the development of Protected Natural Areas (PNAs), as well as the legislative framework governing their protection.
- To examine planning, management and monitoring tools for PNAs and biodiversity, in relation to the challenges of global change and their implications for sustainability.
- To apply interdisciplinary methodologies for the understanding and analysis of case studies of natural areas and landscapes in Europe and the Mediterranean region.
- To develop analytical and management criteria and tools for diagnosis, critical evaluation and decision-making in the management of Protected Natural Areas, from a perspective of sustainability, territorial governance and equity.

Contents

1. Natural areas: what should be conserved?

Biodiversity (genetic, species and ecosystem levels), ecosystem services, drivers of biodiversity loss, global prioritization areas (biodiversity hotspots, ecoregions...) and socioecological values.

2. Protected areas and international initiatives:

International, European and national frameworks for protected areas.

3. **Strategic management planning of natural areas:**

Diagnosis of natural areas, data evaluation, definition of strategic goals, strategies and actions, implementation of the plan, and evaluation.

4. **Species conservation strategies**

In situ and ex situ conservation. Recovery and conservation plans as management tools.

5. **Unprotected natural areas:**

Role of non-protected areas in biodiversity conservation and landscape connectivity, including a case study from Arenys de Mar.

6. **Tourism in natural areas:**

Impacts and management challenges.

7. **Socioecological Heritage and Landscape:**

Indicators of landscape dynamics.

Activities and Methodology

TYPE	TITLE	HOURS	RAs
Guided	1. Oral lectures	16	KA17, KA18, KA19
Guided	2. Guided practical exercises	15	KA19, SA18, CA17
Guided	3. Fieldwork – habitat characterization	2	KA19, SA18, CA17
Guided	4. Fieldwork – visit to natural areas	7	KA17, KA18, SA19, CA18
Supervised	Preparation of assignments and practical exercises	10	KA19, SA18, CA16, CA17, CA18
Supervised	Development of a final project	10	KA19, SA18, SA19, CA16, CA17, CA18
Autonomous	Study of theoretical contents	18	KA17, KA18, KA19
Autonomous	Information search and analysis	50	SA18, SA19, KA19
Autonomous	Writing of documents	20	CA16, CA17, CA18

Guided activities

- Oral lectures delivered by the teaching staff.
- Presentation of the practical assignments of the course.
- Fieldwork for habitat characterization.
- Two compulsory field trips: one to a protected natural area and one to a non-protected natural area.

Supervised activities

- Support and supervision for the development of the course practical assignments.

Autonomous activities

- Study of the theoretical contents of the course.

- Independent work related to the preparation of the practical assignments.

Assessment

Continuous Assessment Activities

TITLE	WEIGHT (%)	HOURS	RAs
1. Final exam	30%	2	KA17, KA18, KA19
2. Habitat characterization assignment	20%	0	KA19, SA18, CA17
3. Individual assignments	20%	0	KA19, SA18, CA16, CA17, CA18
4. Final project	30%	0	KA19, SA18, SA19, CA16, CA17, CA18

This course does not provide for a single assessment system.

The final grade will be obtained from the following activities:

Theory assessment (30%)

- Final exam (30%)

Practical assessment (70%)

- Habitat characterization assignment (20%)
- Individual assignments (20%)
- Final project (30%)

The following must be taken into account:

- 1) **Compulsory activities:** The final exam and the field trips are compulsory.
- 2) **Minimum grades:** In order to calculate the average with the remaining assessment activities, a minimum grade of 5 must be obtained in the final exam.
- 3) **Not assessable:** The student will receive a “not assessable” grade if more than 30% of the assessment activities are not submitted.
- 4) **Academic irregularities:** If the student commits any irregularity that may lead to a significant variation in the grade of an assessment activity, that activity will be graded with a 0, regardless of any disciplinary process that may be initiated. If several irregularities occur in the assessment activities of the same course, the final grade for the course will be 0.
- 5) **Reassessment:** Students have the right to a reassessment of the final exam through a resit exam, which will take place on the date established by the degree coordination.
- 6) **Use of artificial intelligence:** For this course, the use of Artificial Intelligence (AI) technologies is permitted exclusively as complementary support in the learning process. However, these tools may not replace practical knowledge or direct observation, which are fundamental in this subject. In any assessable activity, students must clearly identify which parts have been generated using this technology, specify the tools used, and

include a critical reflection on how these have influenced the process and the final outcome of the activity. Lack of transparency in the use of AI in this assessable activity will be considered a breach of academic integrity and may result in partial or total penalties in the activity grade, or more severe sanctions in serious cases.

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Software

Basic office tools (e.g., word processor, spreadsheets and presentation software). No specific software is required.

A8: Foundations of Ecological Economics (TBD)

Number of ECTS credits	9			
Typology	OP (Compulsory Specialty)			
Temporary organization	1.1			
Language	English			
Modality	Face-to-face			
Contents of the subject	• Origin and principles of ecological economics. • Complexity and exosomatic evolution. • Well-being and externalities. • Environmental policy instruments in the management of energy, natural resources and emissions. • Ecological footprint and rebound effects on energy and water. • Socioeconomic metabolism. • Limited rationality, social interactions, and environmental governance institutions - • Environmental Services - assessment and policy options. • Multi-criteria analysis for decision-making. • Debates on growth and the environment.			
Learning outcomes of the SUBJECT	Knowledge: KA20: Define the origins, principles and key concepts of ecological economics, such as complexity, exosomatic evolution, well-being and externalities, and environmental policy instruments. (KT06) KA21: Describe the integration between economics and biophysical systems, including concepts such as ecological footprint, rebound effects, socioeconomic metabolism, environmental services, and institutions. (KT01, KT06) KA22: Define the main debates around economic growth and-global change from the perspective of green economics. (KT04)			
	Skills: SA20: Apply Multicriteria Analysis and computer applications for decision-making in complex environmental problems. (ST02) SA21: Analyse the behaviour of relevant economic agents in environmental problems from the perspective of ecological economics. (ST07)			
	Competencies: CA19: Evaluate, from the perspective of ecological economics, the environmental impacts and possible sustainable management solutions through environmental assessment. (CT03) CA20: Critically evaluate the ethical and social implications of economic decisions in the field of environmental economics. (CT06) CA21: Demonstrate ethical responsibility in the analysis and proposal of solutions from ecological economics for socio-environmental management that respects biological and cultural diversity. (CT08)			
Training Activities		Directed	Supervised	Autonomous
	Hours	54	35	136
	% face-to-face attendance	100%	10%	0%

A9: Political Ecology (TBD)

Number of ECTS credits	6			
Typology	OP (Compulsory Specialty)			
Temporary organization	1.1			
Language	English			
Modality	Face-to-face			
Contents of the subject	- Political ecology as a multidisciplinary approach to the study of environmental problems from a critical perspective. - Major social theories that inform political ecology, including, for example, unequal ecological distribution, commons, social construction of nature, or environmental and climate justice. - Methodological tools for conducting political ecological research. - Selection of key concepts and debates in political ecology relevant to the Global South and North. - Examples of empirical research on the access, use, planning and/or governance of natural resources and urban infrastructure, and the unequal distribution of environmental costs and benefits.			
Learning outcomes of the SUBJECT	Knowledge: KA23: Define the main social theories that underpin political ecology, such as unequal ecological distribution, the commons, the social construction of nature, and environmental and climate justice. (KT07) KA24: Explain key concepts and debates in political ecology, highlighting their relevance in the contexts of the Global South and the Global North. (KT07)			
	Skills: SA22: Analyse examples of empirical research on access, use, planning and governance of natural resources and urban infrastructure, and the unequal distribution of environmental costs and benefits. (ST01) SA23: To analyse the relevant social and political actors in the study of socio-environmental conflicts from the perspective of political ecology. (ST07) SA24: Critically select qualitative and participatory methodologies suitable for research in political ecology. (ST08)			
	Competencies: CA22: Design environmental governance strategies and participation of social and institutional actors that promote equitable solutions to socio-environmental conflicts and sustainable resource management. (CT02) CA23: Work effectively in a multidisciplinary context to address sustainability challenges from a political ecology perspective. (CT04) CA24: Propose measures to reduce socio-environmental inequalities with special attention to the gender perspective and promote environmental justice within the framework of political ecology. (CT07)			
Training Activities		Directed	Supervised	Autonomous
	Hours	36	23	91
	% face-to-face attendance	100%	10%	0%

A10: Geographical Information Systems

Number of ECTS credits	5
Typology	OP
Temporary organization	1.1
Learning outcomes of the SUBJECT	Knowledge: KA25: Describe the conceptual and methodological foundations of Geographic Information Systems (GIS). (KT01) KA26: Define the data models and spatial databases that form the basis of GIS. (KT01) KA27: Explain the main analysis tools available in GIS software, to analyze environmental changes at different scales. (KT05) Skills: SA25: Manage GIS software for advanced online mapping search and the use of web geoservices. (ST02) SA26: Prepare cartographic compositions and edit results obtained in GIS for the expression of territorial information. (ST04) SA27: Autonomously use new GIS software functionalities, evidencing an adequate update through the development of cartographic products. (ST05) Competencies: CA25: Analyze complex socio-environmental problems using Geographic Information Systems as a support tool. (CT01) CA26: Critically evaluate the ethical and social implications derived from the use of GIS and spatial data in territorial management. (CT06)

Prerequisites

No prior knowledge is required.

Objectives

The main objective of this introductory course is to present the basic concepts and tools of spatial analysis offered by Geographic Information Systems (GIS) derived from the needs in socio-environmental planning and management.

The general objective is for each student to develop the skills to interpret and use spatial data and to lay the foundations for a subsequent (autonomous) expansion of knowledge in the science of GIS.

- Know the basic methods of georeferencing, the main georeferencing systems and the tools to make the necessary system changes.
- Study of the main data models in GIS, and their characteristics. Use of remote sensing data.
- Basic knowledge of data sources and formats useful for geographical studies of all kinds, with special attention to the available standards.
- Introduce knowledge of basic GIS operations such as mosaic, cropping, resolution changes, projection changes or reference system (ED50 to ETRS89 for example). Raster/vector conversion. Analysis of buffers and distance maps, etc. Introduction to interpolation.

- Present and extend knowledge of GIS tools in the context of real-world applications shown in the course, including spatial dynamics with remote sensing, urban growth, change of use, forest fires, etc.

Contents

The various topics developed in the course are:

- Topic 1: Geographic information
 - Information on the territory and on phenomena located in the territory
 - Geographical and non-geographical entities
 - Nature of geographic information
- Topic 2: Data models in GIS
 - The raster model
 - The vector model
 - Data Types, Data Formats, Internet Publishing
 - Remote sensing and GIS
- Topic 3: Spatial analysis
 - Layer Overlay
 - Buffer and distance maps
 - Introduction to Interpolation
- Topic 4: Georeferencing
 - Location as a factor in the relationship
 - The basic methods of georeferencing
 - Main reference systems

The application of the concepts and tools explained during the course in practical use cases will be carried out throughout the course, in an integrated way in the various topics.

Training Activities and Methodology

TIPUS	TÍTOL	HORES	RAs
Directed	1. Oral presentations by the teacher	12	KA25, KA26, KA27
Directed	2. Practical exercises or other teacher-guided training activities	17.75	SA25, SA26
Supervised	1. Resolution of guided practices	10	KA27, SA25, CA25
Supervised	2 Oral presentation of the student	5	KA26, CA26
Autonomous	1. Read theoretical literature	10	KA25

Autonomous	2. Practical exercises developed by students independently	48	SA27
Autonomous	3. Development of a final project	19	SA27, CA25

The content of the course will be developed from the following activities:

- Oral presentations by teachers
- Reading book chapters or articles (individual student activity, complementary to classroom work)
- Practical classes guided by the teacher
- Independent student work based on the teacher's proposals
- Students' oral presentation

Various GIS software will be used to carry out the course.

Evaluation

Continuous assessment activities

TITLE	WEIGHT (%)	HOURS	RAs	Types
1. Final exam	40%	3	KA25, KA26, SA25, CA25	Evaluation
2. Oral presentation	30%	0.25	KA27, SA27, CA26	Directed
3. Practical exercises developed at home	30%	0	SA26	Autonomous

Regular assessment

The evaluation of the course will be obtained from the resolution of practical exercises done in class and at home (30% of the final grade), a brief oral presentation (30%) and a short final exam (40%).

If the final grade does not reach 5, the student has another opportunity to pass the subject through the retake exam that will be held on the date set by the coordination of the degree. In this test, both exams (theoretical and practical) can be retaken. The internship and coursework part is not recoverable.

Single assessment

This subject does not provide for single assessment in accordance with the coordination of the degree and the Dean's Office of the Faculty of Sciences.

Copying and plagiarism

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 will be graded 0, regardless of the disciplinary

process that may be carried out. In the event that there are several irregularities in the evaluation acts of the same subject, the final grade of this subject will be 0. Those evaluation reports in which there have been irregularities are not recoverable.

Use of AI

In this subject, the use of Artificial Intelligence (AI) technologies is not allowed in any of its phases. Any work that includes AI-generated fragments will be considered a lack of academic honesty and may result in a partial or total penalty in the grade of the activity, or greater penalties in cases of severity.

Bibliography

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To the program

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A11: Qualitative Methods for Research in Social Sciences

Number of ECTS credits	5
Typology	OP
Temporary organization	1.1
Learning outcomes of the SUBJECT	Knowledge: KA28: Describe the epistemological concepts and design logic of qualitative and quantitative research in social sciences. (KT01) KA29: Define the different sources of information and data collection, processing and analysis techniques used in social science research (including the necessary software), recognising their usefulness. (KT01) Skills: SA28: Prepare exhaustive bibliographic reviews (systematic and narrative) on topics of interest in the field of Environmental Science and Technology. (ST03) SA29: Apply self-directed learning to acquire, deepen and update research and data analysis methodologies (interviews, focus groups, participant observation, etc.) in the field of social sciences. (ST05) SA30: Determine the most appropriate methodological articulation based on the research questions posed in the field of social sciences. (ST08) Competencies: CA27: Formulate research questions that integrate the interactions between ecological, economic, and social systems to address sustainability challenges, considering their ethical and social implications. (CT01) CA28: Design research in the social sciences, selecting and applying appropriate qualitative methods and techniques to address complex environmental problems. (CT02) CA29: Critically evaluate the ethical and social implications in the design of research in the field of social sciences. (CT06)

Prerequisites

There are no prerequisites.

Objectives

This module develops skills in research design, guiding students through the logic of the research process and providing them with the analytical, methodological, and technological tools necessary to conduct qualitative research in the social sciences. Throughout the course, students will engage with the conceptual and epistemological aspects of research design (including research questions and literature review), the development of research methods, ethical considerations, data collection techniques and skills, as well as data processing, analysis, writing, and presentation of research findings.

Students will define the objectives of their research, design a qualitative study, access existing data, prepare fieldwork, select appropriate techniques to obtain the required data, take detailed field notes, reflect on and monitor their research process, learn qualitative data analysis software, conduct different types of data analysis, and write analytical memos, reports, and articles. By the end of the course, students will be able to critically assess and evaluate research conducted by other scholars.

The course is organized and conducted as a research seminar, including weekly readings, discussions, field exercises, in-class activities, fieldwork reports, and student presentations. Students are expected to come to class prepared, having completed the readings and assignments, and to actively participate in class discussions.

Contents

Section 1: Foundations of Qualitative Research

- Session 1 Introduction to research and research design in Social Sciences
- Session 2 The research topic and research question
- Session 3 Research design

Section 2: Data Collection Techniques

- Session 4 Data collection I: Interviews
- Session 5 Data collection II: Focus Groups
- Session 6 Data collection III: Observation and case studies
- Session 7 Data collection IV: Other qualitative methods

Section 3: Analysis and Advanced Approaches

- Session 8 Data analysis: CAQDAS
- Session 9 Mixed Methods and Community-Based Participation

Section 4: Final Aspects of Research

- Session 10 Managing ethical issues
- Session 11 Writing and publishing qualitative research

Activities and Methodology

TIPUS	TÍTOL	HORES	RAs
Dirigides	Exposicions orals del professor	16	KA28, KA29
Dirigides	Exercicis pràctics guiats pel professor	8	KA29, SA30
Dirigides	Treball de camp	4	SA29, SA30, CA28
Supervisades	Treballs grups reduïts	10	SA30, CA27, CA28
Supervisades	Tutorització	6	SA29, SA30, CA29
Autònomes	Llegir literatura teòrica	15	KA28, SA28

Autònomes	Tasques breus desenvolupades pels estudiants de manera independent	16	SA29, SA30
Autònomes	Desenvolupament d'un treball final (individual i en grup)	40	SA28, SA30, CA27, CA28, CA29
Autònomes	Preparació del treball de camp	4	SA29, CA28

Work in large group (classroom):

1. Discussion of the assigned papers for the session (critical analysis)

Individual student work:

1. Preparation of weekly assignments and readings
2. Preparation and design of qualitative research
3. Class exercises

Work in small groups:

1. Preparation, conduction, and transcription of an interview
2. Writing a group report based on an interview
3. Workshop on qualitative data analysis (QDA software – CAQDAS)
4. Fieldwork

Annotation:

Within the timetable established by the institution or degree programme, 15 minutes of one class will be allocated for students to evaluate their lecturers and courses/modules through questionnaires.

Assessment

Continuous Assessment Activities

TÍTOL	PES (%)	HORES	RAs	Tipus
40%	Examen	2	40%	Examen
10%	Discussió lectures	2	10%	Discussió lectures
50%	Treball (individual i en grup)	2	50%	Treball (individual i en grup)

The course will include the discussion of readings, the preparation of assignments, and an exam for its assessment. Attendance and active participation in class discussions will be taken into account, including the quantity and quality of participation and a constructive attitude toward acquiring knowledge. Only the exam can be retaken.

To participate in the recovery exam, students must have previously been assessed in a set of activities whose weight amounts to at least two-thirds of the total grade. In this case, to pass the course, the student must take the resit exam when the exam grade is below 4 or the overall course average is below 5.

Students will receive a “Not evaluable” grade if they submit zero learning evidence or if the submitted work accounts for up to one-third of the total grade. If this threshold is exceeded, the final grade can no longer be “Not evaluable” and will be based on the learning evidence provided.

If a student commits any irregularity that may lead to a significant variation in the grade of an assessment activity, that activity will be graded with a 0, regardless of any disciplinary process that may follow. If multiple irregularities occur in the assessment activities of the same course, the final grade for the course will be 0. If any irregularity occurs in the exam, it will not be eligible for resit.

This course does not offer a single-assessment system.

For this course, the use of Artificial Intelligence (AI) technologies is permitted exclusively for support tasks such as bibliographic or information searches, summarisation, text correction, or translations. Students must clearly identify which parts have been generated with such technology and specify the tools used. Lack of transparency regarding the use of AI in this assessable activity will be considered academic dishonesty and may result in partial or total penalties on the activity grade, or more severe sanctions in serious cases

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Software

Microsoft Office or similar.

Nvivo/Atlas.ti

A12: Environmental Law: Essential Foundations for Professionals

Number of ECTS credits	5
Typology	OP
Temporary organization	1.1
Learning outcomes of the SUBJECT	Knowledge: KA30: Describe the European Union and international legal framework for environmental protection, including the regime applicable to climate change. (KT01, KT04) KA31: Explain the instruments of environmental prevention and control (strategic environmental assessment, environmental impact assessment, liability for environmental damage, permits) and voluntary instruments such as environmental certification and Corporate Social Responsibility (CSR). (KT01) KA32: Distinguish the specific legal protection regimes for different regulated environmental sectors such as water, coastline, atmosphere, waste, contaminated soils and biodiversity. (KT03, KT05) Skills: SA31: Interpret current environmental regulations by applying them to specific situations and problems of sustainable management. (ST01) SA32: Evaluate the integration of the environmental component in sectoral public policies from a legal perspective and considering the scope of application of each regulation. (ST08) Competencies: CA30: Analyze complex socio-environmental problems from a legal perspective, based on critical judgments on the application and effectiveness of environmental regulations. (CT01) CA31: Critically evaluate the ethical and social implications of environmental regulations and policies. (CT06) CA32: Demonstrate ethical responsibility and respect for fundamental rights and duties in the field of environmental law. (CT08)

Prerequisites

It is recommended that students have a basic knowledge of Law. Even so, each year a small introduction is made on the rules that are applicable, their hierarchy, the competence regime, and the various judicial levels.

Objectives and Contextualisation

This module is aimed at allowing students to understand and interpret the basic legal regime applicable to the environment and sustainability. Administrative environmental law will be discussed in particular, provided that it constitutes the cornerstone of the legal basis applying to the action of the public administrations concerning the environment, and also has a relevant impact in the world of business.

For that purpose, the subject is structured in three large thematic blocks. In the first, it is about offering an overview of what is currently understood by Environmental Law, which legal disciplines converge and in what way; Here it is absolutely essential to see the relevance of international environmental law as well as the environmental law of the European Union. It will also be necessary to influence the right of citizens to have an environment suitable for the development of the person and the duty to preserve it and the obligation of the public powers to ensure the rational use of all natural resources. That is why the role of the Environmental Administration and that of the citizens in the preparation and execution of Environmental Law will have to be discussed.

In the second block, several transversal mechanisms will be studied, which aim to guarantee the participation of citizens in environmental affairs, prevent damage to the environment, favour voluntary environmental rating or management systems, or establish the responsibility of those who cause damage environmental issues, such as access to environmental information, liability for environmental damage, integrated pollution control, environmental impact assessments, eco-labelling and environmental audits.

Finally, the third block will offer an overview of what is the legal regime applicable to environmental subsectors that are usually given independent regulatory treatment, both in terms of the existing distribution of competences and degree of development at state, regional and local, as in the administrative organization adopted, the rules currently in force, their interpretation and the level of application observed: the protection of natural spaces and biodiversity, and protection, management and planning of the landscape; the coast, the coast and the marine environment; continental waters; waste and contaminated soil and atmospheric, acoustic and light pollution. Depending on the time available, they will work more or less thoroughly.

Contents

BLOCK 1: GENERAL PART

1. Environmental protection and sustainability objectives as the subject matter of law. Principles. The environmental legal system.
2. The international framework for the legal protection of the environment. The international legal regime applicable to climate change.
3. The significance of European Union Environmental Law. Actors, competences (powers) and principles. The regulatory instruments used and their relationship with domestic law. Exercise of competences. The difference and complementarity with European strategic environmental programmes. The Eighth Environment Action Programme to 2030 and the European Green Deal.
4. Public Administration and environmental protection. Competences and environmental administrative organisation.

THEMATIC BLOCK 2: Cross-cutting mechanisms

5. Environmental information, citizen and group participation, and access to justice in environmental protection. Citizens' right to participate in the most relevant environmental protection decisions.
6. Liability for environmental damage. Basic features of criminal, civil, administrative and so-called environmental liability applied to this field.
7. Environmental assessment of plans and programmes or strategic environmental assessment. Environmental impact assessment of projects, works, installations and activities.
8. Environmental prevention and control through permits for potentially polluting activities.
9. Traditionally voluntary instruments and their evolution. Incentives for environmental protection. Environmental certification: Ecolabel, green claims/greenwashing, EMAS, ISO standards; Corporate Social Responsibility.

THEMATIC BLOCK 3: Regulated sectors

10. Protection of inland waters.
11. Protection of the coastline and the marine environment.
12. Atmospheric pollution, noise pollution; light pollution and odours: their legal treatment. The regime applicable to climate change.
13. Legal regime of waste and contaminated soils. Circular economy. Hazardous substances.

14. Protection of natural resources. Special protection areas. Protection of biodiversity and the protection, management and planning of landscapes.
15. Integration of the environmental component into the formulation and implementation of sectoral public policies: transport, energy, agriculture...

Activities and Methodology

TYPE	TITLE	HOURS	LOs
Directed	Lectures	20	KA30, KA31, KA32
Directed	Seminars / Practical sessions / Classroom activities	10	SA31, SA32, CA30
Supervised	Tutorials	5	KA30, KA31, KA32, SA31, SA32, CA30, CA31, CA32
Autonomous	Study	40	KA30, KA31, KA32, SA31, SA32, CA30, CA31, CA32
Autonomous	Readings: articles, case law...	10	KA30, KA31, KA32, CA31, CA32
Autonomous	Preparation of presentations and practical work; drafting of papers and/or essays	25	SA31, SA32, CA30

The Environmental Law course is delivered through directed, supervised and autonomous activities.

Directed activities consist of theoretical lectures and seminars/classroom activities.

Seminars and classroom activities usually consist of oral presentations of readings, case law and practical cases, following prior individual work (autonomous activity) and subsequent group deliberations in the classroom (directed activity). The materials are available on the Virtual Campus.

At the beginning of the course, a timetable will be published so that students can consult the schedule of theoretical classes and seminars/classroom activities.

Note: 15 minutes of one class session will be reserved, within the timetable established by the centre/degree programme, for students to complete teaching staff and course evaluation questionnaires.

Assessment

WEIGHT	TITLE	HOURS	LOs	TYPE
30%	First mid-term exam	2.5	KA30, KA31, KA32	Assessment
30%	Second mid-term exam	2.5	KA30, KA31, KA32	Assessment

40%	Class presentations and practical sessions; papers, essays	10	KA30, KA31, KA32, SA31, SA32, CA30, CA31, CA32	Directed
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1. Continuous Assessment

1.1 Assessable activities – Assessment of the theoretical contents of the course is based on two mid-term examinations (each worth 30% of the final mark). The remaining 40% corresponds to the assessment of classroom activities (presentations, practical exercises, etc.) and the papers or essays prepared by students.

At the beginning of the course, the lecturer will make available to students a timetable specifying the specific assessable activities and their weighting, within the limits set by this course guide. It will also indicate whether they are individual or group activities and the scheduled date.

Students will be assessable provided that they have completed a set of activities whose weight amounts to at least two thirds of the total course mark. If this threshold is not reached, the lecturer may consider the student as not assessable.

The dates set for examinations and other assessable activities are compulsory. Only duly justified circumstances that absolutely prevent attendance may allow the activity to be taken on a different date. Driving tests and similar situations are not considered justified reasons.

Mid-term examinations assess knowledge acquired in both lectures and seminars/classroom activities. At the beginning of the course, the lecturer will inform students of the format of the examinations (multiple choice, essay questions, mixed system, etc.).

The marks for classroom activities and written work will also take into account the knowledge and skills applied (ability to solve practical cases, argumentation, presentation skills, teamwork, among others).

To pass the course, it is necessary to obtain a weighted average mark of 5 points. There will be no possibility for students to complete additional work to increase the final average mark.

Students who fail the course (i.e., obtaining an average of less than 5 out of 10) may take the resit examination in accordance with the conditions set out below.

1.2 Resit – Only students who have sat both mid-term examinations may take the resit examination. There is no minimum mark required to access resit: all students who have sat both mid-term exams and have not passed the course may take the resit.

In this examination, both mid-term exams (theoretical and practical) may be recovered. Coursework and practical work are not recoverable. The content of the resit will cover the contents of both mid-term examinations. The lecturer will specify the format and structure of the resit examination.

The resit examination will take place on the date officially determined by the Master's Coordination.

In the resit grade, marks obtained for practical activities or coursework, as well as those obtained in any of the mid-term examinations, will not be taken into account.

1.3 Copying, plagiarism and use of Artificial Intelligence (AI) – Students who copy or attempt to copy in mid-term examinations or written exercises carried out in the classroom will receive a mark of 0 for the course

and will not be entitled to sit the resit examination. Likewise, students who copy or attempt to copy in the resit examination will receive a mark of 0.

Students who submit a practical exercise or any other activity in which there is evidence of plagiarism or who cannot justify the arguments presented will receive a mark of 0 for the activity and a warning. In the event of repeated conduct, the student will fail the course and will not be entitled to sit the resit examination.

Restricted use of AI: For this course, the use of Artificial Intelligence (AI) technologies is permitted exclusively for support tasks (such as bibliographic or information searches, proofreading or translations), or within the context of specific activities in which the lecturer expressly provides for the use of such technologies (such as case simulations). The student must clearly identify which parts have been generated using AI, specify the tools used and include a critical reflection on how these tools have influenced the process and the final result. Lack of transparency will be considered a breach of academic honesty and will entail the same consequences as plagiarism.

2. Single Assessment

2.1 Assessment activities – Assessment of the course is based on three activities: first mid-term exam (30%), second mid-term exam (30%) and practical exam (40%). All these activities will take place on the same day. The date of the assessments will coincide with that set for the second mid-term examination under the continuous assessment system.

The same “not assessable” criterion applies as in continuous assessment.

Students who copy or attempt to copy in the mid-term test, the final examination or the practical test will receive a mark of 0 for the course and will not be entitled to the resit examination. Likewise, students who copy or attempt to copy in the resit examination will receive a mark of 0.

2.2 Resit – Only students who have sat all the activities referred to in paragraph 2.1 may take the resit examination. The same resit system as for continuous assessment will apply.

Review of the final mark follows the same procedure as in continuous assessment.

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III) Webgrafia de carácter general útil:

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Official website European Union http://europa.eu/index_en.htm

Training Package on Principles of EU Environmental Law
<http://ec.europa.eu/environment/legal/law/principles.htm>

Summaries of the European environmental and climate change legislation <https://eur-lex.europa.eu/summary/chapter/20.html>

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https://ec.europa.eu/environment/legal/law/training_package.htm

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Software

This module does not require any specific software.

A13: Corporate Social Responsibility: Company Sustainability Report (TBD)

Number of ECTS credits	5			
Typology	OP			
Temporary organization	1.2			
Language	English			
Modality	Face-to-face			
Contents of the subject	• Concept and theoretical perspectives of CSR. • Strategic management and CSR. • Leading international initiatives related to CSR. • Environmental management tools. • CSR communication. EU standards and sustainability reporting: environmental and social risks.			
Learning outcomes of the SUBJECT	Knowledge: <i>KA33: Define the concept and theoretical perspectives of Corporate Social Responsibility (CSR), as well as the changing relationship between companies, society and public administrations. (KT01)</i> <i>KA34: Describe key international initiatives and regulation related to the different dimensions of CSR (economic, environmental, social, corporate governance). (KT01)</i> <i>KA35: Relate CSR to the strategic management of organisations and business management. (KT01)</i>			
	Skills: <i>SA33: Apply methodologies for CSR management and communication, including the use of European Union standards. (ST01)</i> <i>SA34: Apply self-directed learning strategies that allow continuous updating in the field of CSR and adaptation to its new social demands. (ST05)</i>			
	Competencies: <i>CA33: Work effectively in an international and multidisciplinary context to address CSR-related sustainability challenges. (CT04)</i> <i>CA34: Critically evaluate the ethical and social implications of CSR strategies. (CT06)</i> <i>CA35: Propose measures to reduce social inequalities, with special attention to gender inequalities in the field of CSR and the sustainability report. (CT07)</i>			
Training Activities		Directed	Supervised	Autonomous
	Hours	30	18	77
	% face-to-face attendance	100%	10%	0%

A14: Sustainable Transport and Mobility Policies

Number of ECTS credits	5
Typology	OP
Temporary organization	1.2
Learning outcomes of the SUBJECT	Knowledge: KA36: Differentiate the concepts of mobility and transport, as well as the factors that influence them, and their implication in urban sustainability. (KT01) KA37: Explain the environmental externalities and social consequences of the transport system, including spatial justice, social exclusion in access to mobility, impacts on economic development, and public health and well-being (KT01) KA38: Identify emerging technologies and their impact on urban mobility, as well as acceptance and opposition to transformative urban policies. (KT01) Skills: SA35: Analyse specific mobility problems to identify strategies to reduce dependence on the car. (ST01) SA36: Select key actors in the design and implementation of sustainable mobility policies. (ST07) Competencies: CA36: Evaluate the environmental and social impacts of transport systems to support proposals for sustainable mobility management. (CT03) CA37: Communicate the conclusions on transport and mobility policies to specialised and non-specialised audiences, clearly and unambiguously, adapting the message to the context. (CT05) CA38: Propose measures to reduce social inequalities in access to and use of transport. (CT07)

Prerequisites

There are no formal prerequisites. The course is open to students from all master specialisations. Basic familiarity with debates in urban planning, sustainability, urban geography or public policy is recommended. Students without previous training in urban mobility or transport planning will be asked to work through a short introductory reading pack provided at the beginning of the course. As the course is taught in English, students must be able to read academic texts and participate in discussions in English.

Objectives

- To distinguish between mobility and transport, and to understand the political character of decisions about infrastructure, public space, and everyday accessibility.
- To analyse how spatial, socioeconomic and sociopsychological factors shape mobility patterns and modal choice.
- To assess the environmental, social, economic and health consequences of transport systems, with particular attention to spatial justice, urban sustainability and the unequal distribution of mobility-related impacts, risks and benefits.
- To examine policies and strategies aimed at reducing car dependency and promoting more active, inclusive and sustainable forms of mobility, situating them within debates on ecological transition, urban conflict and the transformation of city models.
- To understand the factors that explain acceptance of and opposition to transformative urban policies, including perceptions of fairness, impact, responsibility and habit change.

Contents

- Introduction: the politics of mobility. Distinguishing mobility from transport; everyday mobility; who plans, for whom planning is done, and how mobility problems are framed.
- Spatial determinants of mobility. Density, diversity, design, accessibility, the 15-minute city, proximity environments, transit-oriented development, and the relationship between land use and modal choice.
- Socioeconomic and sociopsychological determinants. Age, gender, income, household composition, vehicle availability, trip purpose, time, cost, information, habits, symbolic values, and motonormativity.
- Environmental externalities of transport systems. Energy, emissions, fleet renewal, rebound effects, the Jevons paradox, car bloat, and the limits of technological fixes.
- Social and economic externalities. Accessibility, social exclusion, spatial justice, infrastructure impacts, time poverty, retail activity, real estate values, and the relationship between housing, mobility, and inequality.
- Health and road-safety impacts. Air pollution, noise, physical activity, urban heat islands, traffic injuries, unequal distribution of risk, and Vision Zero approaches.
- Car dependency and strategies for change. Induced demand, traffic evaporation, traffic calming, public transport, active mobility, pricing/congestion charging, superblocks, pedestrianisation, and the reallocation of road space.
- Future mobilities. Electric vehicles, autonomous vehicles, micromobility, MaaS, data governance, privacy, logistics, induced-demand risks, and equity implications.
- Acceptance, opposition, and political conflict. Perceived impacts and fairness, responsibility, values, social norms, public communication, and case analysis of transformative urban policies, with attention to Barcelona.

Activities and Methodology

The methodology combines lectures, discussion seminars, problem-based learning, case analysis, applied exercises and short written assignments. The course emphasises the connection between theory, empirical evidence and political conflict: students will work with academic readings, policy reports, audiovisual materials, local and international examples, and practical exercises such as a personal mobility log, the representation of activity spaces, and the critical analysis of a mobility policy.

Overall workload distribution: 30 directed hours, 18 supervised hours and 77 autonomous hours. Total: 125 hours.

TYPE	TITLE	HOURS	LOs
Directed	Lectures and conceptual seminars	14	KA36, KA37, KA38, CA36
Directed	Guided debates and in-class case analysis	8	SA35, SA36, CA37, CA38
Directed	Applied workshops: mobility log, activity spaces, and urban-policy exercises	8	SA35, CA36, CA38
Supervised	Supervision of the case-study work and policy brief	8	SA35, SA36, CA36, CA38

Supervised	Preparation and feedback on presentations and debates	5	SA36, CA37
Supervised	Supervised discussion of readings and materials	5	KA36, KA37, KA38, CA37
Autonomous	Reading academic articles, policy reports, and audiovisual materials	25	KA36, KA37, KA38
Autonomous	Preparation of the mobility log and activity-space map	12	SA35, CA36, CA38
Autonomous	Preparation of seminars, debates, and documented participation	10	SA36, CA37
Autonomous	Preparation of the final assignment / policy brief / case study	30	SA35, SA36, CA36, CA37, CA38

Assessment

Continuous Assessment Activities

TITLE	WEIGHT (%)	HOURS	LOs	Type
Written synthesis test I: concepts, theoretical frameworks and determinants of mobility	30%	1.5	KA36, KA37, SA35, CA36	Assessment
Written synthesis test II: externalities, transport policies and applied cases	30%	1.5	KA37, KA38, SA35, SA36, CA36, CA38	Assessment
Assignment 1	15%	10	KA36, SA35, CA36, CA38	Autonomous
Assignment 2	15%	14	KA37, KA38, SA35, SA36, CA36, CA38	Autonomous
Active and documented participation in seminars, debates and classroom activities	10%	0	KA36, KA37, KA38, SA36, CA37	Directed

The continuous assessment of the course is based on three main components: a written synthesis test, two short applied assignments and active participation in class sessions. The written test accounts for 60% of the final grade and is structured into two differentiated parts: the first part focuses on concepts, theoretical frameworks and determinants of mobility, while the second part focuses on the analysis of externalities, transport policies and applied cases. Each part accounts for 30% of the final grade.

The two assignments together account for 30% of the final grade. The remaining 10% corresponds to active and documented participation in seminars, debates and classroom activities. Participation will not be

assessed solely on the basis of attendance, but on informed contributions to discussions, preparation of readings or materials, and the ability to connect the course contents with contemporary cases, evidence and debates.

Recovery. The recovery date will be set by the degree coordination. The final written test can be reassessed.

Not assessable. Students will be considered not assessable when they have not submitted assessment evidence representing at least 40% of the final grade.

Copying and plagiarism. If a student commits any irregularity that may lead to a significant variation in the grade awarded for an assessment activity, this activity will be graded with 0, regardless of any disciplinary proceedings that may be initiated. If several irregularities occur in the assessment activities of the same course, the final grade for the course will be 0. Assessment activities in which irregularities have occurred cannot be reassessed.

Use of AI. In this course, the use of Artificial Intelligence technologies is permitted as an integral part of the development of coursework, provided that the final result reflects a significant contribution by the student in terms of analysis and personal reflection. Students must clearly identify which parts have been generated using this technology, specify the tools used, and include a critical reflection on how these tools have influenced the process and the final outcome of the activity. Lack of transparency in the use of AI will be considered a breach of academic honesty and may lead to a penalty in the grade for the activity, or more serious sanctions in severe cases.

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Software

- Virtual Campus/Moodle for materials, submission and communication.
- Word processor and spreadsheet software (Microsoft Office, LibreOffice or Google Workspace) for reports and basic analysis.
- Google My Maps or an equivalent tool for the mobility-log and activity-space exercise.
- Web mapping viewers and open urban data sources, such as OpenStreetMap, municipal geoportals or research-project viewers.
- Optionally, QGIS, Datawrapper, Flourish, Kepler.gl, R or Python for students who wish to extend their analysis; previous knowledge of these tools is not assumed.

A15: Urban Ecology (TBD)

Number of ECTS credits	5			
Typology	OP			
Temporary organization	1.2			
Language	English			
Modality	Face-to-face			
Contents of the subject	- Topics explored: Urban sustainability, resilience, vulnerability, environmental justice, nature values, green infrastructure, nature-based solutions, ecosystem services, socio-ecological-technological systems, urban metabolism, circular economy, industrial ecology and urban agriculture. - Tools and methodologies for the environmental improvement of cities at different scales (neighbourhoods, buildings and urban environment): spatial analysis, environmental modelling, multi-criteria decision analysis, socio-computational analysis, transdisciplinary research, co-creation, industrial ecology tools applied to cities and their spaces such as: life cycle assessment, ecodesign and material flow analysis.			
Learning outcomes of the SUBJECT	Knowledge: KA39: Define key concepts of urban ecology such as urban sustainability, resilience, vulnerability, environmental justice, green infrastructure, nature-based solutions and ecosystem services. (KT01) KA40: Relate the concepts of socio-ecological-technological systems, urban metabolism, circular economy and industrial ecology with the study of cities. (KT02) KA41: Describe the fundamentals of urban agriculture and its role in the sustainability of cities. (KT01) Skills: SA37: Apply tools and methodologies such as spatial analysis, environmental modelling and multi-criteria assessment for the environmental improvement of cities. (ST01) SA38: Critically select methods for valuing ecosystem services to apply them to urban planning and management issues, involving citizens and other agents. (ST07) Competencies: CA39: Analyze complex socio-environmental problems in urban environments, considering the interaction between ecological, economic, and social systems. (CT01) CA40: Work effectively in an interdisciplinary context to address complex urban sustainability challenges. (CT04) CA41: Propose measures to reduce socio-environmental inequalities in the development and planning of sustainable cities. (CT07)			
Training Activities		Directed	Supervised	Autonomous
	Hours	30	18	77
	% face-to-face attendance	100%	10%	0%

A16: Climate Change (TBD)

Number of ECTS credits	5			
Typology	OP			
Temporary organization	1.2			
Language	English			
Modality	Face-to-face			
Contents of the subject	- Patterns, causes and mechanisms of natural climate change in ocean and terrestrial systems. - Attribution of recent climate change to anthropogenic activities. - Tools for the study of climate, including numerical modelling, impacts of climate change and their consequences.			
Learning outcomes of the SUBJECT	Knowledge: KA42: Describe the patterns, causes and mechanisms of climate change, both natural and anthropogenic, in ocean and terrestrial systems. (KT04) KA43: Describe the tools and methodologies for the study of climate, including numerical modelling, and their application in the understanding of climate change. (KT01) KA44: Describe the current and future impacts of climate change and its consequences on natural and social systems. (KT04) Skills: SA39: Independently select information in the scientific literature to support and contextualise research in the field of climate change. (ST03) SA40: Continuously update one's own knowledge in climate science and its challenges through self-directed learning strategies. (ST05) SA41: Critically select appropriate methodologies for climate vulnerability and risk assessment at different scales. (ST08) Competencies: CA42: Analyse the complexity of climate science and the challenges of climate change, integrating knowledge and formulating critical judgements on the associated social and ethical responsibilities. (CT01) CA43: Communicate conclusions about climate change, its impacts and coping strategies to specialised and non-specialised audiences in a clear and unambiguous way. (CT05)			
Training Activities		Directed	Supervised	Autonomous
	Hours	30	18	77
	% face-to-face attendance	100%	10%	0%

A17: Biocultural Diversity

Number of ECTS credits	5
Typology	OP
Temporary organization	1.2
Learning outcomes of the SUBJECT	Knowledge: KA45: Describe the concept of biocultural diversity, the intersections between biological, linguistic and cultural diversity, and human-nature interactions analyzed from historical ecology and ethnobiology. (KT01) KA46: Describe biocultural approaches to conservation and health, as well as mechanisms for maintaining biocultural diversity (land and cultural rights) in relation to environmental justice and decolonization. (KT01) KA47: Explain the threats to indigenous and local knowledge systems, and the synergies and tensions with scientific knowledge systems, including the role of digital technologies and their risks and opportunities. (KT07) Skills: SA42: Select information in the scientific literature to inform and contextualize research on biocultural diversity. (ST03) SA43: Determine strategies for the co-production of knowledge with local communities in biocultural diversity studies. (ST06) SA44: Select relevant community and institutional actors in biocultural diversity and conservation projects. (ST07) Competencies: CA44: Communicate complex ideas and opinions about biocultural diversity, its challenges and conservation approaches, to specialized and non-specialized audiences. (CT05) CA45: Critically evaluate the ethical and social implications of interventions in contexts of biocultural diversity. (CT06)

Prerequisites

Students are expected to show an interest in the intersections between biological and cultural diversity, as well as in the social dimensions of conservation science, policy, and practice. Throughout the course, key concepts from different academic traditions will be used, such as critical geography, political ecology, cultural anthropology, ethnobiology or ecological economics. Having some general knowledge about the scientific literature in these areas would be very beneficial, although it is not strictly necessary. It is recommended to have a basic knowledge of conservation science (e.g. general notions about the history of conservation or basic principles of community conservation), as the social and ecological outcomes of different conservation approaches will be critically examined throughout the course. Proficiency in English (both oral and written) is required for this course.

Objectives

The term "biocultural diversity" refers to the spatial overlap and interconnections between biological diversity and cultural diversity. There is increasing evidence that some of the least ecologically altered landscapes on the planet coincide with territories that belong, are inhabited and/or managed by Indigenous Peoples and local communities. Moreover, there is a growing consensus every day that this coincidence is not at all random, and can be explained through the deeply intertwined relationships between biological

diversity and cultural diversity. In this sense, there is a solid base of scientific evidence demonstrating that the losses of biological, cultural and linguistic diversity are inextricably linked and are affected by the same pressures.

In this course we will explore biocultural diversity: what it is, why it is important and what factors can cause its erosion or maintenance. We will also address how it can be maintained and how biocultural approaches are being adopted in both research and public policy. The course is divided into sessions with different topics related to current biocultural research. Most classes will combine theory with practical applications and the use of audiovisual materials to illustrate the complex intersections between biological diversity and cultural diversity. We will also present real case studies of ongoing research to exemplify the different challenges involved in doing field research with a biocultural perspective. We will use debates, ethical dilemmas, and socio-environmental conflict resolution exercises to highlight how biocultural approaches to conservation often involve finding balances between conflicting goals, visions, and values.

At a methodological level, we will offer a general introduction to different field research methods used in ethnobiology and related disciplines, as well as to databases and biodiversity maps that are used in research on biocultural diversity. We will also work on impact-oriented writing, considering different audiences and objectives, as well as the right tools to achieve the desired impact.

Contents

The term "biocultural" is often used as a qualifier in a wide variety of contexts and initiatives, particularly in the fields of cultural heritage and ecosystem management. "Biocultural relations", "biocultural indicators" or "biocultural heritage" are just a few examples of the wide range of etymological and epistemic manifestations that are usually grouped under the umbrella concept of biocultural diversity, often described as the total variety exhibited by the world's interrelated natural and cultural systems. While the meaning of the term biocultural remains open to debate and subject to interpretation, it essentially involves recognizing the symbiotic and mutually enriching relationships between humans and the environment, as part of global efforts to reduce the growing separation between nature and culture. Their use often responds to a deliberate attempt to reflect the closely intertwined links between nature and culture, as expressed in land and seascapes around the world. It is not surprising that biocultural thinking is gaining ground in areas such as applied ecology, ethnobiology and related disciplines, positioning itself as an effective and fair model for conservation policies and practices.

The contents of this course will offer a broad overview of current issues in the study of the relationships between humans and nature from a biocultural perspective, recognizing the cultural dimensions of complex socio-ecological systems. All sessions emphasize, based on recent methodological and theoretical developments, that biocultural thinking is key to sustaining both the biophysical and sociocultural components of dynamic, interactive and interdependent socio-ecological systems. The different sessions are distributed as follows:

- Understanding human-nature interactions through the lens of historical ecology and ethnobiology.
- The intersections between biological, linguistic and cultural diversity.
- Threats to indigenous and local knowledge systems.
- Synergies and tensions between Western and indigenous knowledge systems.
- Biocultural approaches to conservation.

- Environmental Justice, Decolonization and Indigenous Peoples.
- Maintenance of biocultural diversity: rights to land and culture.
- Biocultural approaches to health.
- The contributions of local knowledge to climate research.
- Risks and opportunities of digital technologies and participatory cartography with communities.

Based on these varied and diverse topics, this course will highlight the multiple ways in which biocultural approaches promote transformations towards just, equitable and sustainable futures, and lead to a growing appreciation of the feedback loops between ecological states and human well-being, as well as the ethical dilemmas involved in applying biocultural approaches.

Training Activities and Methodology

TIPUS	TÍTOL	HORESle	RAs
Dirigides	Classes pràctiques	13	KA45, KA46, KA47
Dirigides	Classes teòriques	13	KA45, KA46, KA47
Dirigides	Recapitulació sobre el joc de rol	1	SA43, SA44, CA44
Dirigides	Visualització d'una pel·lícula documental i debat	3	CA44, CA45
Supervisades	Treball personal seguint les pautes del professorat	18	SA42
Autònomes	Cerca i lectura d'articles científics	50	SA42, SA44
Autònomes	Elaboració del treball escrit i preparació de la presentació oral	27	CA44, CA45

The module consists of 12 sessions of 3 hours each. The sessions are divided into two parts. During the first part (1.5 hours), students attend a master class and discuss the associated readings. Students are expected to be prepared and have reviewed the compulsory material before class. During the second part (1.5 hours), students will learn about the different methods used to explore the intertwined relationships between biological and cultural diversity, as well as basic negotiation skills to resolve conservation conflicts. You will also learn how to write with impact, whether for decision-makers, for academia or for a general audience, in preparation for the final essay of the subject (which will be assessed).

Note: 15 minutes of a class will be reserved, within the calendar established by the centre/degree, for students to complete the surveys to evaluate the performance of the teaching staff and the evaluation of the subject.

Evaluation

Continuous assessment activities

TÍTOL	PES (%)	HORES	Ras	Tipus
Assaig	30%	0	SA42, KA45, KA46, KA47	Autònoma
Negociació ambiental (joc de rol)	30%	2	SA43, SA44, CA44	Dirigida
Participació activa a classe	20%	0	KA47, CA44	Dirigida
Presentació oral de l'assaig	20%	6	SA42, CA44, CA45	Avaluació

This module does not offer Single Assessment, as agreed with the coordination of the Master's Degree and with the Secretary of the Faculty of Sciences.

Students will be evaluated according to:

Active participation in class (20%), demonstrating understanding of the scientific topics discussed and the readings, as well as participation in the debates held in class. Teachers will keep a written record of all attendance and interventions in class, and students will be evaluated based on whether they participate proactively with relevant and timely contributions that drive conversation. All sessions will include a brief discussion of the material assigned to each class, in which students will have a space to critically reflect on the main ideas. Face-to-face attendance is mandatory in this course. If a student misses a class, he/she must inform the teacher in advance and write a critical essay of 500 words about the materials of the missed class (which must be delivered within one week of the absence).

Trading simulation (30%). The performance of each student will be evaluated during the negotiation simulation, based on three main criteria: (a) the breadth and depth of the scientific arguments used during the negotiation; (b) their ability to achieve optimal results for the actor they represent in the negotiation; and (c) the use of the different negotiation techniques taught in the preparatory session prior to the class.

Writing with impact (30%). Students will submit a text in the format of an academic article, journalistic article or public policy article, on a topic of their choice relevant to class discussions.

Brief oral presentation (20%) of the essay during the last two days of the course.

In this subject, the use of Artificial Intelligence (AI) technologies is not allowed in any of its phases. Any work that includes AI-generated fragments will be considered a lack of academic honesty and may result in a partial or total penalty in the grade of the activity, or greater penalties in cases of severity.

Any form of plagiarism, including the total or partial copying of other people's works without proper citation, will be considered a serious offense. In accordance with current UAB regulations, these internships may result in the failure of the activity or subject.

In the event of not reaching the minimum evaluation criteria, students may opt for a recovery activity under the conditions and deadlines established by the teaching staff. To be able to access it, it will be necessary to have participated in the continuous assessment activities. The specific characteristics of the recovery will be adjusted to the nature of the competences not achieved.

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Software

No specific software is required.

A18: Water Management

Number of ECTS credits	5
Typology	OP
Temporary organization	1.2
Learning outcomes of the SUBJECT	Knowledge: KA48: Explain the characteristics of the governance of hydraulic infrastructures, both conventional (reservoirs, transfers) and alternative (desalination, reuse). (KT01) KA49: Describe governance models for decentralized water systems, including groundwater, graywater, and rainwater in urban environments. (KT01) KA50: Define the concepts of hidden water flows (water-energy nexus, virtual water, water footprint), water poverty, water as a social need, and commodification of water. (KT06, KT07) Skills: SA45: Propose solutions for the management of water demand, considering its complexity and applying technological and economic criteria. (ST01) SA46: Analyse the relevant actors in water governance, including administrations, users and civil society. (ST07) Competencies: CA46: Design new forms of governance and strategies to address water challenges based on a comprehensive analysis of water that considers its ecological, economic and social dimensions, including risk management. (CT02) CA47: Demonstrate ethical responsibility by promoting water governance that respects fundamental rights, gender equity, and democratic values. (CT08)

Prerequisites

English proficiency in reading, speaking and writing

Objectives

This 5 ECTS elective course, open to Master SAES students. It allows students to explore contemporary debates in global water resource management with aims to provide students with a theoretical and practical foundation for addressing the multifaceted challenges of the water cycle across different scales.

The course moves beyond traditional supply-side engineering to analyze the governance of both conventional (reservoirs, transfers) and alternative (desalination, reuse) infrastructures. Special attention will be given to the shift toward decentralized systems—such as groundwater management and urban greywater/stormwater harvesting—and the implementation of water demand management.

Students will examine the water-energy nexus and "hidden" dimensions like virtual water and water footprints. Furthermore, the course critically addresses the social and ethical dimensions of water, including water poverty, the risks of commodification versus remunicipalization, and the promotion of a governance model rooted in fundamental rights, gender equity, and democratic values. Through classroom exercises, case studies, seminars based on selected literature, and active debate, students will develop the competency in understanding the basics of water management.

Contents

General aspects of water resource management models.

Governance of large-scale conventional hydraulic infrastructure: reservoirs and water transfers.

Governance of large-scale alternative hydraulic infrastructure: desalination and reuse.

Governance of decentralized systems: groundwater, greywater, and stormwater in urban environments.

Water demand management: practices, economics, and technology.

Hidden water flows: water-energy nexus, virtual water, and water footprint.

Water poverty and water as a social necessity.

Commodification of water: privatization and (re)municipalization.

Risk management: droughts and floods.

Activities and Methodology

TIPO	TÍTULO	HORAS	RAs
Directed	Lectures	10	KA48, KA49, KA50
Directed	Exercises	8	SA45, SA46, CA46, CA47
Directed	Seminars	12	KA48, KA49, KA50, SA46
Supervised	Assigned readings	4	KA48, KA49, KA50
Supervised	Course Works	12	SA45, SA46, CA46, CA47
Supervised	Tutorial	2	KA48, KA49, KA50, SA45, SA46, CA46, CA47
Autonomous	Search	20	KA48, KA49, KA50, SA45, SA46, CA46, CA47
Autonomous	Personal study	27	KA48, KA49, KA50, SA45, SA46, CA46, CA47
Autonomous	Readings	30	KA48, KA49, KA50

The following activities will be carried out:

a) Lectures: Including some sessions led by a guest speaker.

b) Seminars: The teaching staff will provide a brief introduction to a specific topic, followed by student presentations of the assigned readings, group discussions on the main points covered in the readings, and a final conclusion coordinated by the instructor. Students are expected to read the assigned materials, prepare and lead the discussions, and participate actively in the debates.

c) Exercises: Practical exercises will be conducted in class, including both individual and cooperative work.

Note: Fifteen minutes of a class will be reserved, within the schedule established by the center/degree program, for students to complete the evaluation surveys regarding the teaching performance and the course.

Assessment

Continuous Assessment Activities

TÍTULO	PESO (%)	HORAS	RA
Class participation (including exercises)	20%	4	SA45, SA46, CA46, CA47
Oral presentation in seminar	20%	1	KA48, KA49, KA50
Summary of seminar (writing task)	20%	3	KA48, KA49, KA50, CA47
Course work (Final presentation)	40%	1	KA48, KA49, KA50, SA45, SA46, CA46, CA47

- **Class Participation (20%):** includes participation in classroom debates and practical exercises conducted in class.
- **Oral Seminar Presentation (20%):** based on the assigned readings.
- **Seminar Summary (written) (20%):** a written summary of the reading and the seminar debate that took place on the day of the presentation.
- **Coursework Project (40%):** a poster presentation to apply the topics covered during the course. A portion of the grade will be peer-reviewed.

Non-assessable: Any student who has not completed and submitted the coursework project will be considered "non-assessable." Unsubmitted activities will be graded as zero (0).

Plagiarism: Should a student commit any irregularity that could lead to a significant variation in the grade of an assessment activity, that activity will be graded as 0, regardless of any disciplinary process that may be initiated. If multiple irregularities occur in the assessment activities of the same subject, the final grade for the subject will be 0.

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

Retake (Resit): Activities related to class participation (including exercises) and the oral presentation of assigned readings are not eligible for a retake. In the event of failing the coursework project, it can be recovered on the date established by the faculty. The maximum grade for a retake is 5. Activities in which irregularities are detected (plagiarism, copying, misuse of AI, etc.) are not eligible for recovery.

Use of AI (Restricted Use): For this subject, the use of Artificial Intelligence (AI) technologies is permitted exclusively for support tasks, such as bibliographic or information searches, text correction, or translations. Students must clearly identify which parts have been generated with this technology, specify the tools used, and include a critical reflection on how these influenced the process and the final result of the activity. A lack

of transparency regarding the use of AI in an assessable activity will be considered academic dishonesty and may lead to a partial or total grade penalty, or more severe sanctions in serious cases.

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Software

No requirement

A19: Tools for Analysing the Metabolism of Societies

Number of ECTS credits	5
Typology	OP
Temporary organization	1.2
Learning outcomes of the SUBJECT	Knowledge: KA51: Describe the concept of metabolism of societies and biophysical indicators of sustainability. (KT01) KA52: Explain the methodologies of Material Flow Analysis (MFA), Input-Output Analysis (IOA) and Land and Time Budget Analysis. (KT01, KT02) KA53: Describe the approach of the Integrated Multiscale Analysis of the Metabolism of Societies and the integration of methodologies through system dynamics. (KT01) Skills: SA47: Calculate biophysical indicators to analyse the metabolism of societies in specific case studies, such as the energy transition. (ST01, ST05) SA48: Manage the specialized programs of Material Flow Analysis, Input-Output Analysis and Land and Time Budget Analysis to assess sustainability. (ST02) SA49: Select the appropriate methodologies for the analysis of the metabolism of societies at different spatial and temporal scales. (ST08) Competencies: CA48: Design integrated methodologies for analysing the metabolism of societies to address sustainability challenges. (CT02) CA49: Critically evaluate the ethical and social implications of the metabolism models of societies. (CT06)

Prerequisites

No prior knowledge is necessary.

Objectives

The main objective of this course is to introduce you to the main methodologies for analyzing the metabolism of societies from the perspective of ecological economics, providing you with the necessary tools to apply them in a practical and rigorous way to real case studies that will allow you to rigorously analyze the biophysical dimension of socioeconomic systems.

Upon completion of the course, you will have achieved the following specific objectives:

- Understand the theoretical foundations of social metabolism and the main biophysical indicators of sustainability.
- Apply Material and Energy Flow Analysis to quantify the biophysical exchanges of socioeconomic systems.
- Know and use the main data sources available for the calculation of metabolic indicators.
- Master the foundations of Input-Output Analysis and its applications in the context of social metabolism.
- Apply Land and Time Budget Analysis as a tool to evaluate the territorial and labor requirements of productive systems.

- Integrate the different methodologies within the framework of the Integrated Multiscale Analysis of the Metabolism of Societies (MuSIASEM).
- Work collaboratively in groups to analyze specific case studies, and communicate and defend the results obtained in a clear and well-founded manner.

Contents

The various topics developed in the course are:

- Topic 1: Introduction to the metabolism of societies.
 - Exosomatic evolution of societies.
 - Complexity and hierarchies.
 - Biophysical indicators of sustainability.
 - Ecological transition and metabolism
- Topic 2: Material and Energy Flow Analysis.
 - Material and energy balances
 - Data sources, calculation of indicators.
 - Examples of applications.
- Topic 3: Fundamentals of Input-Output Analysis.
 - Basic algebra
 - Principles of national accounts
 - Data sources, calculation of indicators.
 - Examples of applications.
- Topic 4: Land and Time Budget Analysis.
 - Conceptual framework
 - Data sources, calculation of indicators.
 - Examples of applications.
- Topic 5: Integrated Multiscale Analysis of the Metabolism of Societies (MuSIASEM).
 - Complex and emergent systems
 - Grammars of energy, water, and land use.
 - Data sources, calculation of indicators.
 - Application examples.

The concepts and tools explained during the course will be applied in practical use cases throughout the course, in an integrated manner across the various topics.

Activities and Methodology

TIPO	TÍTULO	HORAS	RAs
Directed	1. Oral presentations by teachers	10	K51, K52, K53
Directed	2. Practical exercises guided by teachers	19.75	SA47, SA48
Supervised	1. Resolution of guided practical exercises	10	SA48, CA48, CA49

Autonomous	2. Preparation of oral presentation by the student	5	SA49, CA49
Autonomous	1. Reading theoretical literature	20	K51, K52, K53
Autonomous	2. Practical exercises developed by students independently	34	SA47, SA48, SA49, CA48
Autonomous	3. Development of a final report on the practical work	18	CA48, CA49

The course content will be developed based on the following activities:

- Oral presentations by teachers
- Reading of book chapters or articles (individual student activity, complementary to classroom work)
- Practical classes guided by the teacher
- Independent work by students based on the teacher's proposals
- Oral presentation by students

Assessment

Continuous Assessment Activities

TÍTULO	PESO (%)	HORAS	RAs	Type
1. Final report	20%	2	K51, K53, SA47, CA49	Assessment
2. Oral presentation	30%	0.25	K52, K53, SA47, CA48	Directed
3. Practical exercises developed at home	50%	6	SA47, SA48, CA48	Autonomous

Continuous assessment

The course assessment will be obtained from the resolution of practical exercises done in class and at home (50% of the final grade), a brief oral presentation (30%), and a final report on the practical work (20%).

If the final grade does not reach 5, the student has another opportunity to pass the subject through the remedial exam that will be held on the date set by the degree coordination. In this test, the grade of the final report can be recovered. The oral presentation and practical exercises part is not recoverable.

Single assessment

This course does not provide for a single assessment.

Copying and plagiarism

In the event that the student carries out 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 instructed. In the event that several irregularities occur in the assessment acts of the same subject, the final grade for this subject will be 0. Those assessment acts in which there have been irregularities are not recoverable.

Use of AI

In this course, the use of Artificial Intelligence (AI) technologies is permitted only for text editing and as a learning aid. The use of AI for content creation, calculations, and/or data analysis is strictly prohibited. Any work that includes these unauthorized uses will be considered a breach of academic integrity and may result in a partial or full penalty to the activity's grade, or more severe sanctions in serious cases.

Bibliography

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Software

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A20: Strategies for Mitigation and Adaptation to Global Change (TBD)

Number of ECTS credits	5			
Typology	OP			
Temporary organization	1.2			
Language	English			
Modality	Face-to-face			
Contents of the subject	- Identify current socio-ecological challenges. - Conceptual framework of mitigation and adaptation strategies to global change. - Design of global change mitigation and adaptation strategies to promote resilience and resilience to the effects of climate change (nature-based solutions). - Valorization of ecosystem services. - Follow-up and monitoring of ecosystem services. - Assessment of global change mitigation and adaptation strategies in ecosystem services.			
Learning outcomes of the SUBJECT	Knowledge: KA54: Describe the conceptual framework of global change mitigation and adaptation strategies. (KT04) KA55: Explain current socio-ecological challenges and the role of nature-based solutions in mitigating and adapting to global change. (KT01) KA56: Describe the valorization of ecosystem services as a component of adaptation strategies. (KT05)			
	Skills: SA50: Apply tools and methods for the follow-up and monitoring of ecosystem services, as well as to assess the impact of mitigation and adaptation strategies on them. (ST02) SA51: Determine strategies for the co-production of mitigation and adaptation measures to global change, in collaboration with local actors and communities. (ST06)			
	Competencies: CA50: Design innovative proposals that incorporate nature-based solutions to address the effects of climate change. (CT02) CA51: Develop sustainable management solutions through mitigation and adaptation strategies, based on the assessment of the impacts of global change. (CT03) CA52: Propose well-founded measures to reduce socioeconomic inequalities in the implementation of mitigation and adaptation strategies to global change. (CT07)			
Training Activities		Directed	Supervised	Autonomous
	Hours	30	15	80
	% face-to-face attendance	100%	10%	0%

A21: Work Placement (TBD)

Number of ECTS credits	5			
Typology	PRO			
Temporary organization	1.2			
Language	Spanish			
Modality	Face-to-face			
Contents of the subject	The student joins the tasks assigned to companies in the environmental sector (in the broad sense), as well as in the environmental departments of institutions (companies, research centers, and public administrations). Such tasks may include the preparation of studies, reports, assessments, work plans and other similar work.			
Learning outcomes of the SUBJECT	Knowledge: KA57: Relate the theoretical and methodological knowledge acquired in the master's degree with the professional tasks and problems of an institution in the environmental sector. (KT01)			
	Skills: SA52: Apply knowledge of environmental science and technology to carry out environmental studies, reports or assessments or work plans in a professional environment. (ST01) SA53: Appropriately and effectively use Information and Communication Technologies (ICT), together with qualitative techniques and statistical tools, for diagnosis, proposal of solutions and transmission of ideas and results in professional contexts of environmental studies. (ST02) SA54: Communicate efficiently, orally and in writing, knowledge and results in the field of environmental, economic and social sustainability, in professional environments. (ST04) SA55: Execute the tasks assigned in the professional environment of environmental studies with responsibility and proactivity, identifying opportunities for improvement. (ST05)			
	Competencies: CA53: Integrate knowledge in a professional environment related to environmental, economic and social sustainability, formulating critical judgments based on social and ethical responsibilities. (CT01) CA54: Design creative strategies and solutions to face contemporary environmental challenges, applying assessment and communication instruments and techniques sensitive to a diversity of interests and audiences. (CT02, CT05) CA55: Work cooperatively in international and interdisciplinary contexts in the field of environmental studies, assuming and respecting the different roles and responsibilities of team members, as well as the established levels of hierarchy and coordination. (CT04)			
Training Activities		Directed	Supervised	Autonomous
	Hours	0	120	5
	% face-to-face attendance	100%	10%	0%

A22: Master's Degree Dissertation (TBD)

Number of ECTS credits	10			
Typology	TFM			
Temporary organization	1.2			
Language	English			
Modality	Face-to-face			
Contents of the subject	Preparation of students for future research work, i.e. a doctoral thesis or an R+D+i project in a company or administration. See the TFM section of this report.			
Learning outcomes of the SUBJECT	Knowledge: <i>KA58: Relate the fundamental and advanced and interdisciplinary methodological knowledge of environmental, economic and social sustainability, for the preparation of a research or innovation work. (KT01)</i>			
	Skills: <i>SA56: Independently select relevant information from the scientific literature and use research methodologies to propose and contextualise a master's thesis in the field of environmental, economic and social sustainability, considering its spatial scale. (ST03, ST08)</i> <i>SA57: Execute a research or innovation project in the field of sustainability, including its planning and organisation, with autonomy and under the corresponding academic supervision. (ST01, ST05)</i> <i>SA58: Prepare the Master's Thesis report following guidelines for the format and style of scientific publications. (ST04)</i>			
	Competencies: <i>CA56: Design innovative solutions or research approaches to current environmental challenges within the research lines of the master's degree. (CT02)</i> <i>CA57: Critically evaluate the results of research or innovative solutions in environmental studies, interpreting their implications and demonstrating coherence in analysis and discussion. (CT03)</i> <i>CA58: Effectively communicate the conclusions, knowledge and arguments of the Master's thesis, in a clear and unambiguous way, adapting the message to the context and adopting a critical approach. (CT05)</i> <i>CA59: Demonstrate ethical responsibility and respect for fundamental rights and duties in the development of the TFM in the field of environmental, economic and social sustainability. (CT08)</i>			
Training Activities		Directed	Supervised	Autonomous
	Hours	6	40	204
	% face-to-face attendance	100%	10%	0%