UAB
Universitat Autònoma de Barcelona

Interdisciplinary Concepts on Environmental, Economic and Social Sustainability

Code: 43068
ECTS Credits: 15

2024/2025

Degree	Type	Year
4313784 Interdisciplinary Studies in Environmental, Economic and Social Sustainability	OB	0

Contact

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Teachers

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Teaching groups languages

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

Prerequisites

No prerequisites

Objectives and Contextualisation

This is a 15 ECTS introductory and compulsory module which is shared by all the Master's specialisations.

Every environmental issue must be tackled considering natural as well as economic and social aspects in order to guarantee a sustainable solution for future generations. In this vein, this module aims to ensure that all Master's students are familiar with interdisciplinarity of environmental studies, offering at the same time some basics concepts and tools of all Master's specialisations.

From this interdisciplinary approach, a review of the essential concepts related to the three itineraries of this Master's program is conducted. Altogether, new concepts related to ongoing research conducted at ICTA and partner Departments are introduced. The participation of several teachers with diverse backgrounds and research experience enriches the module, as different and complementary perspectives will be discussed.

The module is divided in 5 parts:

- Part 1: Theory and Practice of interdisciplinarity in environmental science.
- Part 2: Introduction to ecological economics.
- Part 3: Introduction to Industrial Ecology.
- Part 4: Introduction to Global Change (a training stay in a natural space).
- Part 5: Communication and academic dissemination.

Parts 1 and 5 are broadly focused on interdisciplinarity either from a theoretical (part 1) or writing methods perspectives (part 5). In-between, parts 2 to 4 offer a basic introduction to each one of the Master's itineraries - Ecological Economics (part 2), Industrial Ecology (part 3) and Global Change (part 4) - without missing the module's interdisciplinary approach.

As this is an introductory module, most of the lectures take place during the first weeks of the Master, including a fieldtrip to the Planes de Son (Pyrenees). Nevertheless, the practical part of part 5 is carried out in March and April. Asthis is a practical part, students will be organised in two sub-groups. In this part basic issues related to communication and scientific dissemination will be practiced, developing some very useful skills for developing the Final Master's Thesis (TFM).

Competences

- Analyse how the Earth functions on a global scale in order to understand and interpret environmental changes on the global and local scales.
- Analyse, summarise, organise and plan projects related to the environmental improvement of product, processes and services.
- Apply knowledge of environmental and ecological economics to the analysis and interpretation of environmental problem areas.
- Apply knowledge of environmental engineering to purification and decontamination in different environments.
- Apply the acquired knowledge and methodologies of environmental, economic and social sustainability to the planning and control of environmental management policies and projects.
- Communicate orally and in writing in English.
- Seek out information in the scientific literature using appropriate channels, and use this information to formulate and contextualise research in environmental sciences.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.

Learning Outcomes

1. Apply a multi-criteria analysis to a system.
2. Communicate orally and in writing in English.
3. Compare and make an objective selection from among the different possible techniques in an industrial process, applying criteria of environmental sustainability.
4. Distinguish the Earth's subsystems and know its interactions.
5. Know the different options for waste treatment.
6. Know the economic tools that can be applied to problems of environmental policy.
7. Know the main systems for purifying water and gases.
8. Know the processes of prevention, re-use, recycling and valorisation of waste.
9. Know the two fundamental tools for evaluation problems: Cost-benefit analysis and multi-criteria analysis.

10. Seek out information in the scientific literature using appropriate channels, and use this information to formulate and contextualise research in environmental sciences.
11. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.

Content

PART 1 - THEORY AND PRACTICE OF INTERDISCIPLINARITY IN ENVIRONMENTAL SCIENCES

- Instructor: Eduard Ariza
- Dates: September 17, 18, 19, 20, and 23 (15:00-18:00)

09/17 Course Introduction

- Introduction to the module
- Introduction top part 1
- Key definitions

09/18 History and theory of interdisciplinarity and transdisciplinarity in sustainability research

- Philosophical concepts and recent evolution
- The need to clarify hidden assumptions: the reflexive approach
- Sustainability science as a value laden research
- The difficult task of framing wicked problems
- Epistemological pluralism

Required Reading:

Lélé, S., and R. B. Norgaard. 2005. "Practicing Interdisciplinarity." Bioscience 55 (11): 967-975.

09/19 Transformative Adaptation

- Transition from Environmental Education and Sustainability to Integrated Systems Thinking
- Theory of transformative learning
- Practice of transformative learning
- Spheres of transformation

Required Reading:

O'Brien, K. 2018. Is the 1.5°C target possible? Exploring the three spheres of transformation. Current Opinion in Environmental Sustainability 31: 153-160

09/20 Different Approaches to Co-Production in Global Change Research

- Descriptive motivation and normative motivation
- Learning, empowerment, institutions, interactions, deconstruction, complexity, dialogue, and societal integration

Required Reading:

Bremer, S. and Meisch, S. 2017. Co-production in climate change research: re-viewing different perspectives. WIREs Clim Change, 8: e4822

09/23 Practical Experiences in Co-Production

- Description of transdisciplinary research process: design, methodology, data collection, treatment, and analysis
- Limitations in prior knowledge, progress, and future research

Required Readings:

Zanotti, L., Carothers, C., Apok, C. A., Huang, S., Coleman, J., & Ambrozek, C. (2020). Political ecology and decolonial research: co-production with the Iñu-piat in Utqiaġvik. Journal of Political Ecology, 27(1), 43-663.

Anna Marín-Puig, A. Ariza, E., and A. Casellas. 2022. "Unattended gap in local adaptation plans: The quality of vulnerability knowledge in climate risk management." Climate Risk Management, 38, 2022, 100465.

PART 2 - INTRODUCTION TO INTERDISCIPLINARY CONCEPTS: ECOLOGICAL ECONOMICS BLOCK

- Instructors: Sergio Villamayor (Block A) and Roberto Cantoni (Block B)
- Block A Dates: September 25, 26, October 2, and 3 (15:00-18:00)
- Block B Dates: September 30, October 1, 7, and 8 (15:00-18:00)

Sergio Villamayor-Tomas (SVT) and Roberto Cantoni (RC) provide an introduction to Ecological Economics as understood within the Barcelona School. Theirsessions cover the following topics:

- SVT Sessions:
    1. Conceptual and historical foundations of heterodox economics and ecological economics (2 sessions)
    2. The role of alternatives (based on the commons) in development and the pluralism of values and knowledge (2 sessions)
- RC Sessions:
    1. Social metabolism and itsconnections with environmental justice (2 sessions)
    2. Decoupling and the political applications of ecological economics principles (2 sessions)

The sessions are structured as follows:

September 25: Basic Concepts of Ecological Economics (SVT)

- Objectives: Contextualize ecological economics within the field of heterodox economics and introduce fundamental concepts.

Required Reading:

- Martinez-Alier, J., & Muradian, R. (2015). "Taking stock: the keystones of ecological economics." In J. Martinez-Alier & R. Muradian (Eds.), *Handbook of Ecological Economics*, Edward Elgar Publishing (pp. 1-26).

September 26: The History of Ecological Economics and the Barcelona School (SVT)

The objectives of this session are twofold:

1. Familiarize participants with the process through which scientific norms and programs evolve, using the example of ecological economics.
2. Provide a firsthand introduction to research on climate behavior economics conducted by one of the Ecological Economics research groups at ICTA (Institute of Environmental Science and Technology).

Required Reading:

- Walker, T. C. (2010). "The perils of paradigm mentalities: Revisiting Kuhn, Lakatos, and Popper." *Perspectives on Politics*, 433-451.
- Villamayor-Tomas, S., Roy, B., Muradian, R. (2022). "The Barcelona School of Ecological Economics and Political Ecology: Building bridges between moving shores." In S. Villamayor-Tomas & R. Muradian (Eds.), *The Barcelona School of Ecological Economics and Political Ecology: A Companion in Honour of Joan Martinez-Alier*, Springer.

September 30: Social Metabolism (RC)

The session aims to:

1. Introduce the theoretical foundations of social metabolism.
2. Examine whether variations in social metabolism are linked to environmental conflicts and explore how.
3. Understand the biophysical roots of the economic process, the feasibility (or lack thereof) of circular economy, and its implications for growth and social justice.
4. Feature presentations by guest speakers representing research groups at ICTA.

Required Readings:

- Scheidel, A. (2023). "Does the Social Metabolism Drive Environmental Conflicts?" In *The Barcelona School of Ecological Economics and Political Ecology: A Companion in Honour of Joan Martinez-Alier* (pp. 181-193). Cham: Springer International Publishing.
- Georgescu-Roegen, N. (1975). "Energy and Economic Myths." *Southern Economic Journal*, 347-381.

October 1: Environmental Justice (RC)

The objective of this session is to understand how both extractive projects and nature conservation efforts can contribute to environmental conflicts. Additionally, we will analyze the nexus between climate, health, and immigration. The session will also feature presentations by guest speakers representing research groups at ICTA.

Required Reading:

- Temper, L., Del Bene, D., & Martinez-Alier, J. (2015). "Mapping the frontiers and front lines of global environmental justice: the EJAtlas." *Journal of Political Ecology*, 22(1), 255-278.

October 2: Alternatives and Commons (SVT)

The goal of this session is to provide a firsthand introduction to the concept of "alternatives" and its connection to the commons paradigm, as practiced in both the Global South and North. The session will also include presentations by guest speakers representing research groups at ICTA.

Required Readings:

- Temper, L., Walter, M., Rodriguez, I., Kothari, A., & Turhan, E. (2018). "A perspective on radical transformations to sustainability: resistances, movements and alternatives." *Sustainability Science*, 13, 747-764.
- Villamayor-Tomas, S., & García-López, G. A. (2021). "Commons movements: Old and new trends in rural and urban contexts." *Annual Review of Environment and Resources*, 46(1), 511-543.

October 3: Plurality of Values and Knowledge (SVT)

The objective of this session is to explore firsthand the work on evolutionary economics, environmental psychology, and local ecological knowledge carried out by two of the Ecological Economics research groups at ICTA. The session will also include presentations by guest speakers representing research groups at ICTA.

Required Readings (TBC):

- Langemeyer, J., Baró, F., Roebeling, P., & Gómez-Baggethun, E. (2015). "Contrasting values of cultural ecosystem services in urban areas: The case of Montjuïc Park in Barcelona." *Ecosystem Services*, 12, 178-186.
- Reyes-García, V., García-del-Amo, D., Benyei, P., Fernández-Llamazares, Á., Gravani, K., Junqueira, A. B., … & Soleymani-Fard, R. (2019). "A collaborative approach to bringinsights from local observations of climate change impacts into global climate change research." *Current Opinion in Environmental Sustainability*, 39, 1-8.
- van den Bergh, J. (2023). "Climate policy versus growth concerns: Suggestions for economic research and communication." *Journal of Behavioral and Experimental Economics*, 107, 102125.

October 7: Degrowth (RC)

The objective of this session is to introduce the concept of "degrowth" and reflect on its theoretical and empirical impact in various geographical contexts. The session will also include presentations by guest speakers representing research groups at ICTA.

Required Reading:

- Kallis, G., et al. (2018). "Research on Degrowth." *Annual Review of Environment and* Resources, 43, 4.1-4.26.

October 8: Political Applications (RC)

The goal of this session is to understand the political applications of ecological economics through the study of real-world cases. The session will also include presentations by guest speakers representing research groups at ICTA.

Required Reading:

- Honey-Rosés, J., Anguelovski, I., Chireh, V. K., Daher, C., Konijnendijk van den Bosch, C., Litt, J. S., … & Nieuwenhuijsen, M. J. (2021). "The impact of COVID-19 on public space: an early review of the emerging questions-design, perceptions and inequities." *Cities & Health*, 5(sup1), S263-S279.

PART 3 - INTRODUCTION TO INDUSTRIAL ECOLOGY

- Instructors: Laura Talens and Carles Gasol
- Dates: October 9, 10, 14, and 15 (15:00-18:00)

The sessions will be structured as follows:

1. Introduction to Circular Economy and Key Tools in Industrial Ecology
   Overview of different schools of thought, with a focus on industrial ecology.
   Description of EU Circular Economy action plans.
   Linking Circular Economy plans with other EU strategies, such as eco-design regulations and critical materials.
3. Introduction to Eco-design
   Basics of eco-design and its application to products.
   Review of EU environmental product legislation (Eco-design Regulation and Sustainable Product Policy).
   Discussion of existing implementation measures.
5. Overview of Life Cycle Assessment (LCA) Tools

Introduction to LCA as a tool for evaluating products, services, and projects.

- Carbon footprint assessment for organizations, products, and services.
- Qualitative environmental tools: Strategic Environmental Assessment.
- Environmental certification systems for products and organizations.
- Introduction to carbon footprint applied to waste management.
- Relationship between municipal waste management systems, carbon footprint, and impact reduction.
- Use of the CO2ZW tool.

PART 4 - INTRODUCTION TO GLOBAL CHANGE

- Instructors: Miquel Ninyerola and Jordi Cristóbal
- Dates: October 16, 17, 18 -> Excursion to Planes de Son

This part of the program will take place outside the UAB campus (250 km away) and will last for 2.5 days. The experience offers an opportunity to learn about natural sciences and socioecological aspects while attending explanations about ongoing projects in the area. Participants will get to know each other better and begin

collaborating andworking together. The activities will occur in one of the natural spaces owned by the Fundació Catalunya-La Pedrera (FC-LP) dedicated to teaching and research: MónNatura Pirineus. For more information, visit: https://fundaciocatalunya-lapedrera.com/es/espacios-naturaleza/monnatura-pirineus.

Why this area? In 2012, UAB and FC-LP signed a contract to facilitate teaching and research activities for UAB members, especially in Alinyà. Due to the size of our group, our activities take place at MónNatura Pirineus.

As an example of the activities and discussions:

- Introduction to the visited area: climatology, geomorphology, biodiversity, biogeography.
- Livestock and pasture and forest management.
- Ongoing research and teaching projects.
- Sustainable use of the local environment and practical landscape interpretation from a socioecological perspective.

FC-LP (Fundació Catalunya La Pedrera) is a private and independent foundation led by a board of experts in various fields. Its goal is to improve people's quality of life and build a better future. Learn more at (https://www.fundaciocatalunya-lapedrera.com/es/quienes-somos).

PART 5 - ACADEMIC COMMUNICATION AND DISSEMINATION

- Instructor: Ricard Morén-Alegret

- Dates and Group/Subgroup Distribution:
  Full group: February 11 and 18 (15:00-18:00)
  Subgroup A (last names A to L): March 14, 21, 28, and April 4 (10:00-13:00)
  Subgroup B (last names M to Z): March 14, 21, 28, and April 4 (15:00-18:00)

Course Objectives: This part of the course introduces students to key aspects ofwriting and oral presentations in an academiccontext in English. The main goal is to help students improve their knowledge of writing articles, reports, theses, and preparing oral presentations with PowerPoint support. Students will specifically work on research design, critical summaries, synthesis, and presentations.

Course Contents: The sessions include:

1. Readings: Students will read academic articles selected by the instructor and themselves. Some readings will be discussed in class.
2. Short writing exercises: Students will complete various short writing exercises during class.
3. Academic debates: Collective discussions will take place in the classroom and other spaces.
4. Exams (March 28, 2025): Students will take two individual exams in person on campus:
   Exam 1: Basic definitions related to academic dissemination and communication.
   Exam 2: Problem-solving, focusing on academic dissemination and communication.
6. Individual oral presentation with PowerPoint support (April 4, 2025).

Mandatory readings

- Boncori, Ilaria (2023)*Researching and Writing Differently*. Bristol, UK: Policy Press. See: https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010817743806709
- Eco, Umberto (2015) *How to Write a Thesis*, Cambridge, Massachusetts, USA: MIT Press. See: https://bibcercador.uab.cat/permalink/34CSUC_UAB/avjcib/alma991010481837706709
- Freiermuth, Mark R. (2023) *Academic Conference Presentations: A Step-By-Step Guide*, London: Springer. See: https://bibcercador.uab.cat/permalink/34CSUC_UAB/1c3utr0/cdi_proquest_ebookcentral_EBC7168715
- Hsu, Hua (2015) A Guide to Thesis Writing that is a Guide to Life, *The New Yorker*, April 6, see: https://www.newyorker.com/books/page-turner/a-guide-to-thesis-writing-that-is-a-guide-to-life
- Morén-Alegret, Ricard; Milazzo, Josepha; Romagosa, Francesc & Kallis, Giorgos (2021) 'Cosmovillagers' as Sustainable Rural Development Actors in Mountain Hamlets? *European Countryside Journal*, 13(2), 267-296. See: https://doi.org/10.2478/euco-2021-0018

- Pullen, Alison; Helin, Jenny & Harding, Nancy (2020) *Writing Differently*, Bingley, UK: Emerald Publishing Limited. See: https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010496454506709

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	40	1.6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Practical exercices	15	0.6	2, 3, 6, 10, 11
Seminars	40	1.6	2, 3, 4, 11
Type: Supervised			
Course works	35	1.4	1, 3, 10, 11
Reading papers	40	1.6	10, 11
Tutorships	7	0.28	1, 3, 4, 5, 6, 7, 8, 9, 11
Type: Autonomous			
Exercice preparation	45	1.8	1, 2, 4, 10, 11
Information research	50	2	10, 11
Personal study	50	2	1, 3, 4, 5, 6, 7, 8, 9, 10, 11
Readings	50	2	1, 3, 4, 5, 6, 7, 8, 9, 10, 11

PART 1 - THEORY AND PRACTICE OF INTERDISCIPLINARITY IN ENVIRONMENTAL SCIENCES

Students will read, summarize, and prepare a brief presentation for an assigned reading in each session of this part. Each session will begin with a brief introduction to the specific topic provided by the instructor. Then, a puzzle methodology will be used to present and discuss the assigned readings, followed by a group debate on the main points discussed in the readings. Finally, students will individually respond to a questionnaire covering the topics discussed.

PART 2 - INTRODUCTION TO ECOLOGICAL ECONOMICS

The sessions are designed as a combination of lectures, debates, and self-learning activities (reading, assignments, and group work). They provide a space for students to interact with ICTA academics and critically evaluate their work.

PART 3 - INTRODUCTION TO INDUSTRIAL ECOLOGY

- Introduction to Circular Economy and Key Tools in Industrial Ecology
  12 hours of class including theory and practical exercises.
  6 hours on Circular Economy, Eco-design, and theory applied to case studies.

6 hours of theory and case studies.
25 hours of readings (documents and case studies) and out-of-class studies (individual and group).

In-Class Hours: The theoretical classes will provide students with the necessary knowledge to understand the application of Life Cycle Assessment (LCA), Carbon Footprint, and Eco-design tools in the analysis and design of electrical and electronic equipment (EEE), as well as conceptualizing a circular economy project.

Out-of-Class Work: Consists of two exercises:

1. Review of an article focused on an LCA case study.
2. Group research project.

Group Projects: Conceptualization and design of a project proposal based on circular economythemes, such as:

- Circular supply: using recycled and reusable materials instead of new ones.
- Resource recovery: innovative processes with a positive impact on the value chain.
- Extending product life: through recovery, resale, or ecological design.
- Products as services: offering paid services for a product while retaining ownership for resource recovery.
- Process innovation: closed-loop production to maximize resource use and minimize environmental impact.

The project proposal will be presented as follows:

- A short video describing the project (max. 7 min). The video should highlight the main objective, potential environmental, social, and economic benefits, and the tentative methodological approach for evaluation.
- A brief report with the following content:
    Section 1: General project focus
        Description of the circular economy project objective.
        Methodological approach.
        Potential project benefits.
    Section 2: Potential impact assessment of the project
        Provisional environmental assessment using tools focused on a systematic life cycle approach.
        Description of the Functional Unit and system or product.
        Discussion of expected evaluation results using the selected environmental tool.

Project proposals will be evaluated based on the following aspects:

1. Discourse and Communication:
    Clarity of the objective, methodology, and results.
    Correct usage of vocabulary and terminology.
3. Time Management:
    Effective use of time for important aspects.
5. Format and Data:
    Ability to convey informationclearly (good listening and reading comprehension).
    Presentation format that facilitates understanding.
7. Project Evaluation:
    Real-world applicability and replicability of the proposal.
    Originality and innovative nature of the idea.
    Potential benefits in environmental, social, and economic aspects.
9. Clear and Measurable Objectives:
    Existence of well-defined and measurable goals.
    Indicators for tracking progress.

PART 4 - INTRODUCTION TO GLOBAL CHANGE

At the beginning of the Master's program, a detailed agenda will be provided for the trip to the space (which will be organized by ICTA-UAB) and the activities. Although the Master's program will cover most of the expenses, students will be asked to contribute a small amount towards travel and accommodation costs. The required amount will be determined later and will not exceed €100 per person (for the 2.5 days of training).

We will engage in outdoor activities as well as classroom sessions, talks, and debates related to understanding and sustainably using the local environment. Key speakers include Miquel Ninyerola (Professor in the Department of Animal Biology, Plant Biology, and Ecology-UAB), Jordi Cristóbal (Professor in the Department of Geography-UAB), FC-LP staff (to be determined), and all Master's students participating in the debates.

Field activities will be adapted to the visited natural space and weather conditions.

PART 5 - ACADEMIC COMMUNICATION AND DISSEMINATION

1. Professor's presentations, problem-solving, and case studies.
2. Learning based on real-world cases.
3. Written and visual presentations using PowerPoint and oral presentationsin the academic workspace.
4. Scientific debates and discussions.
5. Participation in complementary activities.

All activities have deadlines that must be respected according to the proposed schedule (unless students have an official medical certificate indicating the need for additional time). In any case, when possible, it is recommended to maintain open communication with the professor

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

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Assignments, projects and course works	30	0	0	2, 3, 4, 5, 7, 8, 10, 11
Attendance and active participation at class	10	0	0	1, 2, 4, 5, 6, 8, 9, 11
Essays	20	0	0	2, 11
Exams	7	3	0.12	2, 10
Fieldtrip activities	20	0	0	2, 3, 5, 6, 7, 8, 9, 10, 11
Quizzes and questionaires at class	13	0	0	3, 4, 5, 7, 11

Grades will be distributed as follows:

- Part 1: 15%
- Part 2: 30%
- Part 3: 15%
- Part 4: 20%
- Part 5: 20%

To pass the module, students must achieve a minimum grade of 5 out of 10 in each part.

Single Evaluation: This module does not offer the Single Evaluation option, as per the coordination of the program and the Dean's Office of the Faculty of Sciences.

Plagiarism: Copying or plagiarism in any evaluation activity constitutes an offense and will result in a grade of 0, with no possibility of recovery, whether it's an individual or group assignment. If during an individual in-class assignment, the instructor detects a student attempting to copy or use any unauthorized documents or devices, the student will receive a grade of 0 without the option of recovery. A work or activity will be considered "copied" if it reproduces all or a significant part of another student's work. It will be considered "plagiarism" if presented as one's own without citing sources, regardless of whether the original sources are in print or digital format.

PART 1 - THEORY AND PRACTICE OF INTERDISCIPLINARITY IN ENVIRONMENTAL SCIENCES

- Class participation: 10%
- In-class reading questions: 40%
- Group essay: 50%

Not evaluable: A student who has not submitted more than 30% of the evaluation activities will be considered not evaluable.

Recovery: A student who does not achieve a 5 in Part 1 can recover the essay through a new individual essay to be completed on the agreed date on the first day of class.

PART 2 - INTRODUCTION TO ECOLOGICAL ECONOMICS

- Exam to be held on October 30 covering concepts learned in the first two classes (30%).
- Group essay of 1,500 words on the Barcelona School of Ecological Economics and Political Ecology (70%).
- Studentswill be considered "Not evaluable" if they do not submit evaluation work worth at least 30% of the final grade (i.e., if they do not submit at least one of the exam or group work).
- If a student does not achieve at least half of the available points, they will have a second opportunity to submit the essay as an individual task, no later than two weeks after the grades are published.

PART 3 - INTRODUCTION TO INDUSTRIAL ECOLOGY

- To pass the module, students must achieve a minimum grade of 4.0 in each block, and the combined grade must be higher than 5. If a student fails in a block, they must re-enroll in the entire module.
- Block 1: Evaluation consists of 30% initial in-class exams, 20% review exercise of an LCA publication as an assignment, 40% project as an assignment, and 10% based on participation and class attendance.

Participation grade includes:

1. Quizzes (Individual): Each class will begin with a 10-15 minute quiz based on the previous class and assigned readings. This ensures continuous effort from students and motivates them to arrive on time and be prepared to think.
2. Assignments (Individual): There will be 1 activity during the course based on a critical review of an LCA scientific publication.
3. Project (group): Students will create a video presentation of their project during the course. They will also submit a report on the conceptualization, design, and potential environmental impact assessment method of the project. The final project and its presentation will be announced during classes.

- Not Evaluable: A student who has not submitted more than 30% of the evaluation activities will be considered not evaluable.
- Recovery: A student who does not achieve a 5 in the industrial ecology module can take a recovery exercise based on an exam with 3 questions. The maximum grade that can be obtained is 6 out of 10

PART 4 - INTRODUCTION TO GLOBAL CHANGE

The students will create a poster (in groups of 4-5) which will be assessed. Students who receive a score below 5 in the poster presentation will need to repeat it. A date for reevaluation will be set.

PART 5 - ACADEMIC COMMUNICATION AND DISSEMINATION

1. Proactive, critical, and constructive participation in in-person debates on campus related to readings: 20%
2. In-class exercises: 25%
3. Exams: 35%
4. Oral presentation with PowerPoint support: 20%

IMPORTANT NOTE: To pass this part of the course, students must submit in-class exercises, take in-person exams (achieving at least a grade of 5/10), and deliver an oral presentation in class with PowerPoint support (PPT) on the established day and location. If a student fails, oral presentations with PPT can be retaken in June-July. However, participation and in-class exercises cannot be retaken.

Regarding this Part 5, a student will receive a "not evaluable" if they submit less than one-third of the requested coursework.

Bibliography

PART 1 - THEORY AND PRACTICE OF INTERDISCIPLINARITY IN ENVIRONMENTAL SCIENCE

- Bremer, S. and Meisch, S. 2017. Co-production in climate change research: re-viewing different perspectives. WIREs Clim Change, 8: e4823
- Lélé, S., and R. B. Norgaard. 2005. Practicing interdisciplinarity. Bioscience 55 (11): 967-9751
- Anna Marín-Puig, A. Ariza, E., and A. Casellas. 2022. Unattended gap in local adaptation plans: The quality of vulnerability knowledge in climate risk management. Climate Risk Management, 38, 2022, 100465
- O'Brien, K. 2018. Is the 1.5°C target possible? Exploring the three spheres of transformation, Current Opinion in Environmental Sustainability 31: 153-1602
- Zanotti, L., Carothers, C., Apok, C. A., Huang, S., Coleman, J. & Ambrozek, C. (2020). Political ecology and decolonial research: co-production with the Iñupiat in Utqiaġvik. Journal of Political Ecology, 27(1), 43-664

PART 2 - INTRODUCTION TO ECOLOGICAL ECONOMICS

- Georgescu-Roegen, N. (1975). Energy and economic myths. Southern Economic Journal, 347-381
- Honey-Rosés, J., Anguelovski, I., Chireh, V. K., Daher, C., Konijnendijk van den Bosch, C., Litt, J. S., … & Nieuwenhuijsen, M. J. (2021). The impact of COVID-19 on public space: an early review of the emerging questions-design, perceptions and inequities. Cities & health, 5(sup1), S263-S2792
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Software

Explained in the content section of each part

Language list

Name	Group	Language	Semester	Turn
(PAULm) Classroom practices (master)	1	English	annual	morning-mixed
(PAULm) Classroom practices (master)	2	English	annual	afternoon
(TEm) Theory (master)	1	English	annual	morning-mixed