

**Interdisciplinary Concepts on Environmental,
Economic and Social Sustainability**

Code: 43068
ECTS Credits: 15

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

Contact

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Teachers

Jordina Belmonte Soler
María Antonia Casellas Puigdemasa
Laura Talens Peiró
Eduard Ariza Sole
Martí Boada Juncà
Neus Martí Sanz
Carlos Martínez Gasol

Use of languages

Principal working language: english (eng)

External teachers

Federica Ravera
Gonzalo Gamboa

Prerequisites

no prerequisites

Objectives and Contextualisation

This module aims to ensure the interdisciplinarity of environmental studies. 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.

This is why 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. Lastly, topics related to communication and academic diffusion are also to be studied.

This is a module divided between the first and second semester. Nevertheless, as this is an introductory module, most part of the lectures is set in the first semester.

In the first semester the core concepts related to each of the three itineraries are discussed, and lecturers from each of the specialties will take part in the presentations. In this semester a three day fieldwork excursion to Alinyà will be also conducted. This implies that this module contains a considerable workload.

Lectures in the second semester are devoted to topics related to communication and academic diffusion, also related to the Master's Thesis. This is why students are trained in a practical exercise with this specific objective.

Skills

- 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

FIRST SEMESTER

FIRST PART: Tools and methods within industrial ecology

Prof.: Carles Martínez Gassol (carles@ineditinnova.com) and Laura Talens Peiró (Laura.talens@uab.cat)

Objectives

- Understand Life Cycle Assessment Method
- Understand the application of LCA approach in several standards and certifications applied by public and private sector (e.g., Carbon Footprint for product and organization, Environmental Product Declaration, etc.)
- Understand ecodesign method and its applications in real cases studies
- Understand how ecodesign principles are included in EU policies, and how Ecodesign regulations are linked to other EU strategies as the EU circular economy and EU critical raw material.
- Understand waste management system and its contribution to GHG emissions.

Contents

1. Development of Life Cycle Analysis (LCA)

- Introduction to LCA
- Environmental tools

2. Case studies

- Development of Ecodesign
- Introduction to eco-design
- Eco-design strategies
- Eco-innovation and Eco-labels
- Use of edTool (Ecodesign software)
- Case study of Ecodesign, led by students

3. Ecodesign from a policy context and other related EU policies

- Introduction to EU product policies including EU Ecodesign and EU Ecolabel
- Understand the EU Ecodesign implementation process
- Linkages of Ecodesign to other EU strategies as EU Critical Raw Materials and EU Circular economy
- Case study

Methodology

Class time: The theory classes will provide the students with the knowledge necessary to understand the application of LCA & Ecodesign tools in the analysis and design of sustainable products.

Work outside the classroom: The eco-design project will be carried out outside the classroom in order to ensure that students have understood theory classes, and to learn how to put concepts in practice.

Group projects: A product will be analyzed to identify the eco-design strategies already applied and to propose the potential new ones that could be used if the product would be hypothetically redesigned. A report including the analysis of the case study product using the information provided in the block and using edTool(R) will be submitted two weeks once the lectures are ended.

Group project: during the block project development many tasks will be done by students:

- Determination of the case study
 - Determination of objectives and scope of the study.
 - Ecodesign and its implementation to EU product policies (EU Ecodesign Directive and EU Ecolabel).
- Analysis of the product selected
 - Analysis of the design of the product
 - Identification of eco-design strategies already applied in the selected product
 - Potential eco-design strategies to be implemented in an hypothetical redesign.
 - Discussion and interpretation of the results.
 - Report configuration

SECOND PART: Integrative evaluation approaches and Social Multi-Criteria Evaluation

Prof.: Neus Martí Sanz (Neus.marti.sanz@gmail.com)

Invited speakers: Federica Ravera, Gonzalo Gamboa/Claudio Cattaneo, Joan Martinez-Alier.

Evaluation becomes a crucial exercise when public informed-based decision making processes are promoted. The nature of problems related to environmental sustainability requires an appropriated evaluation approach

consistent with their characteristics. *Social multi-criteria evaluation (SMCE)* is proposed as a tool to integrate *different scientific languages* in a public choice framework, where the whole "civil society" and ethical concerns on *future generations* have to be considered along with *policy-makers* and *market conditions*.

The main topics tackled in this course are:

DAY 1 - October, 8th 2018 (15:00-18:00)

Evaluation for an informed-based decision-making

- Dealing with a Complex World: Multiple Dimensions, Values and Scales
- The evaluation purpose
- Public informed-based decision-making processes
- Appropriated evaluation approaches
- Examples of appropriated evaluation approaches

DAY 2 - October, 9th 2018 (15:00-18:00)

The Social Multi-Criteria Evaluation (SMCE)

Invited speakers: Gonzalo Gamboa/ Claudio Cattaneo

- What is Multi-Criteria Evaluation?
- Social Multi-Criteria Evaluation and Sustainability Issues
- Technical and social incommensurability
- Structuring a SMCE process
- The quality of the SMCE process: outputs & process
- Examples of real-world SMCE

DAY 3. October, 10th 2018 (15:00 - 18:00)

Participatory scenarios building as a deliberative tool for decision making

Invited speakers: Federica Ravera

- Complexity and uncertainty of socio-ecological systems
- Participatory building of future scenarios
- Integrating participatory scenarios in evaluation methodologies

DAY 4. October, 11th 2018 (15:00 - 18:00)

Evaluation in the framework of environmental conflicts

Invited speakers: Joan Martínez-Alier

- The nature and causes of environmental conflicts
- Mapping the environmental conflicts

- Challenges in assessing environmental conflicts

THIRD PART: Visit to Alinya Campus

Prof: Jordina Belmonte & Marti Boada (jordina.belmonte@uab.cat; marti.boada@uab.cat)

Alinya campus is a natural space that the Fundació Catalunya-La Pedrera (FCLP) owns and devotes to teaching and research activities. For more information

<http://fundaciocatalunya-lapedrera.com/ca/content/muntanya-daliny%C3%A0-la-rectoria>

UAB and FCLP signed a contract in 2012 to facilitate the development of activities to UAB members in Alinya. This campus will offer us the opportunity to learn natural sciences and socio-ecological aspects and to assist to

explanations on projects that are being run in the area, at the time that all participants get to know better each other and begin to collaborate and work together.

A detailed agenda on the travel to Alinyà (that will be done by bus and organized by ICTA) and the activities will be provided at the beginning of the Master. The students will be asked to contribute to the expenses of the travel and stay. The amount required will be definitively established by that time and will not exceed 75 €/person.

Aula activities, talks and debates related with the Knowledge and the sustainable use of the local environment. Main speakers: Martí Boada (ICTA), Jordina Belmonte (ICTA), Josep Germain (ICTA collaborator), Sílvia Garrigós (FCLP)

- Introduction to Alinyà: geomorphology, biodiversity, biogeography.
- Livestock in the Alinyà valley and the management of pastures
- Sustainable use of the local environment and practical interpretation of the landscape from a socioecological perspective. Talk-debate.

Field activities:

- Visit to the "Rectoria" and the "Agrobotiga" (organic food store) in Alinyà (Llobera). Talk-debate about invigorating the economy of Alinyà Valley. Main speakers: Martí Boada (ICTA), Jordina Belmonte (ICTA), Sílvia Garrigós (FCLP) and all master students in the debate.
- Visit to the site of the EU Life Project for CO₂ fixation through an apple plantation combined with other species to increase fixation. Comments on other experimental projects from FCLP. Staff: Xavier Escuté (FCLP).
- Visit to the supplementary feeding site and presentation of the Project on the reintroduction of the black vulture. Excursion on foot from Alinyà to the "Ermita de Sant Ponç". Staff: FCLP.

SECOND SEMESTER

FOURTH PART: Theory and Practice of Interdisciplinarity in environmental science

Prof. Eduard Ariza (eduard.ariza@uab.cat).

DAY 1. February, 6th 2018 (15:00-18:00)

The history and theory of interdisciplinarity 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 of wicked problems
- Epistemological pluralism

DAY 2. February, 13th 2018(15:00-18:00)

The practice of Interdisciplinarity: the intellectual challenge

- Conflictual framings and search for answers
- Mismatches in methods and explanatory models of the epistemic communities

DAY 3. February, 20th 2018 (15:00-18:00)

The practice of Interdisciplinarity: the institutional challenge

- The disciplinary structure of knowledge production institutions
- The rhetoric of interdisciplinarity
- Disincentives/incentives and punishment for interdisciplinary research: funding, evaluation criteria and peer pressure.

DAY 4. February, 27th 2018 (15:00-18:00)

Developing interdisciplinary capacity

- The use of mixed methods for research
- Building proposals across disciplines
- Tips for writing
- Network building
- Successful interdisciplinary initiatives

FIFHT PART: Communication and academic diffusion, also related to the Master's thesis

Prof. Maria Antònia Casellas (antonia.casellas@uab.cat)

GROUP 1. Tuesday from February 19th to 26th; and from March 5th to 19th. 10:00-13:00h

GROUP 2. Tuesday from February 19th to 26th; and from March 5th to 19th. 15:00-18:00h

Course Purpose and Objectives

The purpose of the course is to introduce students to the fundamentals of writing and presentation in the context of academic work. The main course goal is to help master students with the specific requirements of graduate-level articles, reports, theses and presentations. To this goal, we will specifically work on academic practice of research design, summary-critique, synthesis and presentations.

Topics covered in the class include discussion of Critical/Academic Writing, Papers Structure, Abstracts, Introductions/Conclusions, Literature Review, Evidence, Citation Style, Sources and Quotations, Plagiarism, Academic Sources, and Library Resources. We will also address strategies for presenting information. The course provides opportunities for questions, discussion and exercises.

Specific Goals

- To comprehend the overall and internal organization of an academic essay
- To use search tools to locate appropriate sources and to evaluate and select sources for relevance
- To paraphrase and cite sources and to write effective and coherent paragraphs
- To generate ideas from sources to develop content and write an effective thesis statement
- To give critical peer feedback and to use peer and teacher feedback to edit writing
- To skim for main idea(s) in reading and develop reading speed
- To summarize and paraphrase information in a text
- To use communication strategies to participate in group and class discussions
- To select, compile, and synthesize information for an oral presentation
- To deliver an effective oral presentation and to present information using digital tools

Skills

- Improve critical reading and writing skills
- Improve capacity to identify a range of information sources
- Identify the structural features of academic writing
- Learn to take into consideration the expectations of the target audience
- Use effectively the work of others in writing, including use of sources and citation methods

Learning outcomes

- 1) Demonstrate understanding of writing as a series of tasks, including finding, evaluating, analyzing, and synthesizing appropriate sources, and as a process that involves composing, editing, and revising.
- 2) Demonstrate critical reading and analytical skills, including understanding an argument's major assertions and assumptions, and how to evaluate its supporting evidence.
- 3) Demonstrate research skills and capacity to integrate ideas and apply the conventions of attribution and citation correctly.
- 4) To use an appropriate range of argument types and demonstrate a good command of both general and specialized vocabulary.
- 5) Use writing and reading for inquiry, learning, thinking, and communicating.
- 6) Integrate ideas with those of others.
- 7) Develop flexible strategies for generating, revising, editing, and proof-reading
- 8) Practice appropriate means of documenting work.
- 9) Demonstrate capacity to use a variety of skills and approaches when writing different papers.
- 10) Target the various audiences by adapting writing to the expectations of audiences.

Content

The **assignment requirements** of the sessions include:

- 1) Readings: We will do readings of journal articles selected by professor and students. The readings will be discussed in class.
- 2) Short Writings: Throughout the classes students will complete several short writing assignments in class. These pieces will be exercises in employing concepts learned in class/reading, and will be incorporated into the short essays.
- 3) Short Essays: Students will write two individual short essays:
 - (a) The first essay is a Summary-Critique Essay: Students select a book from their fields of study and write a summary and critique of it.
 - (b) The second essay is a Synthesis Essay: Students write an Introduction for a topic they are working on in their fields of study related to a research question.
- 4) Class presentation: Students will present the Book Review Essay under the directions of the professor and will receive feedback from the class.

Methodology

1. Lectures, problem solving and case studies
2. Case-based learning
3. Presentation and oral exposition of developed research
4. Participation in complementary activities
5. Field trips

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Complementary activities	26	1.04	11
Field trips	80	3.2	3, 2, 8, 4, 11
Final work	65	2.6	10, 2, 6, 11
Lessons	84	3.36	3, 2, 6, 11
Type: Supervised			
Reading papers	40	1.6	10, 11
Reading teaching materials	45	1.8	

Evaluation

The students must obtain a global grade of 5.0. The global rating is the sum of the ratings of each part weighted according to the credits that each of them has. The evaluation of each part is done as follows:

FIRST PART: Tools and methods within industrial ecology

Prof. Carles Martínez Gasol & Laura Talens

Participation in class and activities done in class.....25%

Quizzes done in class25%

Final project presentation.....50%

The participation grade is composed of:

1. Quizzes (Individual). Each class will begin with a 10-15 minute quiz based on the previous class and the assigned readings. Apart from ensuring a continuous effort from part of the students, this will also motivate them to arrive punctually to class, already in thinking mode. Also included in "participation" are the. Both the quizzes and small presentations have equal weight.
2. Presentations (group). There will be either 2 or 3 presentation assignments during the course.
3. Class activities (group). There will be either 1 or 2 activities during the course, after which the students must be able to communicate results.
4. Final project & its presentation to be announced in class- group.

SECOND PART: Integrative evaluation approaches and social multi-criteria evaluation

Prof.: Neus Martí Sanz

Mind map design linking the course contents and readings.....100%

THIRD PART: Visit to Alinya Campus

Prof.: Jordina Belmonte & Martí Boada

Students will follow an evaluation consisting in answering the questions and field exercises that the teachers will provide dealing on the teachings received during the Alinya trip; they can include personal opinions on how to run the management of an environment. Students will have an accorded period of time for preparing and submitting the answers. They will be evaluated from 0 to 10 and the final mark will be the mean of the two (or more) exercises proposed.

FOURTH PART: Theory and practice of interdisciplinarity in environmental science

Prof.: Eduard Ariza

Work describing an interdisciplinary project.....50%

Final exam.....50%

FIFTH PART: Communication and academic diffusion, also related to the Master's thesis

Prof.: Maria Antonia Casellas

Book review 40%

Essay - Introduction 30%

Class Presentations..... 20%

Attendance & class participation..... 10%

Note: students with limited English skills will be able to do their essays in Catalan or Spanish.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Assistance activities and complementary field work	10	20	0.8	10, 3, 2, 7, 8, 5, 9, 6, 11
Attendance and active participation in class	10	5	0.2	1, 2, 8, 5, 9, 6, 4, 11
Defense course assignments	20	10	0.4	2, 11

Bibliography

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[Methodology of supporting decision-making of waste management with material flow analysis \(MFA\) and consequential life cycle assessment \(CLCA\): case study of waste paper recycling](#). Eva Seigné-Itoiz, Carles M. Gasol, Joan Rieradevall, Xavier Gabarrell. [Journal of Cleaner Production](#), Volume 105, 15 October 2015, Pages 253-262.

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Visit to Alinya Campus

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