

**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

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

## Contact

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## Use of Languages

Principal working language: english (eng)

## Teachers

Jordina Belmonte Soler  
María Antonia Casellas Puigdemasa  
Laura Talens Peiró  
Carles Barriocanal Lozano  
Eduard Ariza Sole  
Sergio Villamayor Tomás  
Carlos Martínez Gasol  
Claudio Cattaneo

## 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.

## 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

### FIRST SEMESTER

FIRST PART: Tools and methods within industrial ecology

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

Block 1. Introduction to the circular economy, and the main tools of Industrial Ecology.

Introduction to Circular Economy:

- Introduction to the different schools of thought, with special emphasis on industrial ecology.
- Description of the various action plans in the Circular Economy in the EU.
- Linking the plans in Circular Economy with other EU strategies such as ecodesign regulations and critical materials.
- Understand the EU Ecodesign implementation process.
- Case study.

## Introduction to Ecodesign

- Introduction to ecodesign
- Ecological design strategies
- Review of current ecodesign legislation. Development of life cycle analysis (LCA)
- Introduction to LCA as a tool for evaluating products, services and projects.
- Environmental tools
- Case studies

## Introduction to the carbon footprint applied to waste management.

- Introduction of the carbon footprint concept
- Use of the CO2ZW tool.

## Methodology

Section 1. Introduction to circular economy, and the main tools of industrial ecology - 12 hours of class that include theory and practical exercises. - 6 hours of Circular Economy, Ecodesign and theory applied to case studies - 6 hours of stroke theory and theory applied to case studies - 25 hours of readings (documents and case studies) and studies outside the classroom (individual and in groups).

Classroom hours: Theory classes will provide students with the necessary knowledge to understand the application of LCA and Ecodesign tools in the analysis and design of electrical and electronic equipment (EEE), as well as conceptualize a project proposal in circular economy.

Work outside the classroom: The project of designing a project in circular economy will be carried out outside the classroom to ensure that the students have understood the theoretical classes and to learn to put the concepts into practice.

Group projects: The conceptualization and design of a project proposal based on circular economy issues such as: · Circular supply: use of recycled and reusable materials, instead of new materials. · Recovery of resources through innovative processes that allow a positive impact on the value chain. · Extend product life through recovery, resale, or eco-friendly innovation and design. · Products as services: offering payment services for a product while maintaining its ownership for the subsequent recovery of resources. · Innovation in processes through closed-loop production, to maximize the use of resources and minimize environmental impact.

The project proposal will be presented as follows: · A short video describing your project (max. 7 min). The video should highlight the main objective, the potential benefits in environmental, social and economic terms and the tentative methodological approach to evaluate it. · A brief report with the following content: • Section 1, general approach to the project: o Description of the objective of the circular economy project. o Methodological approach o Possible benefits of the project.

- Section 2, evaluation of the potential impact project: o Provisional environmental assessment of the project using tools that focus on a systematic and life cycle approach. o Definition of the Functional Unit o System and product description o Discussion on the expected results of the evaluation using the selected environmental tool.

The project proposals will be evaluated based on the following aspects: · Speech and communication: clarity of the objective, the methodology and the results, and the correct use of vocabulary and terminology · Time: adjusted use of time to important aspects · Format and data: easy to understand and follow the discourse (good listening and reading of the information presented) · Project: real applicability and replicability of the proposal, originality, and innovative nature of the idea. potential benefits on environmental, social and economic aspects. Existence of clear and measurable objectives and indicators of tracing.

SECOND PART: Introduction to social-environmental sciences: paradigm changes, frontier research, methods and debates

Block: Sergio Villamayor-Tomas (sergio.villamayor@uab.cat)

Introduction to ecological economics: debates and topics

29th of Sept.: Introduction to Ecological Economics and the Barcelona School

The goal of this session is twofold: 1) introduce the basic history and tenets of Ecological Economics and the particular take of scholars working at ICTA (recently referred to as the Barcelona School of Ecological Economics and Political Ecology); and 2) to have a firsthand introduction to the work on environmental justice carried by one of the Ecological Economics research groups at ICTA.

Mandatory 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).

30th of Sept.: Frontiers and paradigm changes in science: the case of Ecological Economics?

The goal of this session is twofold: 1) to become familiar with the process through which scientific standards and programs evolve, using the example of ecological economics; and 2) to have a firsthand introduction to the work on behavioral economics and environmental psychology carried by one of the Ecological Economics research groups at ICTA.

Mandatory readings:

Walker, T. C. (2010). The perils of paradigm mentalities: Revisiting Kuhn, Lakatos, and Popper. *Perspectives on Politics*, 433-451.

Optional reading:

Drews, S., & Van den Bergh, J. C. (2016). What explains public support for climate policies? A review of empirical and experimental studies. *Climate Policy*, 16(7), 855-876.

6th of Oct.: Scientific uncertainty: a problem?

The goal of this session is twofold: 1) Become familiar with the challenges and opportunities of doing research on complex environmental problems; and 2) to have a firsthand introduction to the work on rural and urban commons carried by one of the Ecological Economics research groups at ICTA.

Mandatory reading:

Wilson, James. (2002). Scientific uncertainty, complex systems, and the design of common-pool institutions. *The drama of the commons*. 327-360.

Optional Readings:

Villamayor-Tomas, S., García-López, G., and Scholtens, J. (2020). Do Commons Management and Movements Reinforce Each Other? Comparative Insights from Mexico and Sri Lanka. *Ecological Economics* 173 (July): 106627.

7 of Oct.: Transdisciplinary research and activism: what's your take?

The goal of this session is twofold: 1) to critically evaluate the concept of transdisciplinary research and related paradigms and confront students with their epistemological and normative positions as current/future researchers/professionals of sustainable development; and 2) to have a firsthand introduction to the work on urban environmental affairs carried by one of the Ecological Economics research groups at ICTA.

#### Mandatory reading:

Otero, I., Niewöhner, J., Krueger, T., Dogmus, Ö. C., Himmelreich, J., Sichau, C., & Hostert, P. (2017). The position of scientists in transformations of human-environment systems. An inquiry into IRI THESys research practices.

#### Optional Readings:

Anguelovski, I., Brand, A. L., Connolly, J. J., Corbera, E., Kotsila, P., Steil, J., ... & Langemeyer, J. (2020). Expanding the Boundaries of Justice in Urban Greening Scholarship: Toward an Emancipatory, Antisubordination, Intersectional, and Relational Approach. *Annals of the American Association of Geographers*, 1-27.

Block: Claudio Cattaneo (claudio.cattaneo@uab.cat)

Sessions builds on the first 2 introductory sessions (by Sergio Vilamajor) and figures out hot topics in ecological economics that can offer valuable insights to industrial ecology and global change. The general framework of the biophysical limits to growth is then explored with a specific focus on climate change (energy) and extractivism and environmental conflicts (materials)

Session1: Claudio Cattaneo. Entropy, environment, economics. The biophysical roots of the economic process, the (im)possibility of the circular economy and its implications for growth and social justice.

Session 2: Giorgos Kallis, with Claudio Cattaneo. Introduction to degrowth.

Session 3: Aljosa Slamersack with Claudio Cattaneo. Climate Scenarios and degrowth.

Session 4: Marta Conde with Claudio Cattaneo. Commodity Frontiers & conflicts

#### SECOND SEMESTER

THIRD PART: Visit to Alinyà Campus -- IMPORTANT NOTICE: This part could be modified due to COVID restrictions

Prof: Jordina Belmonte & Carles Barriocanal (jordina.belmonte@uab.cat; carles.barriocanal@uab.cat)

Alinyà 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 Alinyà. This campus will offer us the opportunity to learn natural sciences and socio-ecological aspects and to assist in 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 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 to the Knowledge and the sustainable use of the local environment. Main speakers: Jordina Belmonte (ICTA & Dept. Animal Biology Animal, Plant Biology and Ecology), David Molina (Dept. Geography), Josep Germain (collaborator at ICTA and link with FCLP), Sílvia Garrigós (FCLP), Xavier Escuté (FCLP) and all master students in the debate.

- 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: Jordina Belmonte (ICTA & Dept. Animal Biology Animal, PlantBiology and Ecology), carles Barriconal (ICTA), Sílvia Garrigós (FCLP) and all master students in the debate.
- Visit to the site of the EU Life Project for CO<sub>2</sub> 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 and Jordina Belmonte, David Molina, Josep Germain.

#### FOURTH PART: Theory and Practice of Interdisciplinarity in environmental science

Prof. Eduard Ariza ([eduard.ariza@uab.cat](mailto:eduard.ariza@uab.cat)).

#### DAY 1, WEDNESDAY 3 OF FEBRUARY 2021 (15-18 h)

Eduard Ariza

##### 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

Mandatory reading: Lélé, S., and R. B. Norgaard. 2005. Practicing interdisciplinarity. *Bioscience* 55 (11): 967-975

#### DAY 2, WEDNESDAY 10 OF FEBRUARY 2021 (15-18 h)

Eduard Ariza

##### The practice of Interdisciplinarity: the intellectual challenge

- Conflictual framings and search for answers
- Mismatches in methods and explanatory models of the epistemic communities
- How does an interdisciplinary project work?

Mandatory reading: Farrell, K., Luzzati, T., and S. van den Hove. 2013. What lies beyond reductionism? Taking stock of interdisciplinary research in ecological economics. In: Farrell, K., Luzzati, T. and S. van den Hove (eds). *Beyond Reductionism: A passion for interdisciplinarity*. Routledge, London.

#### DAY 3, WEDNESDAY 17 OF FEBRUARY 2021 (15-18 h)

Eduard Ariza

##### Whole Systems Thinking

- From Environmental and Sustainability Education to Whole Systems Thinking
- Transformative learning theory
- Transformative learning practice

Mandatory reading: Sterling, S.R. 2010. Transformative learning and sustainability: sketching the conceptual ground. *Learning and teaching in Higher Education* 5: 17-33.

#### DAY 4, WEDNESDAY 24 OF FEBRUARY 2021 (15-18 h)

Eduard Ariza

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

Prof. Maria Antònia Casellas ([antonia.casellas@uab.cat](mailto:antonia.casellas@uab.cat))

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 the 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 the information. The course provides opportunities for questions, discussion and exercises.

Content

The assignment requirements of the sessions include:

- 1) Readings: We will do readings of journal articles selected by professors 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 book review.
  - (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 BookReview 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	

## Assessment

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 class.....25%

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: Introduction to social-environmental sciences: paradigm changes, frontier research, methods and debates

Prof. Sergio Villamayor-Tomas and Clauddio Cattaneo

In-class quizzes/short essays based on readings and or in-class activities (50%); essay based on readings and in-class content (50%)

THIRD PART: Visit to Alinyà Campus

Prof.: Jordina Belmonte & David Molina

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 Alinyà 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

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.....50%

Essay - Introduction.....30%

Class Presentation and participation.. 20%

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

### Assessment 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

Tools and methods within industrial ecology

. Guinée, Jeroen (Ed.). 2002. Handbook on Life Cycle Assessment. Operational Guide to the ISO Standards. Springer. ISBN 978-0-306-48055-3.

· 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

· Life Cycle Assessment of apple and peach production, distribution and consumption in Mediterranean fruit sector. Elisabet Vinyes, Luis Asin, Simó Alegre, Pere Muñoz, Carles M. Gasol. Journal of Cleaner Production, Volume 149, 15 April 2017, Pages 313-320

· Life cycle assessment of energy flow and packaging use in food purchasing, Esther Sanyé, Jordi Oliver-Solà, Carles M. Gasol, Ramon Farreny, Xavier Gabarrell. Journal of Cleaner Production, Volume 25, April 2012, Pages 51-59

- Introduction to the Eco-Design Methodology and the Role of Product Carbon Footprint Esther Sanyé-Mengual, Raul García Lozano, Ramon Farreny, Jordi Oliver-Solà, Carles M. Gasol & Joan Rieradevall. Assessment of Carbon Footprint in Different Industrial Sectors, Volume 1 pp 1-24- Part of the EcoProduction book series (ECOPROD) Springer Science+Business Media Singapore 2014
- Kirchherr, J. Et al 2017. Conceptualizing the circular economy: An analysis of 114 definitions. Resources, Conservation and Recycling. 2017. <https://doi.org/10.1016/j.resconrec.2017.09.005>
- EU Action Plan for Circular Economy:  
[http://ec.europa.eu/environment/circular-economy/implementation\\_report.pdf](http://ec.europa.eu/environment/circular-economy/implementation_report.pdf)
- Ellen MacArthur definition of Circular Economy:  
<https://www.ellenmacarthurfoundation.org/circular-economy/overview/concept>
- Chancerel, P., Rotter, S., 2009. Recycling-oriented characterization of small waste electrical and electronic equipment. Waste Manag. 29, 2336-2352. <https://doi.org/10.1016/j.wasman.2009.04.003>
- Ecodesign directive: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0125>
- Gabarell i Durany X, Sanjuan Delmás D, Martinez Gasol C, Feced Mateu M, Talens Peiró L and J Rieradevall Pons. 'Implementation of the Ecodesign Directive via working plans, based on the analysis of the selected product groups'. ISBN 978-92-846-2225-2. European Union, 2017. Available at:  
[http://www.europarl.europa.eu/RegData/etudes/STUD/2017/611015/EPRS\\_STU\(2017\)611015\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2017/611015/EPRS_STU(2017)611015_EN.pdf)
- Ueberschaar, M., Otto, S.J., Rotter, V.S., 2017. Challenges for critical raw material recovery from WEEE - The case study of gallium. Waste Manag. 60, 534-545. <https://doi.org/10.1016/j.wasman.2016.12.035>
- Talens Peiró L., Castro Girón A., Gabarrell i Durany X. Examining the feasibility of the urban mining of hard disk drives. Journal of Cleaner Production. 2019. <https://doi.org/10.1016/j.jclepro.2019.119216>.
- Talens Peiró L., Polverini D., Ardente F., Mathieux F. 2019. Advances towards circular economy policies in the EU: The new Ecodesign regulation of enterprise servers. Resources, Conservation and Recycling. 2019. <https://doi.org/10.1016/j.resconrec.2019.104426>.
- Blengini G.A.; et al. 2017. EU Methodology for Critical Raw Materials Assessment: Policy Needs and Proposed Solutions for Incremental Improvements. Resources Policy. 53, pp.12-12

Introduction to social-environmental sciences: paradigm changes, frontier research, methods and debates

Block: Sergio Villamayor

Readings in the content section

Block: Claudio Cattaneo

Readings:

Georgescu-Roegen, N., 1975. Energy and Economic Myths. Southern Economic Journal, 41(3).  
<http://www.uvm.edu/~jfarley/EEseminar/readings/energy%20myths.pdf>

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

Koch, 2015: Climate Change, Capitalism and Degrowth Trajectories to a Global Steady-State Economy. International Critical Thought <http://dx.doi.org/10.1080/21598282.2015.1102078>

Anderson and Peters, 2016. The trouble with negative emissions Science 354 (6309), 182-183. [doi: 10.1126/science.aah4567]

Patel, R., & Moore, J. W. (2017). Introduction. A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet. Univ of California Press.

Conde, M. and Walter, M. (2015) Commodity Frontiers (Ch 13) Degrowth. A Vocabulary for a New Era.

Additional readings:

Conde, M. (2017). Resistance to mining. A review. *Ecological Economics*, 132, 80-90.

Alimonda H., (2015) Mining in Latin America: Coloniality and Degradation, 149-162 In *International handbook PE* (Bryant (Ed.).

Visit to Alinya Campus

Different authors: Els sistemes naturals de la Vall d'Alinyà. Institució Catalana d'Història Natural i Fundació Territori i Paisatge. [http://ichn.iec.cat/Alinya\\_Articles.htm](http://ichn.iec.cat/Alinya_Articles.htm)

Theory and practice of interdisciplinarity in environmental science

Farrell, K., Luzzati, T., and S. van den Hove. 2013. What lies beyond reductionism? Taking stock of interdisciplinary research in ecological economics. In: Farrell, K., Luzzati, T. and S. van den Hove (eds). *Beyond Reductionism: A passion for interdisciplinarity*. Routledge, London.

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Sterling, S.R. 2010. Transformative learning and sustainability: sketching the conceptual ground. *Learning and Teaching in Higher Education* 5: 17-33.

Communication and academic diffusion also related to the Master's thesis

Aarabi P (2008). *The art of lecturing: a practical guide to successful university lectures and business presentations*. Cambridge, UK: Cambridge University Press.

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Feak C. & Swales J. (2009). *Telling a Research Story: Writing a Literature Review*. Ann Arbor, MI: University of Michigan Press.

Glasman-Deal, H (2009). *Science research writing for non-native speakers of English*. London, Hackensack, NJ : Imperial College Press

Holliday A. (2007). *Doing and Writing Qualitative Research*. London: Sage.

Swales J & Feak C. (2012). *Academic Writing for Graduate Students: Essential Tasks and Skill*. 3rd edition. University of Michigan Press.

Waller, V., Farquharson, K, & Dempsey D. Eds (2016). *Qualitative social research: contemporary methods for the digital age*. Los Angeles, Calif: Sage.

Warren C. A. B. & Karner T.X. (2015). *Discovering qualitative methods: ethnography, interviews, documents, and images*. New York : Oxford University Press.

Yin, K. R (1994). *CaseStudy Research.Design and methods*. London: Sage Publications.