

Global Change

Code: 42404
ECTS Credits: 9

Degree	Type	Year	Semester
4313784 Interdisciplinary Studies in Environmental, Economic and Social Sustainability	OT	0	1

Contact

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Use of languages

Principal working language: english (eng)

Teachers

Patrizia Ziveri
Johannes Langemeyer
Sonia Sánchez Mateo
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External teachers

Anabel Sànchez
Inazio Martinez de Arano

Prerequisites

Students should preferably hold an undergraduate degree with relevance to environmental sciences, biology, geography or ecology, although students with a background in social and political sciences are also welcome and should be able to follow the course provided they are acquainted with basic principles of Earth and physical sciences.

A reasonable level of English speaking and writing skills are recommended to follow the course.

Objectives and Contextualisation

The understanding of the biological, physical and social processes related to Global Change, and their interaction, are some of the main current challenges, not only because of its complexity, but also due to the necessity of finding solutions to the negative impacts caused by such changes.

The course covers many of the diverse types of impacts related to Global Change on different spatial and temporal scales, mainly focused on different types of ecosystems (terrestrial and marine) as well as its effects on society, and the social responses.

The main objectives of the course are summarized below:

- to identify different types of impacts related with global change

- to explore a wide variety of spatial and temporal scales
- to distinguish other driving forces that influences on global change
- to analyze global change manifestations from land use, biodiversity, global carbon cycle, impacts and effects on ecosystems, both terrestrial and marine.
- to identify different approaches to global change through the analysis of protected areas (biosphere reserves, marine protected areas, rural landscapes....)

Skills

- Analyse how the Earth functions on a global scale in order to understand and interpret environmental changes on the global and local scales.
- Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
- Communicate orally and in writing in English.
- Continue the learning process, to a large extent autonomously.
- Seek out information in the scientific literature using appropriate channels, and use this information to formulate and contextualise research in environmental sciences.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Work in an international, multidisciplinary context.

Learning outcomes

1. Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
2. Communicate orally and in writing in English.
3. Continue the learning process, to a large extent autonomously.
4. Know the ways in which global change shows itself in different ecosystems.
5. Seek out information in the scientific literature using appropriate channels, and use this information to formulate and contextualise research in environmental sciences.
6. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
7. Work in an international, multidisciplinary context.

Content

The course is organized as following:

Sub-Module 1: Terrestrial Global Change

1. Welcome and course introduction. Interdisciplinary approach to global change (17 Oct) (RM-SS)
2. Forest Management as a key factor of global change. Sustainable forest management and its revalorization (19 Oct) (RM) (IMA)
3. Forest and human health: a new approach to manage forests. (24 Oct) (RM and Albert Bach)
4. Forests as indicators of global change manifestations. Sentinel landscapes. (26 Oct) (SS)
5. The vital role of biodiversity in urban sustainability (31 Oct) (RM and Pablo Knobel)
6. Ecosystem services and urban green infrastructure (2 Nov) (JL)
7. Mediterranean River Basin: biodiversity indicators and long-term monitoring (7 Nov) (SS)
8. Science with and for society. An example of a River Basin (9 Nov) (RM) (AS)
9. Responding Locally to Global and Globalising Changes. Study cases. (14 Nov)(GG)

Sub-Module 2: Marine Global Change

1. Introduction: Ocean, climate and global change: the marine ecosystem and biogeochemistry (28 Nov) (PZ)
2. Multi-drivers on the ocean environment: integrating modern and past global change studies (30 Nov) (PZ)
3. Introduction to geochemistry. Modelling the ocean's biogeochemistry (12 Dec) (PZ)
4. Overfishing. Ocean governance for sustainability, challenges, options and the role of science. The case of the Marine Protected Areas (14 Dec) (PZ)

Sub-Module 3: Fieldworks

- New trends in rural management in Mediterranean landscapes (Solsonès) (21 Nov) (RM)
- New trends in forest management in Mediterranean landscapes (Les Gavarres) (5 Dec) (RM).

Methodology

Teaching and discussions will occur during lectures, guided by particular readings assigned in advance by individual instructors.

The course also includes fieldworks to explore local-scale manifestations of Global Change impacts.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Fieldwork	12	0.48	4, 3, 7
Lectures	48	1.92	5, 2, 4, 7
Type: Supervised			
Final Exam	3	0.12	2, 6, 1
Type: Autonomous			
Reading articles, books and studying for each of the given lectures and the final exam	81	3.24	5, 4, 6, 1, 3

Evaluation

Students will be assessed on the basis of:

- A final exam that will last 3 hours and cover most aspects of the course. Students will have limited space to answer each of these questions and will have to prove that they have understood and master key concepts and ideas introduced during the course.
- Two written 1500-words essays corresponding to two topics addressed during the course. The teachers will assess the essay following their own marking criteria, taking chiefly into account ability to identify and synthesize relevant literature for a given topic and grasp the correspondent ideas and arguments.
- Fieldworks in order to prove the local effects of Global Change in a Mediterranean landscape
- Their assistance and participation in class.

The final mark will be the weighted average of the following assessments:

- Final exam: 50%
- Two written essays: 30% (15% each)
- Fieldwork: 20% (10% each)

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Fieldwork	20%	12	0.48	4, 3, 7
Final Exam	50%	3	0.12	2, 6, 1
Two written essays	30%	33	1.32	5, 4, 6, 1, 3, 7

Bibliography

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Relevant collaborations in international congresses:

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- Gómez, F.J. (2006): Integrating traditional knowledge into global change analysis models. The case of Ridaura sessile oak forestland (Natural Park of Montseny, NE Spain). *Cultural Heritage and Sustainable Forest Management: the role of traditional knowledge. Italian Academy of Forestry Science. IUFRO. Florencia (Itàlia)*
- Maneja, R.; Varga, D.; Boada, M. (2009): Monitoring of socio-environmental indicators in the Mediterranean river basins. A study case in the Tordera River Basin, a *2nd European Congress of Conservation Biology. Praga: Czech University of Life Prague y Society for Conservation Biology.*
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- Otero, I. (2006): Land use and land cover change in Olzinelles valley (Montnegre, NE Spain). An environmental history approach to forest resources use. *Cultural Heritage and Sustainable Forest Management: the role of traditional knowledge. Italian Academy of Forestry Science. IUFRO. Florencia (Itàlia).*
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