Contact

Name: Roser Maneja Zaragoza
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Use of languages

Principal working language: anglès (eng)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Jordina Belmonte Soler
Victor Sarto Monteys
Peter Graham Mortyn
Esteve Corbera Elizalde
Sonia Sánchez Mateo

External teachers

Patrizia Ziveri

Prerequisites

Students should preferably hold an undergraduate degree with relevance to environmental sciences, 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 necessary to follow the course.

Objectives and Contextualisation

The understanding of the biological, physical, chemical 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, mainly focussed on climate change, as well as its effects on society, and the social and political responses to mitigate the negative consequences of this process.

The main objectives of the course are summarized bellow:
- to distinguish global changes and impacts from other and sometimes very influential forces (e.g. climate).
- to focus heavily on issues and themes tied to the ocean's role in Global Change
- the linkage between biodiversity and Global Change
- the current policies and technologies in relation with climate change
- to explore local-scale manifestations/effects of Global Change impacts in a Mediterranean landscape

Skills

- Analitzar el funcionament del planeta a escala global per comprendre i interpretar els canvis ambientals a escala global i local.
- Buscar informació en la literatura científica fent servir els canals adequats i integrar aquesta informació per plantejar projectes de recerca en ciències ambientals.
- Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
- Comunicar oralment i per escrit en anglès
- Continue the learning process, to a large extent autonomously
- Que els estudiants sap guia aplicar els coneixements adquirits i la seva capacitat de resolució de problemes en entorns nous o poc coneguts dins de contextos més amplis (o multidisciplinaris) relacionats amb la seva àrea d’estudi.
- Work in an international, multidisciplinary context.

Learning outcomes

1. Buscar informació en la literatura científica fent servir els canals adequats i integrar aquesta informació per plantejar projectes de recerca en ciències ambientals.
2. Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
3. Comunicar oralment i per escrit en anglès
4. Continue the learning process, to a large extent autonomously
5. Conèixer les maneres com es manifesta el canvi global sobre els diferents ecosistemes.
6. Que els estudiants sap guia aplicar els coneixements adquirits i la seva capacitat de resolució de problemes en entorns nous o poc coneguts dins de contextos més amplis (o multidisciplinaris) relacionats amb la seva àrea d’estudi.
7. Work in an international, multidisciplinary context.

Content

The Ocean's Role in Global Change

- Introduction to Global Change and Climate Change
- Archives and Proxies as recording systems and tracing tools
- El Niño/Southern Oscillation (ENSO) as a globally relevant case study concept
- Hurricanes and Atlantic warming of recent decades
- Global Biogeochemical Cycles (GBC), and links to changes
- Ocean Acidification (OA)

Biodiversity and Global Change

- Global change processes and impacts on terrestrial systems: vegetation, pollen and spores

Climate Change: Policy, Technology and Land-use

- Evolution and architecture of international climate policy

- Vulnerability and adaptation: concepts, policy and research

- Carbon markets

- Renewables and bioenergy options

- Geo-engineering

- Land-use based mitigation: REDD+

Fieldwork: Recent Global Change effects on Mediterranean landscapes (mountain area)

Methodology

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

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

Activities

<table>
<thead>
<tr>
<th>Title</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Directed</td>
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<td></td>
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<tr>
<td>Fieldwork</td>
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<td></td>
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<td>Lectures</td>
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<td>1.92</td>
<td></td>
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<tr>
<td>Type: Supervised</td>
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<tr>
<td>Final Exam</td>
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<tr>
<td>Type: Autonomous</td>
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<td></td>
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<tr>
<td>Reading articles, books and studying for each of the given lectures and the final exam</td>
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<td>5.92</td>
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<tr>
<td>Two short essays</td>
<td>20</td>
<td>0.8</td>
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Evaluation

Students will be assessed on the basis of:

- A final exam that will last 2.5 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.

Fieldwork 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%

**Evaluation activities**

<table>
<thead>
<tr>
<th>Title</th>
<th>Weighting</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning outcomes</th>
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<tr>
<td>Fieldwork</td>
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<td>0</td>
<td>1, 5, 6, 4</td>
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<tr>
<td>Final Exam</td>
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<td>0</td>
<td>0</td>
<td>1, 3, 6, 2</td>
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<tr>
<td>Two written essays</td>
<td>30%</td>
<td>0</td>
<td>0</td>
<td>1, 3, 5, 6, 2, 4, 7</td>
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**Bibliography**

The Ocean's Role in Global Change


- Hoyos, C.D., P.A. Agudelo, P.J. Webster, and J.A. Curry, Deconvolution of the factors contributing to the increase in global hurricane intensity, Science, 312, 94-97, 2006.


- Normile, D., Clues to supertyphoon's ferocity found in the Western Pacific, Science, 342, 1027, 2013.


Biodiversity and Global Change


Climate Change: Policy, Technology and Land-use


- de Paula Gomes and Muylaert de Araujo, MS. Artificial cooling of the atmosphere-A discussion on the environmental effects. Renewable & Sustainable Energy Reviews, 15:1, 780-786.

- den Elzen, MGJ. et al. The emissions gap between the Copenhagen pledges and the 2 degreesCclimate goal: Options for closing and risks that could widen the gap. Global Environmental Change, 21:2, 733-743.


Fieldwork

