GUÍA DOCENTE

1. DESCRIPCIÓN DE LA ASIGNATURA

Grado:	**Ciencias Ambientales**
Doble Grado:	
Asignatura:	**Global Change**
Módulo:	**Cambios Ambientales a Escala Global**
Departamento:	**Sistemas Físicos, Químicos y Naturales**
Año académico:	**2014-2015**
Semestre:	**2º**
Créditos totales:	**6**
Curso:	**3º**
Carácter:	**Semestral**
Lengua de impartición:	**Inglés**

Modelo de docencia:	**B1**
a. Enseñanzas Básicas (EB):	**60%**
b. Enseñanzas de Prácticas y Desarrollo (EPD):	**40%**
c. Actividades Dirigidas (AD):	**0 %**

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2. RESPONSABLE DE LA ASIGNATURA

Responsable de la asignatura	
Nombre:	Cristina Peña Ortiz
Centro:	Facultad de Ciencias Experimentales
Departamento:	Sistemas Físicos Químicos y Naturales
Área:	Física de la Tierra
Categoría:	Profesor Contratado Doctor
Horario de tutorías:	L,M y X de12:00h-14:00h
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3. UBICACIÓN EN EL PLAN FORMATIVO

3.1. Descripción de los objetivos

At the end of the semester the student should:

- Interpret critically the IPCC scenarios
- Correctly identify and discriminate the impacts that Global Change have on natural ecosystems and on socioeconomic aspects.
- Assess critically the mitigation alternatives at both local and global scale.
- Identify the consequences of Global Change in relation to the loss of biodiversity and the human influence in the planet desertification trend.
- Asses the eutrophication degree at a global scale

3.2. Aportaciones al plan formativo

This subject embrace the skillfulness and competences related with the changes observed in the biosphere as a consequence of human activities, always in a global scale perspective. Climatic Change, as defined by the IPCC (Intergovernmental Panel on Climate Change), is a major part of the subject, but it also includes other environmental issues with effects at large spatial scales, such as nitrogen atmospheric deposition, acid rain, desertification or biodiversity loss, all of them forming part of what is known as Global Change.

3.3. Recomendaciones o conocimientos previos requeridos

We recommend to have been passed the following subjects: Mathematics, Physics, Geology (first year), Meteorology and Climatology, Ecology, Statistics, Hydrology and Soil Science (second year).

4. COMPETENCIAS

4.1 Competencias de la Titulación que se desarrollan en la asignatura

- To know and dominate the procedures needed to estimate and interpret the ecological succession and biodiversity
- To know the functioning of terrestrial, marine and freshwater ecosystems and its resilience to human alterations.
- To be able to analyze the alternatives environmental politics.
- To know the processes related with natural and technological risks, and to elaborate mitigation and risk prevention plans.
- To know the characteristics of the different climates.
- To know and understand the scientific basis and the processes involved in Global Change and its consequences.
- To know the spatial and temporal dimensions of the environmental processes.
- To know the use and interpretation of the remote sensing images for environmental applications.
- To know and understand the factors regulating the ecosystem development and its temporal change.
- To handle the criteria to understand past global changes in perspective with recent changes.

4.2. Competencias del Módulo que se desarrollan en la asignatura

- Understanding of the "human-induced climatic change" concept.
- To acquire the knowledge needed to understand the mechanisms explaining the observed warming at a global scale.
- To know and assess the climatic implications of the rising of global temperature.
- To know the basis of the different IPCC emission scenarios.
- To understand and assess the different models of prediction for the future climate developed by the IPCC.
- To know and assess the human influence in the desertification process at global scale.
- To know and assess the loss of biodiversity at a global scale

4.3. Competencias particulares de la asignatura

- To know the evolution of climate and its variability caused by both natural human origin.
- To understand how the IPCC generate families of future climatic scenarios using different socio-economic previsions.

- The ability to interpret, analyze and develop scenarios of climate change by using simple models of climate simulation.
- To know the effect of climate change on populations, communities and ecosystems.
- To know how climate change affect other processes at global scale, such as the alteration of the N cycle, the desertification and losses of biodiversity.
- To know the effect that global changes other than climatic change have on populations, communities and ecosystems.

5. CONTENIDOS DE LA ASIGNATURA (TEMARIO)

Topic 1. Physical principles of global change.

Topic 2. Energetic balance of the climatic system: Greenhouse effect and global warming.

Topic 3. Climate variability: Natural records, historical records: the impact of human activities.

Topic 4: Forecasting the future of the climate: climatic models and future scenarios.

Topic 5. International Panel on Climate Change (IPCC).

Topic 6. Changes in C cycle. Effects on organisms and ecosystems.

Topic 7. Changes in N and P cycles. Effects on organisms and ecosystems.

Topic 8. Global desertification.

Topic 9. Biodiversity and global change.

6. METODOLOGÍA Y RECURSOS

Global Change is a B1 subject (60% of basic teaching and 40% practices and development). The course includes 27 hours of lesson attendance (classroom training) where the basic contents of the subject are presented. Besides, throughout the course, there will be 4 practical sessions, each one lasting approximately 3 hours. Whenever possible, a day trip (approximately 6-9 hours) will be done to evaluate the impacts of global change on a specific environment and discuss potential mitigation and management actions. Activities such as cineforum or seminaries can be also considered as another potential ways to discuss the topics developed throughout the course.
In addition to classroom training, students must be able to deep on the topics of the course using basic bibliography provided by the professor staff, and prepare some specific subjects to be exposed to their classmates (public seminars) or to the professors (reports). This personal work of the student represents ca. 90 hs, including tutor counsil time.

Along the course, students can check their degree of understanding of the basic concepts of the subject by using self-evaluation questionnaires. The maximum time spent in this kind of evaluation is ca. 15 hours.

The whole time spent on this subject is:
Basic teaching: 27 hours
Practical training: 18 hours
Personal work / tutorials: 90 hours
Self-evaluation: 15 hours (maximum)
In total, it is estimated that each student must devote ca. 150 hours to overcome this subject.

7. ASSESSMENT

The assessment consists of four different components: a final exam, practical sessions, an outing and seminars.

A final exam (6 out of 10 of the final mark)
It will take place at the end of the term and will include theoretical questions and problems based on the course contents. No books or notes are allowed. It is advisable to take a scientific calculator, a ruler, and two different colour pens (red is not allowed). To pass the course a minimum mark of 3 (out of 6) in the exam is required.

Practical sessions (1.5 out of 10 of the final mark).
Throughout the course there will be 4 three-hour practical sessions. During each session the student will complete a questionnaire with a total mark of 10 points. Attendance to the practical sessions is not mandatory. However, students not attending or not submitting the questionnaire in due time will be awarded 0 points for the corresponding session. The average mark obtained in the questionnaires can add up to 1.5 points of the final grade. For the practical classes it is advisable to take a scientific calculator and basic drawing tools (colour pens, pencil, rubber, ruler and a universal goniometer).

Outing (0.5 out of 10 of the final grade).
During the course, depending on the availability of resources, one or more outings will be scheduled. They will last approximately between 6 to 9 hours and will be related to the impact of climate change on the environment. Students will have to complete a questionnaire related to each outing that will represent a maximum of 0.5 points of the final grade. Non-attendance to the outing will be awarded 0 points for this activity.

Seminars (2 out of 10 of the final grade)
Throughout the course, students will be asked to give oral presentations concerning different issues related to the course that have been proposed by the professor. It will be up to the teacher to decide whether these will be given as a group or individually. Seminars represent a maximum of 2 points of the final grade. Students not fulfilling this activity will be awarded 0 points.

Requirements to pass the course:
The final mark is calculated by adding each score obtained in each of the four assessment sections. To pass the course, students must obtain a minimum of 5 points out of 10. It will also be required to have obtained a minimum of 3 points out of 6 in the final exam.

According to current regulations, only students who fall in any of the following categories can request a change in their examination dates:

- Representation in the University institutions or participation in academic or sporting events on behalf of the University.
- Students recognized as high-performance athletes.
- Students with disabilities will be provided with assessment activities in accordance with their needs.

In the event that students fail and need to repeat the course, their former marks will not be valid.

July exam

Although students might have failed some or all of the components previously described and not have managed to pass the course, they will be eligible to take the July exam. In the event that a student renounces his/her marks obtained in the continuous evaluation activities he/she will have to take an exam covering the contents of all components. In this case they will be able to achieve a mark of 10 out of 10 points of the final mark.

Time devoted to the assessment process:
Final exam: 3 hours
Practical classes questionaires: 6 hours
Outing questionair: 1 hour
Seminars: 2 hours
Final exam in July (if applicable): 3 hours
TOTAL: 15 hours

7. BIBLIOGRAFÍA GENERAL

- Biogeochemistry. An analysis of global change. William H. Schlesinger. Academic Press. 2001.
- Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Desertification: causes, impacts & consequences. Behnke, Roy H. Springer, Berlin. 2011.
- Global Warming: the complete briefing. John Houghton.Cambridge University Press, 2004.
- Paleoclimatology: reconstructing climates of the quaternary. Raymond S. Bradley. San Diego, Academic Press, cop. 1999.
- The Oxford Companion to Global Change (Oxford Companions). Edited by Andrew Goudie and David Cuff. Oxford University Press. 2008.