

TEACHING GUIDE COURSE: 2016-17

BASIC DATA OF THE SUBJECT

Subject:	Global Environmental Change		
Subject code:	45094219	Programme:	Degree in Environmental Sciences (Programme 2009)
Academic year:	2016-17	Educational cycle:	Degree
Course:	4	Type:	Compulsory
Length:	Second half of the course		

NORMATIVE HOUR DISTRIBUTION OF THE SUBJECT

Credits:	6	Classroom teaching hours:	45
		Homework hours:	105
		Total hours:	150
VIRTUAL PLATFORM USE:	Teaching support		

TEACHERS DATA

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Personal website

[Web de Pérez Cazorla, Beatriz](#)

ORGANIZATION OF ACTIVITIES

Activities planned for learning and student's work time distribution by activity (estimated in hours)

I. STUDENT'S ACTIVITIES (On-site / Online)	• Extended group	0,0
	• Teaching group	26,0
	• Workgroup/Reduced group	19,0
	<i>Total Classroom teaching / Online Hours ...</i>	45,0
II. STUDENT'S HOMEWORK	• (Workgroup, Individual work)	105
	<i>Total homework hours ...</i>	105
TOTAL STUDENT'S WORK HOURS		150,0

INTERESTING ELEMENTS FOR SUBJECT LEARNING

Justification of contents

In the current humanized biosphere of XXI century, the relationship between environment and civilization has a central role. Human well-being depends absolutely on earth ecosystems and services that these ecosystems provides, i.e. food, water, control of diseases, climate regulation, spiritual satisfaction... so the current state of ecosystems threatens the future of the human welfare.

This has been widely recognized by scientific groups and by the highest international institutions (i.e. ONU), which have required specific platforms for the assessment and monitoring of environmental conditions and ecosystems of our planet. For example, IPCC (Intergovernmental Panel on Climate Change) or Millennium Ecosystem Assessment are helpful work platforms to raise awareness of society and governments about Global Change, recognized as the most important humankind problem. Therefore, as a result of years of debate and the consolidation as a field of scientific knowledge, Global Change, biodiversity and their relationship to human well-being are an important cultural aspect of modern society of knowledge and becomes incorporated into teaching curriculum in universities.

Relationship with other subjects

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Ecology. Society and environment. Geographic Information System and Environmental Remote Sensing. Conservation and management of species. Conservation and management of natural protected areas. Meteorology and climate change.

Knowledge needed

Basic knowledge in Ecology, Biodiversity, Environmental Information Processing and Geographical Information Systems is required.

SKILLS

Generic Skills

Generic Skills at the University of Almería

- Social competences and global citizenship
- Basic professional knowledge
- Problem solving ability
- Oral and written communication in native language
- Ability in the use of information and communication technologies
- Critical and self-critical capacity
- Teamwork

Other Generic Skills

- Comprehension and knowledge capacity
- Knowledge use
- Ability to make judgments
- Communication and social skills

Specific Skills

- Be able to consider environmental problems in a multidisciplinary way
- Be able to design and apply sustainability indicators
- Be able to assess the interaction between natural environment and society
- Be able to plan, manage and preserve goods, services and natural sources

AIMS/LEARNING RESULTS

- Comprehension and understanding of fundamental concepts and processes of Global Change phenomena. - To reach specific common objectives through interaction with other people. - To understand the synergy concept and to achieve synergies through collaborative work. - To do the work responsibly in time and

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content, and in a cooperative way by the group. - To identify the organizational, economical (for both the organization and society) and environmental implications. - To make decisions where the different aspects identified are taken into account in a balanced way. - To recognise environmental problems and to separate them into different natural, social and economical aspects. - To acquire the knowledge and basic concepts to evaluate the impact of Global Change upon the ecosystems. - To identify and understand the spatial and temporal variability of Global Change causes. - Application of the scientific method to describe, estimate, analyze and diagnose the impact of Global Change in specific situations and the design of sustainability indicators. - To acquire basic knowledge and concepts to design and implement sustainability indicators, to estimate the impact that actions derived of natural resources exploitation have upon ecosystems and human well-being. - To acquire abilities and knowledge for transmitting to the society the role that natural resources and ecosystems have in maintaining human well-being. - Link with examples the physical environment and the social system. - Making decisions in the context of the evaluation of plant resources and habitats as part of ecosystems services, based on acquired knowledge and data collected by scientific standards.

TOPICS AND ORGANIZATION METHOD			
Topic	Topic I. Global Change and ecosystems		
Content/Subject			
	Unit 1. Global environmental crisis. Subject introduction: new challenges of environmental management, conservation paradoxes in XXI century. Holocene and civilisation development. Global environmental crisis. Anthropocene. The great acceleration. Direct drivers of global change. Historical development of Global Change Science.		
Methodology and organizational methods			
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>
Teaching group	Master/participatory class		2,0
	Discussion and pooling		2,0
	Others	Presentation and general introduction to the subject	2,0
Description of student homework			
Searching and processing of information. Flux diagrams, conceptual maps, and comparative tables. Collection, selection and reflection of learning evidences to show the teacher.			
Content/Subject			
	Unit 2. Ecosystem effects of Global Change. Climate change impact upon biodiversity. Destruction and fragmentation of habitats. Changes in biotic interactions. Global Change impact upon aquatic ecosystems. Global Change impact upon marine ecosystems.		
Methodology and organizational methods			
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours</i>

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			<i>Class/On line</i>	
Teaching group	Master/participatory class		3,0	
	Discussion and pooling		1,5	
	Audiovisual production		0,5	
Description of student homework				
Searching and processing of information. Flux diagrams, conceptual maps, and comparative tables. Collection, selection and reflection of learning evidences to show the teacher.				
Content/Subject				
	Unit 3. Key ecological processes for human well-being. Key processes to define safe and just operating space for humanity (Planetary Boundaries). Cumulative changes vs. thresholds of change. Relations between global change and human well-being.			
Methodology and organizational methods				
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>	
Teaching group	Master/participatory class		2,0	
Description of student homework				
Searching and processing of information. Flux diagrams, conceptual maps, and comparative tables. Collection, selection and reflection of learning evidences to show the teacher.				
Topic				
Topic II. Concepts and perspectives for Global Change adaptation				
Content/Subject				
	Unit 4. Ecosystems and human well-being. Natural Capital and Ecosystem Services. Frameworks to understand the relationships between human and nature. Ecosystem services cascade. Ecosystem services classes. Providing services. Regulating services. Cultural services. Intermediate and final ecosystem services. Service providing units. The value of conserving ecosystems and biodiversity in a changing world. Ecosystem services assessment. Redefining human well-being within planetary boundaries.			
Methodology and organizational methods				
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>	
Teaching group	Master/participatory class		3,0	
	Discussion and pooling		1,5	
	Audiovisual production		0,5	
Description of student homework				
Searching and processing of information. Flux diagrams, conceptual maps, and comparative tables. Collection, selection and reflection of learning evidences to show the teacher.				
Content/Subject				

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	Unit 5. Environmental management to face Global Change. Adaptive management. Science-policy interface to face environmental problems. Resilience. Green Infrastructures. Management examples to face Global Change in Andalusia: LIFE BLUE NATURA, LIFE CONHABIT and LIFE ADAPTAMED.		
Methodology and organizational methods			
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>
Teaching group	Master/participatory class		1,5
	Discussion and pooling		0,5
Workgroup/ Small group	Cases of study		2,0
Description of student homework			
Searching and processing of information. Flux diagrams, conceptual maps, and comparative tables. Collection, selection and reflection of learning evidences to show the teacher.			
Content/Subject			
	Unit 6. Coupled human and natural systems. From ecological framework to social-ecological approach. Social-ecological systems: concepts and characteristics. Essential variables for social-ecological systems monitoring. Social-ecological systems mapping. Socio-Ecosystem Functional Types.		
Methodology and organizational methods			
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>
Teaching group	Master/participatory class		2,0
	Discussion and pooling		1,0
Description of student homework			
Searching and processing of information. Flux diagrams, conceptual maps, and comparative tables. Collection, selection and reflection of learning evidences to show the teacher.			
Content/Subject			
	Unit 7. Sustainability Science. Challenges of Science in a changing world. Common goods administration. Objectives of sustainable development. New scientific paradigm to face Global Change: post-disciplines, use-inspired research, normative principles of Sustainability Science. Collective Strategies to implement social-ecological approach.		
Methodology and organizational methods			
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>
Teaching group	Master/participatory class		2,0
	Discussion and pooling		1,0
Description of student homework			
Searching and processing of information. Flux diagrams, conceptual maps, and comparative tables. Collection, selection and reflection of learning evidences to show the teacher.			

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Topic	Topic III. Global Change Monitoring in socio-ecosystems		
Content/Subject	Seminars and field work. Protected areas and Global Change. Andalusian Network of Global Change. Global Change Monitoring in Cabo de Gata-Níjar Natural Park and Sierra Nevada National Park: Global Change Observatory of Arid Zones and Global Change Observatory of Sierra Nevada, adaptive management actions in Cabo de Gata-Níjar and Sierra Nevada, monitoring of biophysical parameters.		
Methodology and organizational methods			
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>
Workgroup/ Small group	Discussion		1,5
	Demonstration of specific procedures		0,5
	Field work		4,0
	Team work		1,0
Description of student homework			
Search, consultation and information processing. Cases of study. Evaluation of results. Reporting. Hypothesizing and alternatives.			
Content/Subject	Project-based learning. Monitoring global change in socio-ecosystems of Andalusian Biosphere Reserves. Diagnostic and delineation of socio-ecosystems. Identification of drivers of global change. Characterization and diagnosis of the ecology and natural capital that supports life in the socio-ecosystem. Characterization and mapping of ecosystem services. Analysis of ecosystem services trade-offs.		
Methodology and organizational methods			
<i>Organizational methods</i>	<i>Procedures and training activities</i>	<i>Observations</i>	<i>Hours Class/On line</i>
Workgroup/ Small group	Problem-based learning		10,0
Description of student homework			
Search, consultation and information processing. Cases of study. Evaluation of results. Reporting			



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EVALUATION OF SKILLS

Evaluation criteria

1. Construction of Knowledge:

- Personal Development of ideas and concepts.
- Understanding the content of the materia.
- Interrelation of theoretical connection concepts.
- Search theoretical-practical connection.
- Selection of main and secondary ideas.
- Degree of permeation of the concepts.
- Theoretical foundation of arguments.
- Originality of reflexions.

2. Work presentation:

- Structure and organization.
- Oral and written expression, use of scientific language.

3. Self-learning:

- Analysis of learning difficulties.
- Approach learning objectives from these difficulties.
- Achievement of the objectives.
- Contribution evidences that differ of the teaches.
- Activity in the virtual classroom and social networks.

Percentages of evaluation

	<i>Activity</i>	<i>(Hours)</i>	<i>Percentage</i>
I. STUDENT ACTIVITIES (On-site / Online)	• Extended group	(0)	0 %
	• Teaching group	(26)	30 %
	• Workgroup/small group	(19)	30 %
II. STUDENT HOMEWORK (Independent work)	• (Workgroup, Individual work)	(105)	40 %

Evaluation tools

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- Tests, exercises, problems.
- Process observations.
- Final evaluation of reports, classroom work, homework, etc.
- Final test (written or oral).
- Others: Rubrics of evaluations from reports of student progress.

Follow-up mechanism

- Tutoring assistance.
- Assistance and participation in seminars.
- Use of virtual classroom.
- Participation in tools communication (discussion forums, e-mails..).
- Submission of activities in classroom.
- Submission of activities in tutorials.
- Submission of activities in virtual classroom.

BIBLIOGRAPHY

Recommended literature

- Cambio global. Impacto de la actividad humana sobre el sistema Tierra. (*Duarte, C. (coordinador)*) - Bibliografía básica
- Colapso. Por qué unas sociedades perduran y otras desaparecen. (*Diamond, J.*) - Bibliografía básica
- El informe Stern: La verdad sobre el cambio climático. (*Stern, N.*) - Bibliografía básica
- Panarchy. Understanding transformations in human and natural systems (*Gunderson, L. H. & Holling, C. S. (Ed.)*) - Bibliografía básica
- Principles of ecosystem stewardship: resilience-based natural resource management in a changing world. (*Chapin, F.S., Kofinas, G.P. & Folke, C.*) - Bibliografía básica
- Principles of Terrestrial Ecosystem Ecology (*Chapin, F.S., Matson, P.A., Mooney, H.A.*) - Bibliografía básica
- Sustainability indicators. Measuring the immeasurable. (*Bell, S. & Morese, S.*) - Bibliografía básica

Literature available in the Information System of UAL Library

You can see the literature in the Information System of UAL Library following the link:

<http://almirez.ual.es/search/x?SEARCH=45094219>

WEB

- <http://www.caescg.org>
Web del Centro Andaluz para la Evaluación y Seguimiento del Cambio Global
- <http://www.glocharid.org>
Web del Programa Andaluz de Adaptación al Cambio Climático
- <http://www.stockholmresilience.org/>
Web del Centro de Resiliencia de Estocolmo

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Web del Observatorio de Cambio Global se Sierra Nevada
- <http://www.cebc.bangor.ac.uk/index.php.en?menu=0&catid=0>
Web del Centro para la conservación basada en la evidencia
- <http://www.uam.es/gruposinv/socioeco/>
Web del Laboratorio de socio-ecosistemas de la Universidad Autónoma de Madrid
- <http://www.grida.no/>
Web del Centro GRID-Arendal para el intercambio de información científicos-gestores

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