



## IDENTIFYING DATA

### Global Change and Adaptation

Subject	Global Change and Adaptation			
Code	V02M123V01205			
Study programme	(*)Máster Universitario en Ciencias Biológicas: Biología Molecular, Computacional e Ambiental e Bio-Industrias			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Optional	1st	2nd
Language	English			
Department				
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Lecturers	Iglesias Briones, Maria Jesús Marañón Sainz, Emilio Rodeiro Iglesias, Javier			
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General description	After the Industrial Revolution and, in particular, since the mid-twentieth century our planet is experiencing a set of global environmental changes derived from the exponential increase of the human population and in turn the utilization rate of resources. Human activities entail profound changes in land use, global biogeochemical cycles, species abundance and distribution and the structure and functioning of ecosystems. This course is intended for students aiming to learn the scales and components involved in global change, to understand its main effects on the different marine and terrestrial ecosystems and to become familiar with the main international programs studying this discipline.			

## Competencies

Type A	Code	Competences Specific
	A1	(*)To know the scientific method and the correct use of the scientific terminology as well as to acknowledge the contribution that scientific research provides to the overall knowledge and professional practice.
	A2	(*)Ability to describe and to analyse biological diversity, the mechanisms determining the interactions with the biotic and abiotic environment and being able to select those which might have technical applications.
	A3	(*)Ability to manage and/or to develop basic tools for validating and analysing data by means of statistics and bioinformatics.
	A4	(*)To know the ethical and legal aspects governing the collection and the handling of biological samples, organisms and habitats.
	A5	(*)Ability to design, evaluate and implement models of biological structures, systems and processes.
	A6	(*)To learn the sampling techniques and the instrumental methodologies, in the field and laboratory, for their application in the Biological Sciences
	A7	(*)To have an integrated view of the R&D processes and their possible transfer to the industrial sector. Planning and supervising facilities together with managing their human and economic resources.
	A8	(*)Ability to classify, evaluate, conserve, restore and manage natural and productive systems. Developing and implementing land management and sustainability plans.

A9	(*)To understand and know how to apply quality control systems and safety protocols in any biological laboratory of the public or private sector.
A10	(*)To acquire the professional ability to teach and spread Biology and to offer expertise advice for elaborating scientific, technical and socioeconomic biology reports. Address environmental consulting.
A11	(*)To perform an individual Master Project (critical and in-depth study) under the supervision of a tutor in a research or working environment demonstrating that skills have been acquired.

#### Type B Code Competences Transversal

B1	(*)Dissemination of results and conclusions of the biological studies, in oral and written English, through complex presentations that address ideas related with R&D in Biology.
B2	(*)Managing computational, laboratory, field and industrial techniques in order to obtain, process and apply the acquired information.
B3	(*)Disseminating and broadcasting ideas in contexts both academic and non-specialised.
B4	(*)Reflecting on social and ethical responsibilities.

#### Learning aims

Subject competences	Typology	Competences
Ability to describe and to analyse biological diversity, the mechanisms determining the interactions with the biotic and abiotic environment and being able to select those which might have technical applications.	Know How	A2
Ability to manage and/or to develop basic tools for validating and analysing data by means of statistics and bioinformatics	Know How	A3
To learn the sampling techniques and the instrumental methodologies, in the field and laboratory, for their application in the Biological Sciences	Know How	A6
To acquire the professional ability to teach and spread Biology and to offer expertise advice for elaborating scientific, technical and socioeconomic biology reports. Address environmental consulting.	Know How	A10
Dissemination of results and conclusions of the biological studies, in oral and written English, through complex presentations that address ideas related with R&D in Biology.	Know How	B1
Managing computational, laboratory, field and industrial techniques in order to obtain, process and apply the acquired information.	Know How	B2
Disseminating and broadcasting ideas in contexts both academic and non-specialised.	Know How	B3
Reflecting on social and ethical responsibilities.	Know How	B4

#### Contents

Topic	
Introduction to Global Change	Scales and components of global change General trends of global change
Global Change in Terrestrial Ecosystems	Evidences of global change on terrestrial ecosystems Habitats degradation Global change and biodiversity changes Changes in the biogeochemical cycles
Global change in Marine Ecosystems	Introduction to marine ecosystems and biogeochemistry Long-term perspective: global change in the past Current changes in the sea: warming, deoxygenation, eutrophication, acidification Impacts on marine populations and communities Changes in ecosystems and biogeochemical cycles: global feedback processes
International Protocols and Predictions	IPCC scenarios

#### Planning

Personalized attention	Assessment	Ordinary class hours A	Face-to-face hours outside the classroom Guided academic environment B	Student's work factor C	Outside the classroom hours D	Total hours (A+B+D) E

Case studies / analysis of situations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	2	40	40
Master Session	<input type="checkbox"/>	<input checked="" type="checkbox"/>	30	0	2.5	75	105
Multiple choice tests	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	0	1	1	2
Case studies / analysis of situations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5	0	1	1.5	3
Total hours E:							150
Work load in UVIGO ECTS credits:							6

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

### Methodologies

	Description
Case studies / analysis of situations	Case studies referring to any of the components of global change based on the critical analysis of the most updated literature
Master Session	Theoretical contents

### Personalized attention

	Description
Case studies / analysis of situations	To resolve any issue or problem that may arise when elaborating the case studies

### Assessment

	Description	Qualification
Master Session	Attending the theoretical lectures	10
Multiple choice tests	Short answer questions about the theoretical contents	20
Case studies / analysis of situations	Public presentation of the case study	70

### Other comments and second call

### Sources of information

Duarte C. , Cambio global. Impacto de la actividad humana sobre el sistema tierra, , 2006
Schlesinger W.H., Biogeochemistry. An analysis of global change, , 1997
Canadell, Josep G., Pataki, Diane E., Pitelka, Louis F., Terrestrial Ecosystems in a Changing World, , 2007

### Recommendations