Universidade Vigo

IDENTIFYING DATA				
Climate change				
Subject	Climate change			
Code	O01G261V01702			
Study programme	Grado en Ciencias Ambientales			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	4th	1st
Teaching language	Spanish			
Department				
Coordinator	Escuredo Pérez, Olga Castro Rodríguez, María Teresa de			
Lecturers	Castro Rodríguez, María Teresa de Escuredo Pérez, Olga			
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Web				
General description	The climate change suffered by the Earth from the moment of its formation to the present is studied. In the present climate, the change that takes place in the atmosphere, on the surface and in the ocean is analyzed separately. Subsequently, the effect of climate change on biodiversity is analyzed. Finally, resources and management of mitigation and adaptation to climate change are described.			

Training and Learning Results	
Code	
A3	Students will be able to gather and interpret relevant data (normally within their field of study) that will allow them to have a reflection-based considered opinion on important issues of social, scientific and ethical nature.
A4	Students will be able to present information, ideas, problems and solutions both to specialist and non-specialist audiences.
B1	Students will acquire analysis, synthesis and information-management skills to be applied in the food and agriculture and environmental sectors
B2	Students will acquire and apply teamwork abilities and skills.
C3	To be familiar with the temporal and spatial dimensions of environmental processes.
C10	To be familiar with concepts linked with climate and global change.
C22	To be familiar with the fundamentals of weather forecasting and the analysis of climate phenomena.
D1	Capacity of analysis, organization and planning.
D4	Ability of autonomous learning and information management.
D5	Ability of problem solving and decision making
D9	Team of interdisciplinary nature

Expected results from this subject				
Expected results from this subject	Training and Learning Results			
RA1. Learning of the concepts and basic processes related to climatic change.		B1	C3 C10 C22	D1 D4
AR2. Development of practical cases and resolution of exercises posed in the seminars	A3 A4	B1 B2	C22	D1 D4 D5 D9

Contents
Topic

Part I. Climate Change Subject 1. Climate Change from the origin of the Earth.	1.1 Definition of climate. 1.2 Climatic system. 1.3 Reconstruction of the climate. 1.4 Climatic variability. 1.5 Characterization of the climate in the different periods of the Earth.
Part I. Climate Change Subject 2. Present Climate change in the atmosphere.	2.1 Global temperature evolution from the 190th to the 21st Century. Trends. 2.2 Evolution of the ice cover in the different regions of the planet. 2.2.1 Ice cover trends. 2.3 Variability of the atmospheric humidity. 2.3.1 Humidity trends. 2.4 Evolution of global clouds coverege. 2.5 Variations in the atmospheric circulation.
Part 1. Climate Change Subject 3. Present climate change in the ocean.	3.1 Global temperature and salinity changes. 3.1.1 Temperature trends. 3.1.2 Salinity trends. 3.2 Changes in the sea level rise. 3.2.1 Sea level rise trends. 3.3 Biochemical changes in the ocean. 3.3.1 Trends in biochemical variables.
Subject 4. Future projections of the climatic change	Definition of radiative forcing. Description of the different greenhouse gas emission scenarios used in the IPCC. Future projections of different atmospheric and oceanic variables.
Part II: Climate Change and biodiversity Subject 4. Effect of the climate change on the vegetal biodiversity	4.1 Evidences of the climate change and its characteristics. 4.2 Main climatic elements which determines the plant development and growth. 4.3 Influence of meteorological parameters on the plants periodic phenomenons. 4.3 Effects on the agriculture.
Part II. Climate Change and biodiversity Subject 5. Mitigation and adaptation	5.1 Resources to improve the present energetic system. 5.2 Management of forest resources and of crops.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	26	56	82
Seminars	14	28	42
Problem and/or exercise solving	0	24	24
Essay questions exam	1	0	1
Essay questions exam	1	0	1

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

Methodologies

	Description
Lecturing	The own concepts of each subject will be explained in masterclasses. Like material of support will use the available technology: projection, blackboard, etc. The subjects will dump in the platform of Teledocencia of the University of Vigo (https://moovi.uvigo.gal/).
Seminars	Analysis of temporal series (perpetual years, interannual variability, anomalies, tendencies…) of different variables both atmospheric and oceanic (tidal elevation, air temperature, ocean temperature, salinity and atmospheric indices like NAO, EA…) Resolution of exercises and practical cases. Analysis of documentation on the subject and of audiovisual.

Personalized assistance

Methodologies	Description
Lecturing	Through the platform MOOVI the student can access to the content of each subject and to the different activities proposed. Personal attendance will take place during tutorials and seminars. Tutorials: Monday from 16:00 to 18:00 and Wednesday from 9:00 to 11:00

Seminars	Through the platform MOOVI the student can access to the content of each subject and to the different activities proposed. Personal attendance will take place during tutorials and seminars. Tutorials: Monday from 16:00 to 18:00 and Wednesday from 9:00 to 11:00

Assessment

	Description	Qualification	Training and Learning Results
Problem and/or exercise solving	Resolution of practical cases and exercises proposed in seminars. RESULTS FROM LEARNING EVALUATED: RA2.	40	A3 B1 B2 D4 D5 D9
Essay questions exam	Evaluation of the main aspects of the subject. Part I RESULTS FROM LEARNING EVALUATED: RA1.	30	A3 A4 C3 C10 C22 D1
Essay questions exam	Evaluation of the main aspects of the subject. Part II RESULTS FROM LEARNING EVALUATED: RA1.	30	A3 A4 C3 C10 C22 D1

Other comments on the Evaluation

"The preferred assessment method is Continuous Evaluation. Students who wish to have a Global Evaluation (100% of the grade based on the official exam) must inform the course instructor via email or through the Moovi platform within one month from the start of the course."

Attendance to lectures, particularly seminars, is mandatory for in-person classes.

The course is divided into two independent blocks. To pass the course, students must achieve a minimum of 4.5 in each block. In order to pass each block, students must obtain a minimum grade of 5 in short answer tests and problem-solving, which will be averaged.

Students who are unable to attend various teaching methods due to justified reasons must provide proper justification from the beginning of the course. Evaluation will be carried out through complementary assignments proposed by the professor, depending on the circumstances.

Exam Dates:

Final Exam: September 21, 2023, at 16:00

End of Semester Exam: January 19, 2024, at 10:00

July Exam Session: July 5, 2024, at 16:00

In case of any errors in the transcription of the exam dates, the official dates approved and published on the notice board and the Center's website shall prevail.

For the July exam session, 60% of the grade will be based on an exam covering the syllabus, and 40% will be based on the grade obtained in seminars, which will be carried forward until this session. For the final exam session, students who choose to take the exam at the end of the course will be evaluated solely based on the exam (which will account for 100% of the grade).

Sources of information

Basic Bibliography

Antón Uriarte Centolla, **Historia del Clima de la Tierra**, EuskoJaurlaritzarenArgitalpenZerbituNagusia,

William F. Ruddiman, **Earth´s Climate. Past and Future**, Second Edition, 2008

Complementary Bibliography

Elias F. & Castellví F., **Agrometeorología**, Mundi Prensa,

Mavi H.S. & Tupper G.J., **Agrometeorology.**, Food Products Press.,

Cambio climático y biodiversidad, IPCC,

IPCC, **AR6 Syntesis report: Climate change 2014**, https://www.ipcc.ch/report/sixth-assessment-report-cycle/, 2023

IPCC, **The ocean and cryosphere in a changing climate**, 2019

Recommendations

Subjects that continue the syllabus

Terrestrial ecosystems pollution/O01G261V01923

Physical climatology/O01G261V01916

Air pollution/O01G261V01918

Subjects that are recommended to be taken simultaneously

Aerobiology/O01G261V01917

Subjects that it is recommended to have taken before

Meteorology/O01G261V01912