



## IDENTIFYING DATA

### Science and technology of the environment

Subject	Science and technology of the environment			
Code	001G281V01503			
Study programme	Grado en Ingeniería Agraria			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Escuredo Pérez, Olga			
Lecturers	Escuredo Pérez, Olga Guada Prada, Guillermo			
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Web				
General description				

## 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 be able to develop analysis, synthesis and information-management skills for application in the agricultural, food and environmental sectors.			
B2	Students will acquire and apply teamwork abilities and skills.			
C13	Ability to understand and use the principles of ecology, studies of environmental impact, their assessment and correction.			
D2	Analysis, organization and planning skills.			
D3	Oral and written communication skills in local and foreign languages.			
D4	Independent-learning and information-management skills.			
D5	Problem-solving and decision-making skills.			
D8	Interdisciplinary teamwork skills.			

## Expected results from this subject

Expected results from this subject	Training and Learning Results			
(*)Saber aplicar os coñecementos e a normativa de protección do medio ambiente	A3 A4	B1 B2	C13	D2 D3 D4 D5
(*)Coñecer, desenvolver e aplicar os coñecementos en materia ambiental á práctica para a produción agrícola e gandeira		B1 B2	C13	D4
(*)Saber aplicar os instrumentos de xestión ambiental ás industrias agrarias e alimentarias	A3 A4		C13	D2 D4 D5 D8
(*)Saber elaborar e interpretar informes en materia ambiental	A3 A4		C13	D3

## Contents

Topic	
CONCEPT AND IMPORTANCE OF THE ENVIRONMENT.	It's components. Interaction of man with the environment. Natural resource concept. Environmental problems and demographics. Development and Environment.
ECOSYSTEMS.	It's components. ecological factors. Study of the population and the Community. ecological succession.
BIOGEOCHEMICAL CYCLES.	Generalities. Carbon, Nitrogen and Phosphorus Cycles.
ECOSYSTEM DYNAMICS.	The population: properties and forms of growth. Community. Interaction between species. Biodiversity. Ecosystem development.
FLUID MASSES: WATER.	Cycle and uses of water. Surface waters: hydrological distribution and geochemical evolution. Groundwater: hydrological distribution and geochemical evolution.
OCEAN DYNAMICS.	Types of currents. Estuaries: types and dynamics. Mixing processes in the marine environment.
FLUID MASSES: AIR, ATMOSPHERE.	Composition, structure and function. Radiations in the atmosphere.
ATMOSPHERIC DYNAMICS.	Local winds. Mechanisms of dispersion, transport and deposition of pollutants in the atmosphere. Meteorology: weather maps and forecasts.
WATER CONTAMINATION.	Cycle of water use. Microbiological characteristics of water and biological contamination. Physical parameters indicators of contamination. Water contaminants: total matter, inorganic and organic contaminants. Bionutrient contamination and eutrophication. Dissolved oxygen and organic matter. Indicator parameters of contamination by organic matter. Metal contamination. Contamination by detergents and pesticides. Other contaminants.
WASTEWATER TREATMENT SYSTEMS.	Wastewater purification systems. Processes used: chemical, physical, thermal and biological. Treatment of urban wastewater. Low cost purification systems. Reuse of purified water. Water pollution due to agricultural activities. Regulations on pollution and water purification.
ATMOSPHERIC POLLUTION.	Concepts of emission and immission. Emission sources. Types of air pollution. The aerosol: its evolution in the atmosphere. Pollution of a chemical nature: primary pollutants.
EVOLUTION OF ATMOSPHERIC POLLUTION.	Evolution of pollutants in the atmosphere: secondary pollution. Photochemical smog. Acid smog. Acid rain. Factors that affect pollution in the atmosphere. Pollutants emitted by agricultural and food industries. Control of atmospheric contamination. Legislation on air pollution.
ENERGY AND ENVIRONMENT.	Conventional and alternative energy sources: their use and environmental problems they generate.
GLOBAL CHANGE.	Ozone layer destruction. Greenhouse effect and climate change. Causes. Consequences on agriculture. Measures taken.
REDUCTION OF BIODIVERSITY.	Biodiversity. The value of wild species. The problem of reducing diversity: causes. Biodiversity in the Iberian Peninsula.
PROTECTION OF NATURE.	Protected Natural Areas: history and legislation. Figures and instruments of protection. Protection of wild flora and fauna. Community regulations on the conservation of spaces of interest.
AGRICULTURE AND ENVIRONMENT.	Types of agriculture. Impact of agricultural activities. Measures for the environmental integration of agricultural activities.
ENVIRONMENTAL MANAGEMENT INSTRUMENTS.	Development and Conservation. Legislation and Environment. Environmental impact. Environmental management instruments.
METHODOLOGY OF ENVIRONMENTAL IMPACT STUDIES.	Environmental impact assessment. Environment Effect investigation. Applicable regulations.
ENVIRONMENTAL POLICY AND COMPANY	Environmental Management System in the company. Environmental audit. Ecolabels. Life cycle analysis.
LIFE CYCLE ANALYSIS.	Life cycle analysis concept. Stages in the life cycle of a product. Methodology. Applications.

Planning			
	Class hours	Hours outside the classroom	Total hours
Seminars	6	18	24
Studies excursion	4	0	4
Mentored work	4	12	16
Lecturing	14	35	49
Lecturing	14	35	49
Problem and/or exercise solving	0	8	8

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

Methodologies	
	Description
Seminars	Exercises related to Topics of the subject.
Studies excursion	Previous preparation of a script by the teacher.
Mentored work	Elaboration in groups on a specific theme approached by the teacher or the student's suggestion. Presentation and discussion of the topic
Lecturing	The teacher exposes a script of the topic supported by computer and screen projection.
Lecturing	The teacher exposes a script of the topic supported by computer and screen projection.

### Personalized assistance

Methodologies	Description
Lecturing	In the classroom, tutorials and through ICTs.
Seminars	In the classroom, tutorials and through ICTs.
Studies excursion	During the development of the study trip.
Mentored work	In tutorials and through ICTs.
Lecturing	In the classroom, tutorials and through ICTs.

### Assessment

Assessment		Qualification Training and Learning Results					
	Description						
Seminars	Participation, activities carried out and their quality will be taken into account.  R1-R4	5	A3	B1	C13	D2	
			A4	B2		D3	
						D4	
						D5	
						D8	
Studies excursion	Attendance and participation will be valued.  R1-R4	5	A3	B1	C13	D2	
			A4	B2		D3	
						D4	
						D5	
						D8	
Mentored work	A work will be done in a small group on aspects dealt with in the master classes.  R1-R4	10	A3	B1	C13	D2	
			A4	B2		D3	
						D4	
						D5	
						D8	
Lecturing	The learning results will be evaluated by means of an exam with short questions. The student must obtain 40% of the exam grade in order to pass the subject.  R1-R4	40	A3	B1	C13	D2	
			A4	B2		D3	
						D4	
						D5	
Lecturing	The learning results will be evaluated by means of an exam with multiple choice questions. The student must obtain 40% of the exam grade in order to pass the subject.  R1-R4	40	A3	B1	C13	D2	
			A4	B2		D3	
						D4	
						D5	
						D8	

### Other comments on the Evaluation

The continuous evaluation modality will be used as preferred following the sequence of activities that are proposed. Students who want Global Assessment (100% of the grade in the official exam) must notify the person responsible for the subject, by email or through the Moovi platform, within a period not exceeding one month from the beginning of the teaching of the subject.

Students who cannot attend face-to-face classes must justify it. The evaluation of the face-to-face activities will be carried out through complementary tests proposed by the teacher.

Exams: Those established in the official calendar and published on the website of the Faculty of Sciences.

End of the race: 09/20/2023 at 4:00 p.m.

1st edition: 11/08/2023 at 10:00 a.m.

2nd edition: 04/07/2024 at 4:00 p.m.

The end of degree call will be evaluated with a final exam (according to the date established in the official call) that will have a value of 100% of the grade. If this exam is not passed, the student will be evaluated according to the criteria of the other editions.

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### Sources of information

#### Basic Bibliography

Bueno J.L., Sastre H. & Lavin A.G, **Contaminación e Ingeniería Ambiental**, Edit. FICYT, 1997

Odum E & Warrett G.W, **Fundamentos de Ecología**, 5ª, Thomson, 2006

#### Complementary Bibliography

Orozco C., Pérez A., González M.N., Rodríguez F.J. & Alfayete J.M., **Contaminación ambiental: una visión desde la Química**, Thomson, 2003

Kiely G., **Ingeniería ambiental: fundamentos, entornos, tecnologías y sistemas de gestión**, McGraw-Hill., 2003

Gomez Orea D, **Evaluación de impacto ambiental: un instrumento preventivo para la gestión ambiental.**, Mundi-Prensa, 2003

Glynn Henry J. & Heinke G.W., **Ingeniería ambiental.**, Prentice may, 1999

Nebel B & Wright R.T., **Ciencias Ambientales. Ecología y desarrollo sostenible**, Pearson Educación, 1999

Tyller Miller G., **Introducción a la Ciencia Ambiental**, Thomson, 2002

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### Recommendations

#### Other comments

It is advisable to attend both theoretical and practical classes, seminars and discussions of work done by their peers. In this way, it will be easier for the student to pass the subject since he will learn the required skills and abilities more quickly and effectively. Likewise, it will be easier for you to organize your time when making it compatible with the tasks assigned in the other subjects of the degree.

Another recommendation is to use the tele-teaching service on the MooVi platform and take advantage of face-to-face tutoring hours as well as e-mail. These services are recommended even if it is difficult for the student to attend the theoretical and practical classes.

Finally, the continuous and constant work of the student throughout the course is important.