



IDENTIFYING DATA

Ecology

Subject	Ecology			
Code	001G261V01602			
Study programme	(*)Grao en Ciencias Ambientais			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish			
Department				
Coordinator	Mouriño Carballido, Beatriz			
Lecturers	Álvarez Jiménez, Maruxa Mouriño Carballido, Beatriz			
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General description	English Friendly subject: International students may request from the teachers: a) materials and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.			

Competencies

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.
C1	To know the physical, chemical and biological foundations linked with the environment and its technological processes
C3	To be familiar with the temporal and spatial dimensions of environmental processes.
C4	Ability to integrate the experimental data found in field and/or lab work with theoretical knowledge.
C6	To be familiar with the different aspects involved in planning, management, assessment and preservation of natural resources.
D1	Capacity of analysis, organization and planning.
D3	COral and written communication in the native language and foreign
D4	Ability of autonomous learning and information management.
D5	Ability of problem solving and decision making
D9	Team of interdisciplinary nature

Learning outcomes

Expected results from this subject	Training and Learning Results			
Knowledge of the composition, structure and dynamic of the ecosystems, its dependency with the environmental factors to different scales, and its role in the global biogeochemical cycles.	A3 A4	B1 B2	C1 C3 C6	D1 D3 D4 D5 D9
Familiarise with the design of experimental studies in Ecology through a team activity that includes the collection of data in the field.	A3 A4	B1 B2	C1 C4 C6	D1 D3 D4 D5 D9

Interpretation of relevant ecological processes, by using individual and team activities, that include the analysis of data, and the deriving of conclusions	A3	B1	C1	D1
	A4	B2	C4	D3
			C6	D4
				D5
				D9

Contents

Topic	
Subject 1. The physical environment and scales of variability	Interaction of physical-biological processes in land and aquatic ecosystems. Entrance of energy in the ecosystem. Climate and soils. General patterns of oceanic circulation.
Subject 2. Concept of population and descriptors	Concept of population. Population parameters: geographic rank, abundance, density, spatial distribution, dispersion. Quantification of populational parameters. Life histories.
Subject 3. Population dynamics	Exponential growth models. Factors that limit the population growth. Logistic growth model. Population growth based on age structure . Survival curves and life tables.
Subject 4. Interspecific competition	Concept, experimental evidences and types of interspecific competition. Concept of ecological niche and principle of competitive exclusion. Coexistence and environmental heterogeneity. Competition models: Lotka-Volterra and Tilman.
Subject 5. Trophic interactions	Types and general characteristics of trophic interactions: depredation, herbivory, mutualism, parasitism, commensalism
Subject 6. Predation	Definition and type of predation. Factors that determine the preferences of diet. Energetic considerations: theory of the optimum procurement, optimum diet and theorem of the marginal value. Types of functional responses and experimental evidences. Numerical and development responses. Lotka and Volterra predation model and modifications.
Subject 7. Diversity	Concept and quantification of diversity. Distribution species-abundance. Factors that control diversity: resources, variety of habitats, and level of perturbation. Spatial patterns of diversity. Zonation.
Subject 8. Trophic structure	Trophic structure concept. Direct and indirect effects: trophic cascades. Bottom-up and top-down control. Concept of stability. Relation between diversity and stability.
Subject 9. Succession	Concept and types of observations. Examples of succession in land and aquatic ecosystems. Mechanisms of succession: facilitation, tolerance and inhibition. Succession, diversity and perturbation. Succession and flow of energy.
Subject 10. Entry of energy in the ecosystem: primary production	Ecology and laws of the thermodynamics. Gross and net primary production: concept, methods of determination and magnitude. Control factors in primary production. Temporal and spatial variability in primary production. Stoichiometric ratios in the organic matter.
Subject 11. Transfer of energy in the ecosystem: secondary production	Secondary production: herbivorous and detritivore routes. Energetic balance of secondary production: efficiencies. Control factors in secondary production. Decomposition and remineralization of organic matter in terrestrial and aquatic ecosystems. Trophic pyramids and transfer efficiencies. Energy flow in terrestrial and aquatic ecosystems.
Subject 12. Cycles of matter in the ecosystem	Compartments, mass balance and residence time. Global carbon and nitrogen cycles.
Subject 13. Changes in the ecosystems during the Antropoceno	Limits of the planet and main environmental problems. Diversity losses. Perturbations in the nitrogen cycle. Perturbations in the carbon cycle: warming and acidification. The role of the ocean in climate regulation. Feedback mechanisms in the Earth system.
Subject 14. Urban ecology	Global expansion of urban habitats. Patterns of urbanisation: dispersion, the urban-countryside gradient. Urban metabolism. Urban biodiversity. Indicators of urban sustainability.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	28	51	79
Seminars	14	14	28
Studies excursion	7	7	14
Learning-Service	2	2	4
Presentation	5	20	25

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

Methodologies	
	Description
Lecturing	Presentation of topics included in the classroom contents supported with graphic material. This activity will allow the student to know the composition, structure and dynamic of the ecosystems, its dependency with environmental factors operating at different scales, and its role in global biogeochemical cycles.
Seminars	Through individual and team activities, including the analysis of data, and the deriving of conclusions, relevant ecological processes will be discussed.
Studies excursion	Field trip to an intertidal system. Students will be introduced to experimental design in ecology by means of a team activity
Learning-Service	Presentation of projects. The students will be introduced to the design of experimental studies in Ecology, as well as the critical analysis and the presentation of results.
Presentation	Exposición de trabajos. Mediante una actividad de trabajo en equipo el alumno se familiarizará con el diseño de estudios experimentales en Ecología, así como el análisis crítico y la presentación de resultados.

Personalized assistance

Methodologies	Description
Presentation	Students will be supervised for the experimental design of a field study in a intertidal system, the analysis of data, and the interpretation of results.

Assessment

	Description	Qualification	Training and Learning Results			
Lecturing	The understanding of the contents explained during the lessons will be evaluated.	65	A3 A4	B1 B2	C1 C3 C4 C6	
	Learning outcomes: Knowledge of the composition, structure and dynamic of the ecosystems, its dependency with the environmental factors operating at different scales, and its role in global biogeochemical cycles.					
Seminars	The capacity to resolve problems and exercises related with the contents explained during the seminars will be evaluated.	10	A3 A4	B1 B2	C1 C3 C4 C6	D1 D3 D4 D5 D9
	Learning outcomes: Familiarise with the design of experimental studies in Ecology through a team activity that includes the collection of data in the field.					
Learning-Service	The design and verification of a tool of detection of environmental incidences.	10	A3 A4	B1 B2	C1 C4 C6	D1 D3 D4 D5 D9
	Learning outcomes: Interpretation of relevant ecological processes, by using individual and team activities, that include the analysis of data, and the deriving of conclusions.					
Presentation	The experimental design of field study and the clarity and rigour in the presentation will be evaluated.	15	A3 A4	B1 B2	C1 C3 C4 C6	D1 D3 D4 D5 D9
	Learning outcomes: Interpretation of relevant ecological processes, by using individual and team activities, that include the analysis of data, and the deriving of conclusions.					

Other comments on the Evaluation

To pass the subject will be necessary to pass the written test, that represents 65% of the final score. The assistance to the classrooms is not compulsory, however the evaluation system will be the same for all the students, so the assistance to the field trip and the seminars is strongly recommended. Dates of examinations: 01/10/18 16:00 (End of career); 17/01/2019 10:00 (1ª *Ord); 1/07/2019 16:00 (2ª *Ord).

Sources of information

Basic Bibliography

Ricklefs, R.E., **Ecology : The economy of nature**, 7th Edition, WHFreeman, 2014

Rodríguez, J., **Ecología**, 3ª Edición, Pirámide, 2013

Molles, Manuel C., **Ecología : conceptos y aplicaciones**, 3ª Edición, McGraw-Hill, 2006

Begon, M., Harper, J., Towsend, C.R., **Ecology: From individuals to Ecosystems**, 4th Edition, Wiley-Blackwell, 2006

Gotelli, N.J., **A primer of Ecology**, 4th Edition, Sinauer Associates, 2008

Complementary Bibliography

Little C., Willimas G.A., Trowbridge C.D., **The Biology of Rocky Shores (Biology of Habitats)**, 1st Edition, Oxford University Press., 2009

Recommendations