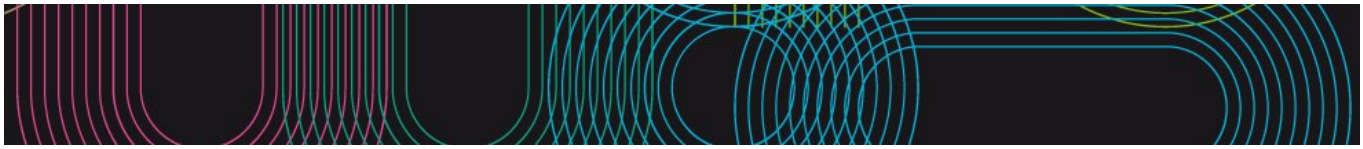

IDENTIFYING DATA				
Biodiversity				
Subject	Biodiversity			
Code	V02M123V01108			
Study programme	(*)Máster Universitario en Ciencias Biolóxicas: Bioloxía Molecular, Computacional e Ambiental e Bio-Industrias			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Optional	1st	1st
Language				
Department				
Coordinator	Sánchez Moreiras, Adela María			
Lecturers	Ferrero Vaquero, Victoria Pedrol Bonjoch, María Nuria Rojas Martín, Danny Rojas Nossa, Sandra Victoria Sánchez Moreiras, Adela María			
E-mail	adela@uvigo.es			
Web				
General description	Understanding biodiversity at different levels (genes, individuals, populations, communities), as well as the main filters that determine the structure of the ecosystems.			

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 responsabilities.

Learning aims

Subject competences	Typology	Competences
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.	know Know How	A1
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 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
Ability to design, evaluate and implement models of biological structures, systems and processes.	Know How	A5
To learn the sampling techniques and the instrumental methodologies, in the field and laboratory, for their application in the Biological Sciences	know	A6
Ability to classify, evaluate, conserve, restore and manage natural and productive systems. Developing and implementing land management and sustainability plans.	know Know How	A8
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 Know be	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. Managing computational, laboratory, field and industrial techniques in order to obtain, process and apply the acquired information. Disseminating and broadcasting ideas in contexts both academic and non-specialised. Reflecting on social and ethical responsabilities.	know Know How Know be	B1 B2 B3 B4

Contents

Topic	
Introduction to biodiversity	a) Concept and types of biodiversity (alpha, beta, gamma) b) Mapping biodiversity c) Levels of biodiversity (genes, individuals, populations, communities)
Methodology to measure biodiversity	(a) Planning a program for surveying and monitoring biodiversity. (b) General biodiversity evaluation methods. (c) Habitat and species survey and monitoring methods.
Modulation of biodiversity	a) Environmental gradients. Acclimation and adaptation. Physiological and ecological optimum values. Ecophysiological Bases of the distribution and abundance of plant species. b) Co-stress and multiple stress in plants. Diversity of responses to stress. Mechanisms of response and adaptation of plants to stressful environments. c) Functional types. Diversity and stability.
Influence of plant biodiversity on ecosystems structure	a) Relevance of the different species on ecosystem composition b) Plant secondary metabolites: regulation and role on plant metabolism c) Role of plant secondary metabolites on plant-plant interaction. d) Role of volatile plant secondary metabolites on ecosystem structure. e) Multi-trophic interactions.

The architecture of biodiversity	a) Interaction networks. b) Food webs and trophic chains. c) Extinction cascades. d) Biological diversity and the stability of ecosystems.

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
Seminars	☒	☒	4	0	5	20	24
Case studies / analysis of situations	☒	☒	4	0	4	16	20
Laboratory practises	☒	☐	6	0	5	30	36
Outdoor study / field practices	☒	☐	5	0	3	15	20
Master Session	☒	☐	7	0	3	21	28
Reports / memories of practice	☒	☒	1	0	5	5	6
Short answer tests	☒	☒	2	0	6	12	14
Other	☒	☒	1	0	1	1	2
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
Seminars	Autonomous work related to the different aspects of biodiversity
Case studies / analysis of situations	Classroom, lab or computer analyses of different problems/cases related to biodiversity
Laboratory practises	The students will have the chance to learn and practice different techniques for the measurement of biodiversity
Outdoor study / field practices	The students will have the chance to learn and practice different techniques for the sampling and measurement of biodiversity
Master Session	The students will have the chance to learn and understand all the contents necessary for the development of field, lab and computer practices and analyses

Personalized attention

	Description
Master Session	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.
Seminars	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.
Case studies / analysis of situations	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.
Laboratory practises	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.
Outdoor study / field practices	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.
Reports / memories of practice	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.
Short answer tests	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.
Other	Resolving the problems that the students could find during the study of the topics, the development of field and lab practices and the resolving of the cases via face to face and online tutoring.

Assessment		
	Description	Qualification
Seminars	Realization and presentation of the works done by the students	30
Case studies / analysis of situations	Evaluation of the results of the proposed cases	10
Reports / memories of practice	Evaluation of the reports of field and lab practices	30
Short answer tests	Evaluation of the theoretical concepts	20
Other	Presence, attitude and implication on the different activities of the matter	10

Other comments and second call

Sources of information

Plant physiological ecology

/ Hans Lambers, F. Stuart Chapin III, Thijs L. Pons. 2nd ed. Berlin: Springer-Verlag, 2008. ISBN 978-0-387-78340-6

*Functional plant ecology*Â / edited by Francisco I. Pugnaire, Fernando Valladares. 2nd ed. Boca Raton (Florida): CRC Press Taylor & Francis, 2007. ISBN 978-0-8493-7488-3

*Biotic stress and yield loss*Â / edited by Robert K.D. Peterson, Leon G. Higley. Boca Raton, Florida: CRC Press, 2001. ISBN 0-8493-1145-4

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Gaston, K. J. 1996. Biodiversity. A biology of numbers and difference. Blackwell, Oxford, UK.

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Harrington R, Woiwod I, Sparks T (1999) Climate change and trophic interactions. Trends in Ecology and Evolution 14: 146-150.

Hill, D.A., Fasham, M., Tucker, G., Shewry, M., Shaw, P., 2005. Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring. Cambridge University Press, Cambridge, United Kingdom.

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Ramakrishna A, Ravishankar GA (2011) Influence of abiotic stress signals on secondary metabolites in plants. Plant Signaling and Behaviour 6: 1720-1731.

Van Dam N.M. (2009) How plants cope with biotic interactions. Plant Biology, 11: 1-5.

Walbot V. (2011) How plants cope with temperature stress. BMC Biology, 9: Art. 79

Wink M (1999) Functions of Plant Secondary Metabolism. Sheffield Press, Sheffield.

Recommendations

Subjects that continue the syllabus

Glogal Change and Adaptation/V02M123V01205
Populatión Ecology and Ecosystem Complexity/V02M123V01109

Subjects that are recommended to be taken simultaneously

Reproductive and Developmental Biology/V02M123V01204
Conservation and Natural Resource Management/V02M123V01206

Subjects that it is recommended to have taken before

Experimental Design And Data Analyses/V02M123V01102