UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: MONITORING OF BIOLOGICAL DIVERSITY
Code: 310730
Type: ELECTIVE
ECTS credits: 4.5
Degree: 2335 - Master Degree Program in Environmental Sustainability in the Local and Territorial
Academic year: 2023-24
Center:
Group(s): 40
Year: Sin asignar
Duration: C2
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **ROCIO ARANZAZU BAQUERO NORIEGA** - Group(s): **40**

Building/Office	Department	Phone number	Email	Office hours
Sabatini/0.26	CIENCIAS AMBIENTALES	5466	rocio.baquero@uclm.es	Moday and Wednesday from 10:00 to 13:00. Please request an appointment by email.

Lecturer: **FEDERICO FERNANDEZ GONZALEZ** - Group(s): **40**

Building/Office	Department	Phone number	Email	Office hours
Edificio Sabatini, Despacho 0.24	CIENCIAS AMBIENTALES	925265753	federico.fdez@uclm.es	Tuesday, Wednesday and Thursday from 1:00 pm to 3:00 pm, previous request by e-mail

Lecturer: **URSULA HOFLE HANSEN** - Group(s): **40**

Building/Office	Department	Phone number	Email	Office hours
IREC/Despacho B8	CIENCIA Y TECNOLOGÍA AGROFORESTAL Y GENÉTICA	926052583	ursula.hofle@uclm.es	Moday and Wednesday from 10:00 to 13:00. Please request an appointment by email.

Lecturer: **TERESA ITZIAR RODRIGUEZ URBIETA** - Group(s): **40**

Building/Office	Department	Phone number	Email	Office hours
ICAM/ 0.33	CIENCIAS AMBIENTALES	5763	itziar.rodriguez@uclm.es	

2. Pre-Requisites

It is essential that the student have basic knowledge about genetic diversity, animal physiology, population dynamics and ecology. Basic knowledge of R statistical software is not obligatory but a helpful asset.

3. Justification in the curriculum, relation to other subjects and to the profession

This subject delves into the design of monitoring of the different levels and components of biological diversity (genes, individuals, populations, communities and ecosystems) and the corresponding conceptual tools and application techniques, which will be used in the other two subjects of the specialty. The development of these contents is directly related to the assessment of environmental sustainability with regard to biodiversity, and has obvious connections with research in applied sciences such as conservation biology, ecological restoration and ecosystem management. The combined monitoring of different components of diversity in communities, habitat types or landscapes, as well as the evaluation of the state of conservation of the functionality of ecosystems, imply innovative techniques of recent development.

4. Degree competences achieved in this course

Course competences

Code	Description
CB06	Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.
CB07	Apply the achieved knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to the area of study
CB08	Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of knowledge and judgments
CB09	Know how to communicate the conclusions and their supported knowledge and ultimate reasons to specialized and non-specialized audiences in a clear and unambiguous way
CB10	Have the learning skills which allow to continue studying in a self-directed or autonomous way
CE02	Know the main drivers of global change, their causes, trends, interactions and scales of action, and identify and analyze their impacts on natural heritage and environmental quality
CE05	Know the methodological requirements of the monitoring applied to the evaluation of sustainability and interpret them within the framework of adaptive management
CE07	Identify the mechanisms and processes by which climate change can modify the behavior and distribution of organisms and apply procedures for its projection and monitoring
CE09	Know and apply the conceptual and methodological bases for carrying out environmental inventories and the economic valuation of natural resources
CE10	Know the role of disturbances and ecological restoration for the sustainable management of natural resources and apply it in monitoring designs

CG01	Be able to carry out a critical analysis, evaluation and synthesis of new and complex ideas.
CG02	Use specialized software for environmental management, analysis of environmental problems and environmental research
CG03	Be able to integrate information from various sources and sectors in a critical and relational way, and incorporate it into decision-making processes to identify the most appropriate management options
CG05	Know how to communicate and discuss proposals, results and conclusions in multilingual, specialized and non-specialized forums
CM03	Know techniques and methods for monitoring genetic diversity, biological efficiency and population dynamics, and design monitoring schemes appropriate to the species characteristics and the type of evaluation required
CM04	Know techniques and methods for monitoring communities and habitats diversity, and apply structural, compositional and functional indicators for monitoring and evaluating conservation status

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Ananlyze the results of monitorization ofgenetic diversityto evaluate and propose measures for the management and conservation of species

Participate in the design of the monitoring programs on species, communities or habitats as well as in analyzing and integrating the obtained results

Undertsand the principles of the design of different types of monitorization schemes of species

Acquire knowledege about the objectives and methods of population and habitat monitorization

Recognize the importance of monitorization of the emergence or re-emergence of infectious diseases or parasitic infestations as indicators of the healrh status of populations

Recognize the importance of monitoring ecological rpocesses to evaluate the impact and effects of global change

recognize the importance of monitoring individual traits of biologigal efficiency as an indicator of population dynamics

Critically analyze the design and evaluate the results of specific examples of monitoring programs of species, communities and habitats

6. Units / Contents

Unit 1: Monitoring genetic diversity.

Unit 1.1 Factors influencing genetic diversity.

Unit 1.2 Population genetics applied to the monitoring of species of interest for hunting, fishing or conservation.

Unit 1.3 Genetic mapping and identification of evolutionary significant units (ESUs) and management units (MUs).

Unit 2: Functional monitoring of species

Unit 2.1 Biological fitness assessment: physical condition, immunitary response, stress, prevalence and intensity of parasitism, diseases.

Unit 2.2 Functional monitoring designs.

Unit 3: Demographic monitoring

Unit 3.1 Design of demographic monitoring programs for species. Advanced demographic models.

Unit 3.2 Revision of examples and practical cases: monitoring of threatened species, European Union LIFE projects.

Unit 4: Biodiversity monitoring in communities and ecosystems.

Unit 4.1 Biodiversity assessments and monitoring: examples and applications in assessment of effects of agri-environmental schemes, land-use changes, forest management, etc.

Unit 4.2 Design of monitoring of the effects of global change on ecological processes

ADDITIONAL COMMENTS, REMARKS

This subject is taught over two consecutive weeks.

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB06 CB07 CE02 CE05 CE07 CE09 CE10 CG03 CM03 CM04	0.8	20	Y	N	Expositions of the topics of the subject, with presentations, bibliography, questions, protocols and work scripts available for the student on the virtual platform. Active participation of the student in the theoretical classes will be considered as part of the continuous evaluation.
Class Attendance (practical) [ON-SITE]	Combination of methods	CB06 CE02 CE05 CE07 CE09 CE10 CG03 CM03	0.32	8	Y	Y	Laboratory practices on functional monitoring. In-person attendance at practices is a compulsory and non-recoverable activity in order to pass the subject. The evaluation will be carried out through the final test, which is recoverable in both resit/retake exams.
Field work [ON-SITE]	Combination of methods	CB06 CB07 CE02 CE05 CE07 CE09 CE10 CG03 CM03 CM04	0.12	3	Y	Y	Field practices on demographic monitoring of species. In-person attendance at practices is a compulsory and non-recoverable activity in order to pass the subject. Its evaluation will be carried out through the final test, which is recoverable in both resit/retake exams.
							Elaboration and delivery of the work

Writing of reports or projects [OFF-SITE]	Case Studies	CB07 CB08 CB09 CB10 CE05 CE07 CE09 CE10 CG01 CG03 CG05 CM03 CM04	1.6	40	Y	Y	reports on demographic monitoring and monitoring of communities and ecosystems, for which the student will have protocols and schemes in the theoretical and practical classes, as well as supervision guidelines. Delivery of these reports is mandatory to pass the subject and recoverable in both resit/retake exams.
Problem solving and/or case studies [ON-SITE]	Case Studies	CB06 CE02 CE05 CE07 CE09 CE10 CG03 CM03	0.48	12	Y	N	Group discussions on case studies and student works supervision. Active participation of the student in these seminars will be considered as part of the continuous evaluation.
Study and Exam Preparation [OFF-SITE]	Combination of methods	CB06 CB07 CB08 CB10 CE05 CE09 CG01	1.1	27.5	N	-	Students' homework: review and study of presentations, complementary readings before and after the theoretical and practical sessions, and preparation of own presentations in seminars.
Final test [ON-SITE]	Assessment tests	CB06 CB07 CB10 CE02 CE05 CE07 CE09 CE10 CG02 CG03 CM03 CM04	0.08	2	Y	Y	Written test on those topics of the subject not evaluated through the working reports. This test is compulsory in order to pass the subject and recoverable in the resit/retake exams.
		Total:	**4.5**	**112.5**			
		Total credits of in-class work: 1.8					**Total class time hours: 45**
		Total credits of out of class work: 2.7					**Total hours of out of class work: 67.5**

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of active participation	20.00%	0.00%	Active participation and initiative in theoretical and practical sessions and seminars, as well as clarity, correctness and originality of the interventions.
Final test	30.00%	40.00%	Written test with questions about the subject topics.
Theoretical papers assessment	50.00%	60.00%	Applied working reports on demographic monitoring and biodiversity monitoring in communities and ecosystems.
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

In order to pass the subject it will be necessary to obtain a minimum final grade of 5 points out of 10. The grade for each activity is compensable with a minimum grade of 4 points.

Non-continuous evaluation:

Upon request students may benefit from the non-continuous assessment modality, as long as they have not carried out more than 50% of the activities scheduled for continuous assessment.

Specifications for the resit/retake exam:

Similar to those of the final exam. In the resit/retake exam, each of the non-continuous assessments that were not passed in the final exam may be recovered.

Specifications for the second resit / retake exam:

Similar to those of the final exam. In the second resit/retake exam, each of the non-continuous assessments that were not passed in the final exam may be recovered.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	**hours**
Writing of reports or projects [AUTÓNOMA][Case Studies]	40
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	27.5
Final test [PRESENCIAL][Assessment tests]	2
Unit 1 (de 4): Monitoring genetic diversity.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Unit 2 (de 4): Functional monitoring of species	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Class Attendance (practical) [PRESENCIAL][Combination of methods]	4

Field work [PRESENCIAL][Combination of methods]	3
Unit 3 (de 4): Demographic monitoring	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Class Attendance (practical) [PRESENCIAL][Combination of methods]	4
Problem solving and/or case studies [PRESENCIAL][Case Studies]	12
Unit 4 (de 4): Biodiversity monitoring in communities and ecosystems.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	8
Global activity	
Activities	**hours**
Problem solving and/or case studies [PRESENCIAL][Case Studies]	12
Class Attendance (theory) [PRESENCIAL][Lectures]	20
Class Attendance (practical) [PRESENCIAL][Combination of methods]	8
Field work [PRESENCIAL][Combination of methods]	3
Final test [PRESENCIAL][Assessment tests]	2
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	27.5
Writing of reports or projects [AUTÓNOMA][Case Studies]	40
Total horas:	112.5

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Bañares A. (Ed.)	Biología de la conservación de plantas amenazadas	Organismo Autónomo Parques Nacionales	Madrid		2002	
Bennett, A.F. et al.	Ecological processes: A key element in strategies for nature conservation.				2009	
Bird, D.M. & K.L. Bildstein (eds)	Raptor research and management techniques	Raptor Research Foundation, Hancock house Publishers			2007	
Bookout, T.A.	Research and management techniques for wildlife and habitats	The Wildlife Society, Bethesda			1994	
Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers & L. Thomas	Introduction to distance sampling: estimating abundance of biological population	Oxford University Press			2004	
Caswell H.	Matrix population models: construction, analysis, and interpretation	Sinauer Associates	Sunderland, Ma		2001	
Frankham, R., J.D. Ballou & D.A. Briscoe	Introduction to Conservation Genetics	Cambridge University Press			2010	
Gavier-Widen, D., A. Meredith & J.P. Duff (eds)	Infectious diseases of wild mammals and birds in Europe	Wiley-Blackwell			2012	
Hanski, I. & M.E. Gilpin	Metapopulation biology. Ecology, genetics and evolution	Academic Press			1997	
Iriondo J.M., Albert M.J., Giménez Benavides L., Domínguez Lozano F. & Escudero A. (Eds.)	Poblaciones en peligro: viabilidad demográfica de la flora vascular amenazada de España	Dirección General de Medio Natural y Política Forestal, Ministerio de Medio Ambiente y Medio Rural y Marino	Madrid		2009	
Lande, R., Engen, S. & B.E. Saether	Stochastic population dynamics in ecology and conservation	Oxford University Press			2003	
Allendorf, F.W., G.H. Luikart & S.N. Aitken	Conservation and the genetics of populations	Wiley			2012	
Morris W.F. & Doak D.F.	Quantitative conservation biology. Theory and practice of population viability analysis	Sinauer Associates	Sunderland, Massachusetts, USA		2002	
Morrison, M.L., B.G. Marcot & R.W. Mannan	Wildlife-habitat relationships. Concepts and applications	Island Press			2006	
Naeem, S. et al.	Biodiversity and ecosystem functioning: maintaining natural life support processes				1999	
Ramírez L. (Ed.)	Indicadores ambientales. Situación actual y perspectivas	Organismo Autónomo de Parques Nacionales,	Madrid		2002	

Sibly, R.M., Hone, J. & Clutton-Brock, T.H.	Wildlife population growth rates	Ministerio de Medio Ambiente Cambridge University Press	2003
Sinclair, A., J. Fryxell & G. Caughley	Wildlife ecology, conservation and management	Blackwell Science	2005
Townsend, A., J. Soberon, R.G. Pearson, R.P. Anderson, E. Martínez-Meyer, M. Nakamura & M.B. Araujo	Ecological niches and geographic distributions	Princeton University Press	2011
Loreau, M., S. Naeem & P. Inchausti	Biodiversity and ecosystem functioning: synthesis and perspectives	Oxford University Press	2002
Larsson T.-B. & al.	Biodiversity evaluation tools for European forests		2001
Crone E.E. & al.	How do plant ecologists use matrix population models?		2011