



1. General information

Course: FUNCTIONAL PLANT ECOLOGY

Type: ELECTIVE

Degree: 340 - UNDERGRADUATE DEGREE PROGRAMME IN ENVIRONMENTAL SCIENCES

Center: 501 - FACULTY OF ENVIRONMENTAL SCIENCES AND BIOCHEMISTRY

Year: 4

Main language: Spanish

Use of additional languages:

Web site:

Code: 37332

ECTS credits: 4.5

Academic year: 2023-24

Group(s): 40

Duration: First semester

Second language: English

English Friendly: Y

Bilingual: N

Lecturer: MARIA BELEN HINOJOSA CENTENO - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
Sabatini/0.36	CIENCIAS AMBIENTALES	5470	mariabelen.hinojosa@uclm.es	Tuesdays from 15:00 to 17:00; Wednesdays and Thursdays from 12:00 to 14:00 (appointment by e-mail)

Lecturer: ANTONIO PARRA DE LA TORRE - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
ICAM/0.26	CIENCIAS AMBIENTALES	926051400	antonio.parra@uclm.es	Tuesday, Wednesday and Thursday from 12:00 to 14:00 (appointment by e-mail). The schedule will be updated in the Virtual Secretary if necessary.

2. Pre-Requisites

Not established.

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

Plant Functional Ecology is a discipline with a high relevance in the field of the Environmental Sciences, given the important role played by plants in ecosystems. This subject contemplates the ecophysiological basics that affect plant distribution in natural or naturalized environments, as well as the analysis of factors affecting the long-term success of plants in a given environment. Therefore, this subject will analyse the functional responses of plants to different stress situations, whether abiotic (water, nutrients, radiation, temperature, pollutants, etc.) or biotic (competition with other plants, herbivory, reactions to pathogens, etc.), with special attention to plant responses to face with adverse situations occurring nowadays, such as climate change, pollution or land-use changes. Moreover, the role of vegetation in carbon fixation and its importance in carbon footprint estimates will be emphasized.

This subject aims to improve the employability of the Environmental Sciences graduates in the field of forestry, agriculture and plant ecology, through the transfer of theoretical concepts and technical field/laboratory training related to the basic aspects of the *Plant Functional Ecology*.

The subject of *Plant Functional Ecology* belongs to the module of scientific bases of the natural environment, and it has a direct relationship with basic and obligatory subjects such as *Biology* and *Ecology*. At the same time, this subject gives a fundamental knowledge that will help to consolidate those contemplated in other optative subjects related to the curricular intensification "Conservation, environmental planning and management" such as *Fire Ecology*, *Aquatic Ecosystems* or *Terrestrial Ecosystems*, besides other matters related with the curricular intensification "Analysis and technologies of the environment" such as *Ecological Restoration*.

4. Degree competences achieved in this course

Course competences

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
E01	Ability to understand and apply basic knowledge.
E03	Awareness of the temporal and spatial dimensions of environmental processes
E04	Ability to integrate experimental evidence found in field and/or laboratory studies with theoretical knowledge.
E05	Capacity for qualitative data interpretation
E06	Capacity for quantitative data interpretation
E13	Ability to handle software.
T02	To know and apply the Information and Communication Technologies (ICT).
T03	To use a correct oral and written communication.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Analyze the response of plants to the changing conditions of their environment as well as the availability of resources, with special emphasis on situations of environmental stress.

Understand the main functional mechanisms of plants that explain their geographical distribution, and their influence on biogeochemical cycles, particularly carbon and water.

Additional outcomes

Know the main interactions, both positive and negative, of plants with other organisms, and characteristics of the plant that determine or influence such interactions.

Acquire skill in sampling criteria, management of basic research equipment, data preparation and presentation of results related to Plant Functional Ecology.

Make simple observations, ask questions and formulate hypotheses in a student's environment related to Plant Functional Ecology.

6. Units / Contents**Unit 1: Introduction to Plant Functional Ecology****Unit 2: Acquisition and balance of resources: plant adaptations**

Unit 2.1 Energy

Unit 2.2 Carbon

Unit 2.3 Water

Unit 2.4 Mineral nutrients

Unit 3: Plant responses to environmental stress

Unit 3.1 Temperature

Unit 3.2 Soils with extreme characteristics

Unit 3.3 Atmospheric pollution

Unit 4: Biotic interactions of plants

Unit 4.1 Plant-plant interactions

Unit 4.2 Plant-organism interactions

ADDITIONAL COMMENTS, REMARKS

The practicals and the field trip of the subject will deal with several of the topics covered in the theoretical part, such as the adaptations of plants to light, their functional response to drought or their capacity as a sink for CO₂ emissions.

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	CB01 CB02 CB03 E01 E03 E04 E05 E06	0.88	22	N		Lectures. All the teaching material will be available on the virtual platform.
Other off-site activity [OFF-SITE]	Self-study	CB03 CB04 E04	0.24	6	N		Preparation of workshops and seminars to be presented in class.
Workshops or seminars [ON-SITE]	Workshops and Seminars	CB03 CB04 T02 T03	0.16	4	Y	N	Students will present and discuss scientific articles and/or assignments related to the field trip.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	CB02 CB03 CB04 E04 E05 E06 E13 T02 T03	0.6	15	Y	Y	Practical field and laboratory work. Attendance at practicals is compulsory and, by their nature, cannot be made up.
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	E04 E05 E06	0.9	22.5	Y	Y	Preparation of a report about the practical sessions.
Mid-term test [ON-SITE]	Assessment tests	CB01 CB02 E01 T03	0.04	1	Y	N	Mid-term test on the theoretical contents of the course, which may eliminate material for the final exam.
Study and Exam Preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 E01 E03 E04 E05 E06	1.56	39	N		Study and preparation of the evaluation tests.
Final test [ON-SITE]	Assessment tests	CB01 CB02 E01 E03 T03	0.12	3	Y	Y	Final test to evaluate the theoretical knowledge acquired.
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
Mid-term tests	30.00%	0.00%	Mid-term test which may eliminate material for the final exam. Minimum mark of 4 out of 10 to pass this activity.
			Final test with a weight of 30% of the total of the subject if the mid-term test has been passed. In case of not having passed the mid-term test, or opting for non-continuous assessment, it

Final test	30.00%	70.00%	will be necessary to take the whole subject in the final test (weight of 60% and 70% respectively). Minimum mark of 4 out of 10 to pass this activity.
Practicum and practical activities reports assessment	30.00%	30.00%	Assessment of the practical part of the subject by means of a written report. Minimum mark of 4 out of 10 to pass this activity.
Other methods of assessment	10.00%	0.00%	Assessment of the topics presented in the seminars and/or the tasks related to the field trip.
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:

Students will be assigned by default to the continuous assessment program. Any student can request transfer to the non-continuous evaluation (before classes have ended) by sending an email to the professor, as long as the student has not taken part of 50% of evaluable activities.

The evaluable activities to be carried out are the following:

MID-TERM TEST: There will be a non-compulsory mid-term exam, which may eliminate material for the final exam. Minimum mark of 4 out of 10 to pass this activity.

FINAL TEST: There will be a compulsory final exam to evaluate the theoretical knowledge acquired. In case of not having passed the mid-term test, it will be necessary to take the whole subject in the final test. A minimum mark of 4 out of 10 is required to pass this activity.

PRACTICAL REPORT: A compulsory written report will be prepared to evaluate the practical knowledge acquired. Minimum mark of 4 out of 10 to pass this activity.

OTHER SEMINARS AND/OR TASKS: Other non-compulsory evaluable activities which do not require a minimum mark.

All evaluable activities will be recoverable, either in the extraordinary or special call for completion. However, attendance to the practicals, due to their nature, is considered as a compulsory and non-recoverable activity in order to pass the subject. In any case, the subject will only be considered passed if the overall grade, weighting the different evaluable activities according to the table above, results in a mark of 5 or higher (out of 10).

Non-continuous evaluation:

The same criteria will be applied in non-continuous assessment than in continuous assessment, taking into account the weightings shown in the table above.

Specifications for the resit/retake exam:

The same criteria will be applied in the extraordinary session than in the ordinary session. In this call, it will only be necessary to pass the part/s of the ordinary call that have not been passed with at least a 4 out of 10. In any case, the subject will only be considered passed if the overall grade, weighting the different evaluable activities according to the table above, results in a mark of 5 or higher (out of 10).

Specifications for the second resit / retake exam:

The same criteria will be applied in the special call for completion than in the extraordinary session. In this call, it will only be necessary to pass the part/s of the previous year that have not been passed with at least a 4 out of 10. In any case, the subject will only be considered passed if the overall grade, weighting the different evaluable activities according to the table above, results in a mark of 5 or higher (out of 10).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	4
Other off-site activity [AUTÓNOMA][Self-study]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	22.5
Mid-term test [PRESENCIAL][Assessment tests]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	39
Final test [PRESENCIAL][Assessment tests]	3
Unit 1 (de 4): Introduction to Plant Functional Ecology	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 2 (de 4): Acquisition and balance of resources: plant adaptations	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	10
Unit 3 (de 4): Plant responses to environmental stress	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Unit 4 (de 4): Biotic interactions of plants	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Global activity	
Activities	hours
Other off-site activity [AUTÓNOMA][Self-study]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	22.5
Mid-term test [PRESENCIAL][Assessment tests]	1
Final test [PRESENCIAL][Assessment tests]	3
Class Attendance (theory) [PRESENCIAL][Lectures]	22
Study and Exam Preparation [AUTÓNOMA][Self-study]	39
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	4

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Mirza Hasanuzzaman	Plant Ecophysiology and Adaptation under Climate Change: Mechanisms and Perspectives I General Consequences and Plant Responses	Springer-Verlag			2020	
Fitter, A.H.; Hay R.K.M.	Environmental Physiology of Plants	Academic Press			2002	
Lambers, H.; ChapinIII, F.S.; Pons, T.L.	Plant Physiological Ecology	Springer-Verlag			2008	
Larcher, W.	Physiological Plant Ecology	Springer-Verlag			2003	
Pugnaire, F.I.; Valladares, F.	Handbook of Functional Plant Ecology	CRC Press/Taylor & Francis Group			2007	
Reigosa, M.J.; Pedrol, N.; Sánchez, A.	La Ecofisiología Vegetal: Una Ciencia de Síntesis	Thomson			2004	
Scott, P.	Physiology and Behaviour of Plants	J. Wiley & sons			2008	
Terradas, J.	Ecología de la Vegetación: de la Ecofisiología de las Plantas a la Dinámica de Comunidades y Paisaje	Omega			2001	