

**1. General information****Course:** ECOLOGICAL RESTORATION**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:** 37345**ECTS credits:** 4.5**Academic year:** 2021-22**Group(s):** 40**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** MARIA BELEN HINOJOSA CENTENO - Group(s): 40

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2. Pre-Requisites

Not established.

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

This course pretends to establish the basis for the development and evaluation of ecosystem restoration projects, which constitutes a professional opportunity for graduates in Environmental Sciences. We will analyze the scientific bases of ecological restoration. We will describe how to diagnose the ecosystem status and the techniques that allow recovering the ecosystems. In addition, specific cases and projects will be analyzed.

This subject, belonging to the "Environmental Technology" module (Environmental Conservation and Management), has a direct relationship with basic and compulsory subjects such as Biology, Botany, Ecology, Zoology, and Geology. In addition, this subject is strongly related to subjects of the curricular intensification "Analysis and Environmental Technologies" (Energy and Environment, Management and Treatment of Industrial Effluents, Radiation and Noise and Geological Risks and Environmental Geochemistry, among others), or subjects of the curricular intensification "Conservation, Planning and Management of the Environment" (Fire Ecology, Aquatic Ecosystems, Terrestrial Ecosystems, Iberian Vegetation, Cartography and Bases of Habitat Management, Wildlife Management and Population Dynamics).

4. Degree competences achieved in this course**Course competences**

Code	Description
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.
CB06	Students have developed the ability to work as a team and lead, direct, plan and supervise multidisciplinary teams
E01	Ability to understand and apply basic knowledge.
E02	Capacity for multidisciplinary consideration of an environmental problem
E03	Awareness of the temporal and spatial dimensions of environmental processes
E05	Capacity for qualitative data interpretation
E06	Capacity for quantitative data interpretation
E07	Capacity to plan, manage and conserve natural resources
E16	Ability to track and control environmental projects
E18	Capacity to manage the natural environment
E20	Capacity to plan and carry out actions to restore the natural environment
E25	Capacity to treat contaminated soil.
G03	Good oral and written communication
G04	Ethical commitment and professional deontology

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Capacity to intervene in the design of conservation programmes and implement measures to prevent the extinction of populations, species and habitats.

Ability to identify soil degradation problems and propose concrete recovery measures.

Knowledge of the main ecological restoration techniques and their comparison with other techniques.

Collaborate and cooperate in multidisciplinary teams.

Acquisition of the concepts on which ecological restoration is based.

Maintain an attitude of learning and improvement throughout their studies and in their future professional life.

Organize your work and face any difficulties that may arise in an autonomous and creative way.

Planning the restoration in space and time: protocols for action.

Realization of plans for projects for the restoration of the natural environment.

Capacity for analysis and diagnosis of degraded environmental systems.

6. Units / Contents

Unit 1: Introduction and historical reviews. Fundamental concepts in ecological restoration. Basic notions about the development of a restoration project.

Unit 2: Ecological basis of restoration.

Unit 2.1 At the landscape level.

Unit 2.2 At ecosystem level.

Unit 2.3 Community level.

Unit 2.4 Population level.

Unit 3: General methodological bases applied to restoration.

Unit 3.1 Relief-topography.

Unit 3.2 Soil.

Unit 3.3 Water.

Unit 3.4 Vegetation and fauna.

Unit 4: Specific cases of ecological restoration.

Unit 4.1 Forest systems

Unit 4.2 Riparian systems

Unit 4.3 Wetlands

Unit 4.4 Mining

Unit 4.5 Linear infrastructures

ADDITIONAL COMMENTS, REMARKS

During the practical sessions, the basic contents that should be present in an ecological restoration project will be worked on. A field trip is foreseen in order to see the results of an ecological restoration project.

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	CB02 CB03 E01 E02 E03 E05 E06 E16 E20 E25 G04	0.88	22	N		Lectures. All the teaching material will be available on the virtual platform.
Workshops or seminars [ON-SITE]	Combination of methods	CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E07 E16 E18 G03 G04	0.16	4	Y	N	Analysis and discussion of real cases of ecological restoration (field trips, invited lectures, etc).
Analysis of articles and reviews [OFF-SITE]	Reading and Analysis of Reviews and Articles	CB03 E05 E06	0.24	6	Y	N	Analysis of scientific texts and preparation of reviews.
Class Attendance (practical) [ON-SITE]	Combination of methods	CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E07 E16 E18 E20 G03 G04	0.6	15	Y	Y	The basic contents that should be present in an ecological restoration project will be described. A critical analysis of ecological restoration projects will be carried out under the guidance of the teacher.
Practicum and practical activities report writing or preparation [OFF-SITE]	Cooperative / Collaborative Learning	CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E16 E20 G03 G04	0.9	22.5	Y	Y	Writing and presentation of the critical evaluation of a restoration project. Group activity.
Study and Exam Preparation [OFF-SITE]	Self-study	CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E16 G03 G04	1.56	39	N		Study and preparation of the evaluation tests.
Progress test [ON-SITE]	Assessment tests	CB02 CB03 CB04 E01 E02 E03 E05 E06 E16 E20 E25 G03	0.08	2	Y	N	There will be two progress tests about the theoretical contents, which may eliminate material for the final exam.
Final test [ON-SITE]	Assessment tests	CB02 CB03 CB04 E01 E02 E03 E05 E06 E16 E20 E25 G03	0.08	2	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
Final test	60.00%	70.00%	Assessment of the theoretical part of the subject by means of two partial tests (continuous evaluation) and/or a final test (non-continuous evaluation).

Practicum and practical activities reports assessment	30.00%	30.00%	Evaluation of the practical part of the course through a written report and a presentation.
Other methods of assessment	10.00%	0.00%	It includes the presentation and discussion of topics presented in seminars, reading articles, workshops, etc.
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:

There will be two mid-term tests to assess the theoretical knowledge acquired. In order to pass the mid-term exams, it will be necessary to obtain at least a 4 (out of 10) in each of them. In case of failing one or both mid-term exams, it will be necessary to sit the final exam in order to be assessed for the part/s not passed.

In order to pass the course, it will be necessary to obtain a mark of 4 or higher (out of 10) in the theoretical and practical parts independently. In any case, the course 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).

All the evaluable activities will be recoverable, either in the extraordinary or special final exam. However, attendance to the practicals is considered as a compulsory and non-recoverable activity in order to pass the subject.

Non-continuous evaluation:

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

Specifications for the resit/retake exam:

Grades for the extraordinary exam will follow the same criteria as for the ordinary exam.

Those evaluable activities that have obtained a mark of 4 or higher (out of 10) in the ordinary assessment will be considered compensable in this extraordinary call. In any case, the subject will only be passed if the overall grade, weighting the different evaluable activities according to the above table, results in a mark of 5 or higher (out of 10).

Specifications for the second resit / retake exam:

The grades for the special final examination will follow the same criteria as those for the extraordinary examination. Those evaluable activities that have obtained a mark of 4 or higher (out of 10) in the previous year will be considered compensable for this call. In any case, the course will only be 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
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	6
Class Attendance (practical) [PRESENCIAL][Combination of methods]	15
Practicum and practical activities report writing or preparation [AUTÓNOMA][Cooperative / Collaborative Learning]	22.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	39
Progress test [PRESENCIAL][Assessment tests]	2
Final test [PRESENCIAL][Assessment tests]	2
Unit 1 (de 4): Introduction and historical reviews. Fundamental concepts in ecological restoration. Basic notions about the development of a restoration project.	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 2 (de 4): Ecological basis of restoration.	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Unit 3 (de 4): General methodological bases applied to restoration.	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Unit 4 (de 4): Specific cases of ecological restoration.	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Workshops or seminars [PRESENCIAL][Combination of methods]	4
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	22
Workshops or seminars [PRESENCIAL][Combination of methods]	4
Class Attendance (practical) [PRESENCIAL][Combination of methods]	15
Practicum and practical activities report writing or preparation [AUTÓNOMA][Cooperative / Collaborative Learning]	22.5
Final test [PRESENCIAL][Assessment tests]	2
Progress test [PRESENCIAL][Assessment tests]	2
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	6
Study and Exam Preparation [AUTÓNOMA][Self-study]	39
Total horas: 112.5	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Mola, I., Sopeña, A. y de Torre, R.	Guía Práctica de Restauración	Fundación Biodiversidad del Ministerio				

(editores).	Ecológica	para la Transición Ecológica	2018
	https://ieeb.fundacion-biodiversidad.es/sites/default/files/guia_practica_re_0.pdf		
González, M.; García, D.	Guía Metodológica para Elaboración de Proyectos de Restauración de Ríos.	Secretaría General Técnica. Ministerio de medio Ambiente	2009
Gómez Orea, D.	Recuperación de Espacios Degradados	Ediciones Mundi-Prensa	2004
Hammerl-Resch M.; Gattenlöhner U.; Jantschke S.	Restauración de Humedales. Manejo Sostenible de Humedales y Lagos Someros, Manual para la Elaboración de un Plan de Gestión.	Global Nature Fund	2004
Ley, C.; Gallego, J.B.;Vidal, C.	Manual de Restauración de Dunas Costeras	Ministerio de Medio Ambiente. Dirección General de Costas	2007
Magdaleno, F.	Manual de Técnicas de Restauración Fluvial	Secretaría General Técnica. Ministerio de medio Ambiente.	2010
Ortiz, I. et al.	Técnicas de Recuperación de Suelos Contaminados	Fundación para el conocimiento madri+d	2007
Perrow M.R.; Davy A.J	Handbook of Ecological Restoration	Cambridge University Press	2002
Rey Benayas,J.M.; Espigares, T.;Nicolau, J.M:	Restauración de Ecosistemas Mediterráneos.	Servicio de Publicaciones de la Universidad de Alcalá.	2003
Seoánez, M.; Varela, R.	Manual de Contaminación Marina y Restauración del Litoral	Mundi-Prensa	2000
Sánchez, O et al.	Temas sobre Restauración Ecológica	Instituto Nacional de Ecología y Cambio Climático	2005
Valladares, F., et al.	http://www2.inecc.gob.mx/publicaciones/consultaPublicacion.html?id_pub=467 Restauración ecológica de áreas afectadas por infraestructuras de transporte	Fundación Biodiversidad	2011
Vallejo V.R.; Alloza J.A.	Avances en el estudio de la Gestión del Monte Mediterráneo	Fundación Centro de Estudios Ambientales del Mediterráneo	2004
Van Andel, J.; Aronson, J.	Restoration Ecology. The New Frontier	Blackwell Publishing	2006
Cuevas, L. et al.	Proteccion, Restauracion y Conservacion de Suelos Forestales	Comisión Nacional Forestal	2007

NOTA IMPORTANTE: A lo largo de la impartición del contenido teórico de la asignatura el profesor ofrecerá al alumno más bibliografía específica de cada tema.