

**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:** 2019-20**Group(s):** 40**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** MARIA BELEN HINOJOSA CENTENO - Group(s): 40

| Building/Office | Department | Phone number | Email | Office hours |
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| Sabatini/0.36 | CIENCIAS AMBIENTALES | 5470 | mariabelen.hinojosa@uclm.es | Martes, miércoles y jueves de 12:00 a 14:00 horas (previa cita por e-mail) |

Lecturer: GONZALO ZAVALA ESPÍÑEIRA - 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. The scientific bases of ecological restoration will be analyzed, how to diagnose of ecosystem status will be described and the techniques that allow to recover the ecosystem will be revised. 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. At the same time, this subject is strongly related to subjects related to 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 related to the curricular intensification "Conservation, Planning and Management of the Environment" (Fire Ecology, Aquatic Ecosystems, Terrestrial Ecosystems and Iberian Vegetation, Cartography and Bases of Habitat Management, Wildlife Management, 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

Acquisition of the concepts on which ecological restoration is based.

Capacity for analysis and diagnosis of degraded environmental systems.

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.

Collaborate and cooperate in multidisciplinary teams.

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

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.

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.

Unit 3.5 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 | R | Description |
|---|--|---|---|--------------|----|-----|---|-------------|
| Class Attendance (theory) [ON-SITE] | Lectures | CB02 CB03 E01 E02 E03 E05 E06 E16 E20 E25 G04 | 0.76 | 19 | N | - | - | |
| Analysis of articles and reviews [OFF-SITE] | Reading and Analysis of Reviews and Articles | CB03 E05 E06 | 0.16 | 4 | Y | N | N | |
| Workshops or seminars [ON-SITE] | Combination of methods | CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E07 E16 E18 G03 G04 | 0.2 | 5 | Y | N | N | |
| Group tutoring sessions [ON-SITE] | Combination of methods | CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E16 G03 G04 | 0.08 | 2 | N | - | - | |
| Other off-site activity [OFF-SITE] | Cooperative / Collaborative Learning | CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E16 G03 G04 | 0.64 | 16 | N | - | - | |
| Study and Exam Preparation [OFF-SITE] | Self-study | CB02 CB03 CB04 CB06 E01 E02 E03 E05 E06 E16 G03 G04 | 1.2 | 30 | N | - | - | |
| 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 | N | |
| 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 | 0.7 | 17.5 | Y | Y | Y | |
| Progress test [ON-SITE] | Assessment tests | CB02 CB03 CB04 E01 E02 E03 E05 E06 E16 E20 E25 G03 | 0.08 | 2 | Y | N | N | |
| Final test [ON-SITE] | Assessment tests | CB02 CB03 CB04 E01 E02 E03 E05 E06 E16 E20 E25 G03 | 0.08 | 2 | Y | Y | Y | |
| 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

R: Rescheduling training activity

| 8. Evaluation criteria and Grading System | | | |
|---|----------------|--------------------|---|
| Evaluation System | Grading System | | Description |
| | Face-to-Face | Self-Study Student | |
| Final test | 60.00% | 0.00% | Two partial exams will be carried out to evaluate the theoretical knowledge acquired. To pass the partial exams it will be necessary to obtain at least 5 in each of them. In case of not passing one or both partial tests it will be necessary to take the final exam, to be evaluated of the part (s) not passed. The final grade of the theoretical part (average of partial and / or final test) must be higher than 5 to overcome this part of the subject. This part will constitute 60% of the grade. |
| Practicum and practical activities reports assessment | 30.00% | 0.00% | The quality of the critical analysis of a restoration project will be considered in terms of methodological correctness, quality of the information provided, analysis and discussion of the data and technical measures adopted, as well as its presentation and written expression. |
| 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% | 0.00% | |

Evaluation criteria for the final exam:

Two partial exam will be carried out to evaluate the theoretical knowledge acquired. To pass the partial exam it will be necessary to obtain at least 5 in each of them. In case of not passing one or both partial tests it will be necessary to take the final exam, to be evaluated of the part (s) not passed. The final grade of the theoretical part (average of partial and / or final test) must be higher than 5 to overcome this part of the subject. This part will constitute 60% of the grade.

The final grade will be the result of the application of the respective percentages to the qualifications of the theoretical exam/s (60%), the practical report (30%) and evaluation of other activities such as seminars or reading articles (10%).

Specifications for the resit/retake exam:

The evaluation of it call will be made on the basis of a final test (written exam), whose evaluation will involve up to 70% of the grade; while the remaining 30% will be the corresponding to the practical part.

Specifications for the second resit / retake exam:

The evaluation of it call will be made on the basis of a final test (written exam), whose evaluation will involve up to 70% of the grade; while the remaining 30% will be the corresponding to the practical part.

| 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] | 4 |
| Group tutoring sessions [PRESENCIAL][Combination of methods] | 2 |
| Other off-site activity [AUTÓNOMA][Cooperative / Collaborative Learning] | 16 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 30 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 15 |
| Practicum and practical activities report writing or preparation [AUTÓNOMA][Cooperative / Collaborative Learning] | 17.5 |
| 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] | 6 |
| Workshops or seminars [PRESENCIAL][Combination of methods] | 1 |
| Unit 3 (de 4): General methodological bases applied to restoration. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 5 |
| Unit 4 (de 4): Specific cases of ecological restoration. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 6 |
| Workshops or seminars [PRESENCIAL][Combination of methods] | 4 |
| Global activity | |
| Activities | hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 19 |
| Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles] | 4 |
| Workshops or seminars [PRESENCIAL][Combination of methods] | 5 |
| Group tutoring sessions [PRESENCIAL][Combination of methods] | 2 |
| Other off-site activity [AUTÓNOMA][Cooperative / Collaborative Learning] | 16 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 30 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 15 |
| Practicum and practical activities report writing or preparation [AUTÓNOMA][Cooperative / Collaborative Learning] | 17.5 |
| Final test [PRESENCIAL][Assessment tests] | 2 |
| Progress test [PRESENCIAL][Assessment tests] | 2 |

| 10. Bibliography and Sources | | | | | | |
|---|---|---|------|------|------|-------------|
| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
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| 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 | |
| Seoáñez, 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 | |
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| 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 | |

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.