



1. General information

Course: NATURAL LAND RESOURCES MANAGEMENT AND CONSERVATION
Type: CORE COURSE
Degree: 340 - UNDERGRADUATE DEGREE PROGRAMME IN ENVIRONMENTAL SCIENCES
Center: 501 - FACULTY OF ENVIRONMENTAL SCIENCES AND BIOCHEMISTRY
Year: 3
Main language: Spanish
Use of additional languages:
Web site:

Code: 37322
ECTS credits: 6
Academic year: 2022-23
Group(s): 40
Duration: First semester
Second language: English
English Friendly: Y
Bilingual: N

| Lecturer: MARIA ROSA PEREZ BADIA - Group(s): 40 | | | | |
|--|----------------------|--------------|----------------------------|--------------------------------|
| Building/Office | Department | Phone number | Email | Office hours |
| Sabatini, Despacho 0.25 | CIENCIAS AMBIENTALES | ext. 5443 | rosa.perez@uclm.es | Make an appointment via e-mail |
| Lecturer: MARIA PILAR RODRIGUEZ ROJO - Group(s): 40 | | | | |
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| Lecturer: SANTIAGO SARDINERO ROSCALES - 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

Soil degradation is one of the most serious environmental problems worldwide. In this subject, the main causes of soil degradation and possible strategies aimed at the conservation will be studied. The main objectives are: to know the processes that cause the degradation of the soil, to understand how they occur, their consequences, the field and laboratory techniques used for the diagnosis of degraded soils, preventive and remedial measures, as well as, appropriate measures to achieve the sustainable management of forest systems.

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. |
| CB05 | Have developed the necessary learning abilities to carry on studying autonomously |
| 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 |
| 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 |
| E07 | Capacity to plan, manage and conserve natural resources |
| E08 | Ability to value goods, services and natural resources economically |
| E09 | Capacity to analyze the exploitation of resources in the context of sustainable development |
| E13 | Ability to handle software. |
| E14 | Capacity to design and apply sustainability indicators |
| E16 | Ability to track and control environmental projects |
| E18 | Capacity to manage the natural environment |
| E19 | Capacity to carry out integrated spatial planning and development |

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|-----|---|
| E20 | Capacity to plan and carry out actions to restore the natural environment |
| E25 | Capacity to treat contaminated soil. |
| T01 | To know a second foreign language. |
| T02 | To know and apply the Information and Communication Technologies (ICT). |
| T03 | To use a correct oral and written communication. |
| T04 | To know the ethical commitment and professional deontology. |

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Collaborate and cooperate in multidisciplinary teams.

Basic knowledge of the structure, functioning and dynamics of forest systems.

Learn to critically value different opinions.

Design and implement the most appropriate management strategy according to known circumstances.

Ability to diagnose the state of a conservation objective and analyse the causes that determine it.

Ability to design and carry out monitoring in protected areas.

Ability to identify the impacts of forest harvesting and treatment on the conservation of forest resources.

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

Ability to participate in the development of natural resource management plans and protected area management plans.

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

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

Knowledge of the causes and dimensions of biodiversity loss.

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

Knowledge of the soil variables, with their measurement procedures, necessary to diagnose the state of conservation of a soil and to attribute its most appropriate uses to it.

Capacity for analysis and diagnosis of degraded environmental systems.

Management of conservation objectives and prioritization criteria.

Acquisition of the concepts on which ecological restoration is based.

Critically analyze the effects of different management proposals.

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.

6. Units / Contents

Unit 1: Introduction. Minerals, soil organic matter, redox processes, texture, structure, soil interaction with the environment, climate as an influence factor in the soil formation, soil classification.

Unit 2: Soil degradation. The soil as a natural resource, soil degradation concept, causes and processes (physical, chemical, biological)

Unit 2.1 Soil degradation: study of cases

Unit 2.2 Aridisols; saline, alkaline soils, gypsisols, calcisols. Study of cases

Unit 3: Soil contamination. Contaminants in the soils, pollutant-soils interactions, transport and storage of contaminants, biogeochemical cycles of pollutants, contamination risks, restoration of contaminated soils.

Unit 3.1 Soil contamination. Study of cases.

Unit 4: Sustainable management of forest systems. General concepts.

Unit 5: Sustainable management of forest systems: Silvicultural management, criteria and indicators of sustainable management.

Unit 6: Sustainable management of forest systems. Legislation and planification.

ADDITIONAL COMMENTS, REMARKS

During the practices, soil samples from different locations close to Toledo will be taken, analyzed in the laboratory, and the data obtained will be related to the geology, biogeography, bioclimatology, vegetation types, physico-chemical properties of soils, and land management.

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 CB05 E01 E02 E03 T01 T02 | 1 | 25 | N | - | The contents will be developed to achieve the objectives and competencies. The material will be available to students on the virtual platform. |
| Group tutoring sessions [ON-SITE] | Group tutoring sessions | CB02 CB03 CB04 E01 E02 E03 E04 E05 E06 E07 E08 E09 T01 T02 T03 T04 | 0.28 | 7 | Y | N | At the end of each topic, sessions will be organized to discuss the most difficult or interesting aspects, and participation will be evaluated. |
| Field work [ON-SITE] | Case Studies | CB02 CB03 CB05 E01 E02 E03 E04 E05 E06 E07 E08 E09 E18 E20 T01 T02 T03 T04 | 0.16 | 4 | Y | Y | Field trip to the outskirts of Toledo to integrate theoretical knowledge in the study of real cases: soil degradation, desertification, anthropic pressure, climatic pressure, forest management. |
| | | | | | | | Development of skills in physical, chemical and biological properties, analysis techniques through case studies and problem-based learning. |

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|---|----------------------------------|---|--------------------------------------|-----|---|---|---|
| Laboratory practice or sessions [ON-SITE] | Practical or hands-on activities | CB02 CB03 CB04 E01 E02 E03 E04 E05 E06 E20 E25 T01 T02 T03 T04 | 0.64 | 16 | Y | Y | Attendance to the practicals is considered as a compulsory activity and non-reschedulable to pass the course. The evaluation of the same will be reschedulable, either in the extraordinary or special call for completion. |
| Computer room practice [ON-SITE] | Case Studies | CB02 CB03 CB04 CB05 E01 E02 E03 E04 E05 E06 E09 E13 T01 T02 T03 T04 | 0.2 | 5 | Y | Y | Students will analyze data obtained from case studies with the help of computer programs, and interpret the results using theoretical knowledge. |
| Writing of reports or projects [OFF-SITE] | Self-study | CB02 CB03 CB04 CB05 E01 E02 E03 E04 E05 E06 E07 E09 E13 E18 E20 E25 T01 T02 T03 T04 | 1.8 | 45 | Y | Y | Integration of theoretical knowledge, field work, case studies and laboratory practices. |
| Study and Exam Preparation [OFF-SITE] | Self-study | CB02 CB03 CB04 CB05 E01 E02 E03 E04 E05 E06 E07 E08 E09 E13 E18 E20 E25 T01 T02 T03 T04 | 1.8 | 45 | N | | Study of the theoretical and practical knowledge acquired in the activities developed in the course. |
| Final test [ON-SITE] | Assessment tests | CB02 CB04 CB05 E01 E02 E03 E04 E05 E06 E07 E09 E18 E20 E25 T01 T02 T03 T04 | 0.12 | 3 | Y | Y | Written test of questions to assess the knowledge acquired through the correctness of the answers and the adequacy of the reasoning. through the correctness of the answers and the adequacy of the reasoning. |
| Total: | | | 6 | 150 | | | |
| Total credits of in-class work: 2.4 | | | Total class time hours: 60 | | | | |
| Total credits of out of class work: 3.6 | | | Total hours of out of class work: 90 | | | | |

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 | 50.00% | 50.00% | Written exam with questions that the students will have to discuss |
| Practicum and practical activities reports assessment | 20.00% | 25.00% | Report of labwork that will be evaluated according to the capacity to integrate the theoretical concepts, the practical classes of the field work, the problems resolution in the laboratory |
| Assessment of problem solving and/or case studies | 20.00% | 25.00% | Report of a practical topic |
| Assessment of active participation | 10.00% | 0.00% | |
| 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:

It is necessary to obtain a grade of at least 4 out of 10 in the final exam as well as in the practical report and in the resolution of problems or cases in order to pass the course. In any case, the course will only be considered passed if the total of all the evaluable activities results in an average grade of 5.0 or higher (out of 10).

Non-continuous evaluation:

The default mode assigned to the student will be the continuous evaluation. Any student may request a change to the non-continuous evaluation mode (before the end of the class period) by sending an e-mail to the professor, provided that he/she has not completed 50% of the evaluable activities.

It is necessary to obtain a grade of at least 4 out of 10 in the final exam as well as in the practical report and in the resolution of problems or cases in order to pass the course. In any case, the course will only be considered passed if all the evaluable activities together result in an average grade of 5.0 or higher (out of 10).

Specifications for the resit/retake exam:

In the extraordinary call, the grade of the previously passed mandatory activities is retained.

Specifications for the second resit / retake exam:

For the retake exam, the evaluation of practicum need to be passed in the previous academic coursework.

| 9. Assignments, course calendar and important dates | |
|---|--------------|
| Not related to the syllabus/contents | |
| Hours | hours |
| Unit 1 (de 6): Introduction. Minerals, soil organic matter, redox processes, texture, structure, soil interaction with the environment, climate as an influence factor in the soil formation, soil classification. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 7 |
| Group tutoring sessions [PRESENCIAL][Group tutoring sessions] | 2 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 6 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 7 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 7 |

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| Final test [PRESENCIAL][Assessment tests] | .5 |
| Unit 2 (de 6): Soil degradation. The soil as a natural resource, soil degradation concept, causes and processes (physiical, quimical, biological) | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 6 |
| Group tutoring sessions [PRESENCIAL][Group tutoring sessions] | 1 |
| Field work [PRESENCIAL][Case Studies] | 4 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 5 |
| Computer room practice [PRESENCIAL][Case Studies] | 5 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 10 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 10 |
| Final test [PRESENCIAL][Assessment tests] | .5 |
| Unit 3 (de 6): Soil contamination. Contaminants in the soils, pollutant-soils interactions, transport and storage of contaminants, biogeochemical cycles od pollutants, contamination risks, restoration of contaminated soils. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 2 |
| Group tutoring sessions [PRESENCIAL][Group tutoring sessions] | 1 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 5 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 7 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 7 |
| Final test [PRESENCIAL][Assessment tests] | .5 |
| Unit 4 (de 6): Sustainable management of forest systems. General concepts. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3 |
| Group tutoring sessions [PRESENCIAL][Group tutoring sessions] | 1 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 7 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 7 |
| Final test [PRESENCIAL][Assessment tests] | .5 |
| Unit 5 (de 6): Sustainable management of forest systems: Silvicultural management, criteria and indicators of sustainable management. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 4 |
| Group tutoring sessions [PRESENCIAL][Group tutoring sessions] | 1 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 7 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 7 |
| Final test [PRESENCIAL][Assessment tests] | .5 |
| Unit 6 (de 6): Sustainable managment of forest systems. Legislation and planification. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3 |
| Group tutoring sessions [PRESENCIAL][Group tutoring sessions] | 1 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 7 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 7 |
| Final test [PRESENCIAL][Assessment tests] | .5 |
| Global activity | |
| Activities | hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 25 |
| Field work [PRESENCIAL][Case Studies] | 4 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 16 |
| Computer room practice [PRESENCIAL][Case Studies] | 5 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 45 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 45 |
| Final test [PRESENCIAL][Assessment tests] | 3 |
| Group tutoring sessions [PRESENCIAL][Group tutoring sessions] | 7 |
| Total horas: 150 | |

| 10. Bibliography and Sources | | | | | | |
|------------------------------|---|--|-----------|---------------|------|---|
| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
| Aranda, G. (Coord.) | Hidrología forestal y protección de suelos | Ministerio de Agricultura, Pesca y Alimentación. | Madrid | 8480140437 | 1992 | Hidrología forestal y protección de suelos: técnicas y experiencias en dirección de obras |
| BOCM | Ley 3/2008, de 12 de junio de 2008, de Montes y gestión forestal sostenible de Castilla-La Mancha | | | | 2008 | |
| BOE | Ley 43/2003, de 21 de noviembre, de Montes (BOE 22 de noviembre de 2003) | | Madrid | | 2003 | |
| Barbero Martín, A. et al. | Manual de Forestación en Tierras Agrícolas. | Ministerio de Agricultura, Pesca y Alimentación | Madrid | 8434108054 | 1994 | Manual de Forestación en Tierras Agrícolas |
| Blanco E. & al. | Los bosques ibéricos. Una | Ed. Planeta | Barcelona | 9788408058205 | 1997 | Interpretación geobotánica de los |

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|--|---|---|-----------------|-------------------|------|--|--|
| | interpretación geobotánica. | | | | | | bosques ibéricos |
| Weil, R.R. & Brady, N.C. | The nature and properties of soils. 15th Ed. | Pearson Education Limited | Harlow, England | 978-1292162232 | 2017 | | |
| Soil Survey Staff | Kellogg Soil Survey Laboratory Methods Manual. Soil Survey Investigations Report No. 42, Version 5.0. U.S. Department of Agriculture, Natural Resources Conservation Service. | USDA, NRCS | | | 2014 | | Manual de métodos de análisis de suelos |
| FAO (Organización de las Naciones Unidas para la Agricultura y la Alimentación) | https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/research/guide/?cid=nrcs142p2_054247 El estado de los bosques del mundo 2018. Las vías forestales hacia el desarrollo sostenible. http://www.fao.org/3/i9535es/i9535es.pdf | FAO | Roma | 978-92-5-130715-1 | 2018 | | Estado de los bosques del mundo 2018 |
| Fernández González, F, Pérez Badia R., Sardinero S., Rodríguez Torres A. & Crespo G. | Espacios naturales protegidos y cambio climático en Castilla-La Mancha. En Impactos del cambio climático en Castilla-La Mancha. | Fundación General del Medio Ambiente. Consejería de Industria, Energía y Medio Ambiente de Castilla-La Mancha | Toledo | 978-84-7788-557-3 | 2009 | | |
| González, L.M. y Alfonso San Miguel (Coord.) et al. | Manual de buenas prácticas de gestión en fincas de monte mediterráneo de la Red Natura 2000. | Ministerio de Medio Ambiente | Madrid | | 2005 | | |
| JCCM | Revisión del Plan de Conservación del Medio Natural de Castilla-La Mancha | Consejería de Medio Ambiente | Toledo | | 2003 | | |
| Killham, K. | Soil ecology. | Cambridge University Press | | | 1999 | | |
| Martín Herrero, J. et al. | La vegetación protegida en Castilla-La Mancha | Junta de Comunidades de Castilla-La Mancha. Consejería de Medio Ambiente | Toledo | | 2003 | | |
| Orozco E. & López F. (Eds.) | Selvicultura mediterránea | Universidad de Castilla-La Mancha, Colecc. Estudios | Cuenca | | 1993 | | |
| Porta, J., López-Acevedo, M. y Roquero, C. | Edafología para la agricultura y el medio ambiente | Mundi¿Prensa. | | 9788484761488 | 1999 | | Edafología para la agricultura y el medio ambiente |
| Ryan, J., Estefan, G. and Rashid, A. | Soil and Plant Analysis Laboratory Manual, 2nd Ed. | Scientific Publishers | | 9788172337650 | 2012 | | Manual de análisis de suelos y plantas en climas áridos y semiáridos |
| SECF (Sociedad Española de Ciencias Forestales) | https://www.researchgate.net/publication/236984396_Soil--Plant-AnalysisSoil_and_Plant_Analysis_Laboratory_Manual Situación de los bosques y del sector forestal en España. Informe 2010 | SECF (Sociedad Española de Ciencias Forestales) | | | 2011 | | |
| Varios autores | Modelos de restauración forestal (Vol. I: Bioclimatología y Biogeografía; Vol. II: Series de Vegetación; Vol. III: Modelos de gestión de la vegetación; Vol. IV: Anexo Cartográfico y Series de vegetación edafohigrófilas). http://www.juntadeandalucia.es/medioambiente/consolidado/publicacionesdigitales/40-762_ANEXO_CARTOGRAFICO_Y_SERIES_DE_VEGETACION-MODELOS_DE_RESTAURACION_FORESTAL/40-762.htm | Junta de Andalucía | Sevilla | | 2004 | | |