ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

135004554 - Management And Restoration Of Mediterranean Forests

DEGREE PROGRAMME

13MP - Grado En Ingenieria Del Medio Natural

ACADEMIC YEAR & SEMESTER

2025/26 - Semester 1

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	135004554 - Management And Restoration Of Mediterranean Forests
No of credits	3 ECTS
Type	Optional/elective
Academic year ot the programme	Fourth year
Semester of tuition	Semester 7
Tuition period	September-January
Tuition languages	English
Degree programme	13MP - Grado en Ingenieria del Medio Natural
Centre	13 - E.T.S.I. Montes, Forestal Y Medio Natur.
Academic year	2025-26

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Jose Alfredo Bravo Fernandez	Dasometría	alfredo.bravo@upm.es	M - 10:00 - 14:00 W - 12:00 - 14:00
Sonia Roig Gomez	Edif Montes	sonia.roig@upm.es	M - 10:00 - 14:00 Th - 10:00 - 12:00 Also arranged by email

Raquel Benavides Calvo (Subject coordinator)	Selvicultura	raquel.benavides@upm.es	Sin horario. No specific timetable. Must be arranged with the teacher
Jesus Fernandez Moya	Selvicultura	jesus.fmoya@upm.es	Sin horario. No specific timetable. Must be arranged with the teacher
Juan Antonio Oliet Pala	Selvicultura	juan.oliet@upm.es	Sin horario. No specific timetable. Must be arranged with the teacher

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

- Gestion Agraria

- Tecnicas De Restauracion Vegetal

- Tecnicas De Restauracion Y Conservacion De Suelos

- Geologia Y Edafologia

- Ecofisiologia Vegetal

- Botanica

- Flora Y Vegetacion En Los Sistemas Naturales

- Recursos Hidricos Y Gestion De Cuencas

- Maquinaria De Infraestructuras Verdes

- Climatologia

- Biometria

- EcologÍa General Y EcosistÉmica

- Ecologia Aplicada

3.2. Other recommended learning outcomes

The subject - other recommended learning outcomes, are not defined.

4. Skills and learning outcomes *

4.1. Skills to be learned

CB02 - Que los estudiantes sepan aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posean las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio

CE 1.01 - Conocer los campos de aplicación de la Ingeniería del Medio Natural, y tener una apreciación de la necesidad de poseer unos conocimientos técnicos profundos en ciertas áreas de aplicación; apreciación del grado de esta necesidad en, por lo menos, una situación.

4.2. Learning outcomes

RA265 - RA649 - Aplicar los conocimientos de la Selvicultura a la defensa de argumentos y resolución de problemas dentro del campo del tratamiento de los montes

RA263 - RA641 - Conocimiento y comprensión del papel que las repoblaciones forestales pasadas tienen en los paisajes actuales

RA275 - RA648 - Conocer y analizar los principales esquemas selvícolas de las especies forestales más relevantantes en España

RA273 - RA639 - Valorar la influencia de los factores ecológicos en la respuesta del repoblado

RA274 - RA652 - Presentar en público y defender, con argumentos técnicos y científicos, trabajos de caracterización, diagnóstico, evaluación, planificación y gestión de masas forestales

RA279 - RA651 - Tomar conciencia de la importancia de la Selvicultura en el mundo y en España, considerando sus productos finales económicos y ecológicos

RA278 - RA647 - Diagnosticar situaciones selvícolas de las masas forestales

RA86 - RA393 - Conocer la tipología de las principales agrupaciones vegetales junto con sus especies dominantes en el Medio Natural español.

RA270 - RA646 - Identificar y asignar objetivos de la acción repobladora

RA276 - RA650 - - Proponer y diseñar los tratamientos selvícolas más adecuados según especies, estado de las masas forestales y objetivos de las mismas

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

The Mediterranean region is a biodiversity hotspot, harbouring a wide variety of landscapes, ecosystems and species. This is due not only to its rich natural heritage, but also to the seamless interaction between humans and the environment that has existed since ancient times. However, the Mediterranean area is also one of the European regions most vulnerable to climate change. In line with Goal 15 of the Sustainable Development Goals, protecting, restoring and promoting the sustainable use of these ecosystems is therefore a priority.

Forest management and restoration are key disciplines for natural environment managers and landscape planning professionals. These disciplines integrate knowledge of ecosystem functioning and its interaction with human activity, combining information on ecosystem description, the legacy of disturbances, current limitations and natural dynamics, together with an in-depth understanding of societal needs. In Spain, forest land covers over 50% of the total area (approximately 27.9 million hectares), including 18 million hectares of wooded land (36% of the total). These figures illustrate the significant scope of these disciplines in this region.

This course provides an introduction to the main ecological factors that drive natural dynamics in Mediterranean ecosystems and reviews the historical management of forests and old plantations, i.e. the first restoration attempts, that have shaped the current ecosystems and landscapes. We then focus on particularly relevant or unique forest ecosystems, providing descriptions and the main silvicultural guidelines for paradigmatic ecosystems such as 'dehesas' or cork oak stands. The course concludes with a discussion of the main restoration strategies and relevant methods for restoring degraded areas in a Mediterranean context.

5.2. Syllabus

1. 1. Introduction: ecological and historical factors in Mediterranean forests
    1.1. Mediterranean ecosystems: main ecological factors
    1.2. Mediterranean ecosystems: Iberian forests and shrublands
    1.3. Historical factors modelling forest landscape
        1.3.1. Historical facts and forest landscape degradation
        1.3.2. Counteracting degradation: forestations plans in recent history
2. 2. Cultural Mediterranean ecosystems
    2.1. An introduction to silvicultural systems
    2.2. Mediterranean forest ecosystems: description and management
        2.2.1. Silvopastoral systems
        2.2.2. Cork oak woodlands
        2.2.3. Coppice forests
        2.2.4. Mediterranean natural pine forests
        2.2.5. Conversion of planted forest: promoting resilience and biodiversity
3. Restoration of Mediterranean ecosystems
    3.1. Restoration strategies
    3.2. Restoration methods

6. Schedule

6.1. Subject schedule*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	**Lesson 1** Duration: 01:30 Lecture	**Introduction to the course** Duration: 00:30 Lecture		
2	**Lesson 2** Duration: 02:00 Lecture			**Assigment L1 and L2** Written test Progressive assessment Presential Duration: 00:10
3	**Lesson 3** Duration: 01:00 Inverted classroom **Lesson 3** Duration: 01:00 Lecture			**Assigment L3** Individual presentation Progressive assessment Presential Duration: 00:10
4		**Field trip** Duration: 08:00 Practice field trip		**Questionaire about the field trip** Written test Progressive assessment and Global Examination Presential Duration: 00:10
5	**Lesson 4** Duration: 02:00 Lecture			
6	**Lesson 5** Duration: 02:00 Lecture			**Assigment L 4 and 5** Written test Progressive assessment Presential Duration: 00:10
7		**Field trip (optional)** Duration: 08:00 Practice field trip		**Questionaire** Written test Progressive assessment Presential Duration: 00:10
8	**Lesson 6** Duration: 02:00 Lecture			**Assigment L6** Written test Progressive assessment Presential Duration: 00:10
9	**Lesson 7** Duration: 01:00 Lecture **Lesson 8** Duration: 01:00 Lecture			**Assigment L7 and L8** Written test Progressive assessment Presential Duration: 00:10

10	**Lesson 9** Duration: 02:00 Lecture			**Lesson 9** Written test Progressive assessment Presential Duration: 00:10
11	**Lesson 10** Duration: 02:00 Lecture			**Assigment L10** Written test Progressive assessment Presential Duration: 00:10
12	**Lesson 11** Duration: 02:00 Lecture			**Assigment L 11** Individual work Progressive assessment Presential Duration: 00:10
13	**Lesson 12** Duration: 02:00 Lecture			**Assigment L 11 and 12** Written test Progressive assessment Presential Duration: 00:10
14				
15				
16				
17				**Final test** Written test Progressive assessment Presential Duration: 03:00 **Final test** Written test Global examination Presential Duration: 03:00

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
2	Assigment L1 and L2	Written test	Face-to-face	00:10	6%	5 / 10	CE 1.01
3	Assigment L3	Individual presentation	Face-to-face	00:10	6%	5 / 10	CE 1.01
4	Questionaire about the field trip	Written test	Face-to-face	00:10	10%	5 / 10	CB02 CE 1.01
6	Assigment L 4 and 5	Written test	Face-to-face	00:10	6%	5 / 10	CB02
7	Questionaire	Written test	Face-to-face	00:10	6%	5 / 10	CB02 CE 1.01
8	Assigment L6	Written test	Face-to-face	00:10	6%	5 / 10	CB02 CE 1.01
9	Assigment L7 and L8	Written test	Face-to-face	00:10	6%	5 / 10	CB02 CE 1.01
10	Lesson 9	Written test	Face-to-face	00:10	6%	5 / 10	CB02 CE 1.01
11	Assigment L10	Written test	Face-to-face	00:10	6%	5 / 10	CB02 CE 1.01
12	Assigment L 11	Individual work	Face-to-face	00:10	6%	5 / 10	
13	Assigment L 11 and 12	Written test	Face-to-face	00:10	6%	5 / 10	CB02 CE 1.01
17	Final test	Written test	Face-to-face	03:00	30%	5 / 10	CB02 CE 1.01

7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
4	Questionaire about the field trip	Written test	Face-to-face	00:10	10%	5 / 10	CB02 CE 1.01
17	Final test	Written test	Face-to-face	03:00	90%	5 / 10	CB02 CE 1.01

7.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

7.2. Assessment criteria

A seamless and personal follow-up of the evolution and learning progress of students will be addressed. There are two modealitis of evaluation:

CONTINUAL EVALUATION
To pass the course, attendance to one of the two scheduled field trips will be required, together with a questionnaire, which will account for 10% of the mark.
Throughout the semester, short individual assignments or questionnaires on each topic (between 8 and 10) will account for 60% of the mark. At least, two-thirds of them should be handed in.
A final in-class test will account for 30% of the mark. The format and structure of the test will be previously set in Moodle.

GLOBAL EVALUATION

To pass the course, attendance to one of the two scheduled field trips will be required, and complete a questionnaire, which will account for 10% of the mark.
A final in-class test will account for 90% of the mark. The format and structure of the test will be previously set in Moodle.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Loidi (ed) 2017. The Vegetation of the Iberian Peninsula. Volume 1. Springer. 676pp	Bibliography	

Pemán García, J.; Navarro, R.M.; Aránzazu Prada Sáez, M.; Serrada Hierro, R. (Coords.) 2021 Bases técnicas y ecológicas del proyecto de repoblación forestal Ministerio para la Transición Ecológica y el Reto Demográfico. Madrid. Tomo II, 546 pp.	Bibliography	Manual actualizado con todas las técnicas y aspectos operativos para el diseño de repoblaciones con especies leñosas
SMITH, D.M.; LARSON, B.C.; KELTY, M.J.; ASHTON, P.M. 1997. The practice of silviculture: applied forest ecology. John Wiley & sons. New York. 9ª Ed.	Bibliography	
SERRADA, R.; MONTERO, G.; REQUE, J.A. 2008. Compendio de Selvicultura Aplicada en España. Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria. Fundación Conde del Valle de Salazar. Madrid	Bibliography	
DIÉGUEZ, U. et al. 2009. Herramientas selvícolas para la gestión forestal sostenible en Galicia. DG de Montes. Consellería do Medio Rural, Xunta de Galicia. 260 pp.	Bibliography	
REQUE. J.A.; BAYARRI, E.; SEVILLA, F. 2013. Diagnóstico selvícola. Universidad de Valladolid-Profor. Valladolid.	Bibliography	
SERRADA, R. 2011. Apuntes de Selvicultura. Fucovasa. Madrid. 571 p.	Bibliography	
Oliver, C.D.; Larson, B.C.1996. Forests stand dynamics. McGraw-Hill. NY, 540 pp	Bibliography	

NYLAND, R.D. 2016 Sylviculture. Concepts and applications Mc. Graw-Hill Series in Forest Resources. 682 pp.	Bibliography	
MATTHEWS, J.D. 1989 Sylvicultural systems. Oxford University Press. Oxford Science Publications	Bibliography	
Alía Miranda, R.; Alba Monfort, N.; Agúndez Leal, D. 2005. Manual para la comercialización y producción de semillas y plantas forestales. Materiales de base y de reproducción. Organismo Autónomo Parques Nacionales. Ministerio de Medio Ambiente	Bibliography	
Pemán García, J.et al. 2012-13. Producción y Manejo de semillas y plantas forestales. Tomo I Naturaleza y parques nacionales. Serie Forestal. Ministerio de Agricultura, Alimentación y Medio Ambiente.	Bibliography	Disponibles en http://www.magrama.gob.es/es/parques-nacionales-oapn/publicaciones/naturaleza-parques.aspx
Cortina, J.; Peñuelas, J.L.; Puértolas, J.; Savé, J.; Vilagrosa, A. (Coords.). 2006. Calidad de planta forestal para la restauración en ambientes mediterráneos degradados. Estado actual de conocimientos. Ministerio de Medio Ambiente	Bibliography	
Peman, J.; Navarro, R.M. 1998. Repoblaciones Forestales. Ediciones de la Universidad de Lleida. Lleida	Bibliography	
Serrada, R. 2000. Apuntes de Repoblaciones Forestales. Fundación Conde del Valle de Salazar. EUITF. Madrid	Bibliography	

Junta de Castilla y León. 2015. Requerimientos técnicos. Forestación y creación de superficies forestales. Junta de Castilla y León. 66 pp	Bibliography	
Centro de Mejora Forestal El Serranillo:	Web resource	http://www.magrama.gob.es/es/biodiversidad/temas/montes-y-politica-forestal/recursos-geneticos-forestales/CNMF_serranillo.aspx
Federación Española de Viveristas Forestales	Web resource	 http://www.federacionviveros.es/
Reforestación, Viveros y Recursos Genéticos del Servicio Forestal Americano:	Web resource	http://www.rngr.net/
Inventario de Tecnologías de Lucha Contra la Desertificación	Web resource	http://www.magrama.gob.es/es/biodiversidad/temas/desertificacion-y-restauracion-forestal/lucha-contra-la-desertificacion/lch_inventario_tec.aspx
http://secforestales.org	Web resource	Sociedad Española de Ciencias Forestales. Informes, Cuadernos de la SECF, Actas de congresos, Buscador de publicaciones. Recursos en abierto
https://www.miteco.gob.es/es/biodiversidad/temas/inventariosnacionales/default.aspx	Web resource	Forest inventories
http://secforestales.org/content/glosario-tecnico-forestal	Web resource	Glosario forestal de la SECF
Archivo fotográfico y de presentaciones. Archivo supuestos prácticos y casos.	Others	
Viveros de la UD Selvicultura y Repoblaciones	Equipment	Invernadero y umbráculo

Laboratorio U.D. Selvicultura y Repoblaciones.	Equipment	Cámaras de germinación, campo de prácticas. Invernaderos y umbráculo.

9. Other information

9.1. Other information about the subject

The languaje of the course will be English, although technical vocabulary will be algo given in Spanish in order to help the students understand basic concepts in Spanish and a better integration into the academic environment.

Two field trips will be offered together with the course 'Selvicultura General' (GIF), being one of them mandatory and the other one optional. In situ basic translations will be given of the comments done by the professionals that will guide the trip.

The Unit provides students with the tools, laboratories and greenhouses to carry out research work for Bachelor Theses or internships.