



POLITÉCNICA

INTERNATIONAL  
CAMPUS OF  
EXCELLENCE

COORDINATION PROCESS OF  
LEARNING ACTIVITIES  
PR/CL/001



E.T.S. de Ingeniería de Montes,  
Forestal y del Medio Natural

# ANX-PR/CL/001-01

## LEARNING GUIDE

### SUBJECT

**133000270 - Watersheds Management In Mediterranean Areas**

### DEGREE PROGRAMME

13AD - Master Universitario En Ingeniería De Montes

### ACADEMIC YEAR & SEMESTER

2024/25 - Semester 2

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DRAFT VERSION

## 1. Description

### 1.1. Subject details

<b>Name of the subject</b>	133000270 - Watersheds Management In Mediterranean Areas
<b>No of credits</b>	3 ECTS
<b>Type</b>	Optional
<b>Academic year of the programme</b>	First year
<b>Semester of tuition</b>	Semester 2
<b>Tuition period</b>	February-June
<b>Tuition languages</b>	English
<b>Degree programme</b>	13AD - Master Universitario en Ingenieria de Montes
<b>Centre</b>	13 - E.T.S. De Ingenieria De Montes, Forestal Y Del Medio Natural
<b>Academic year</b>	2024-25

## 2. Faculty

### 2.1. Faculty members with subject teaching role

<b>Name and surname</b>	<b>Office/Room</b>	<b>Email</b>	<b>Tutoring hours *</b>
Fernando Magdaleno Mas	Edificio A	fernando.magdaleno@upm.es	Tu - 18:00 - 19:00 Apply in advance
Jose Luis Garcia Rodriguez (Subject coordinator)	13W.02.005.0	josel.garcia@upm.es	Sin horario. Apply in advance
Jose Carlos Robredo Sanchez	13W.02.007.0	josecarlos.robredo@upm.es	M - 16:00 - 20:00 Apply in advance

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

### 2.3. External faculty

Name and surname	Email	Institution
Juan Antonio Ballesteros Cánovas	ballesterosnauj@yahoo.es	CSIC

## 3. Prior knowledge recommended to take the subject

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### 3.1. Recommended (passed) subjects

- Planificación Hidrológica

### 3.2. Other recommended learning outcomes

- Hydrology
- Hydraulics

## 4. Skills and learning outcomes \*

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### 4.1. Skills to be learned

CE 2.4 - Capacidad para la planificación hidrológica y la lucha contra la desertificación

CE 6.1 - Capacidad para la gestión de recursos naturales

## 4.2. Learning outcomes

RA76 - Diseñar sistemas de protección frente a los fenómenos torrenciales en áreas de montaña

RA91 - Conocer los conceptos básicos en materia de Planificación Hidrológica

RA95 - Identificar los síntomas de degradación que se pueden presentar en las diferentes áreas (dominantes y dominadas) de una cuenca hidrográfica; evaluar su intensidad y planificar las medidas para su control

RA75 - Conocer la problemática de torrencialidad en áreas de montaña

\* 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

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### 5.1. Brief description of the subject

This subject responds to the interest in the management of mountain river basins in the Mediterranean environment. It is a subject that aims to provide a holistic perspective on the management of river basins. The aim is to study the basic principles underpinning Hydrological Forest Restoration as a watershed management tool in Spain, which may have many similarities with other nearby regions in the Mediterranean scenario.

The syllabus is a set of themes dealing with the review of the main factors of the hydrological cycle, such as: precipitation, evapotranspiration, infiltration, runoff and streamflow. This is followed by a series of themes related to water erosion, sediment transport and associated processes such as gully and gully formation.

The hydromorphology of catchments will be studied and the focus will be on riparian zones and the study of riparian zones.

A theme is devoted to Snow Hydrology, which is so important in the headwater areas of many places and the associated risks in the mountains.

This is followed by a description of certain hydrological models and their relationship with GIS.

Finally, there is a theme on socio-economic considerations in river basin management.

## 5.2. Syllabus

### 1. Introduction

- 1.1. Watershed Management Strategies and Responses to Problems
- 1.2. Watershed Management: A Global Perspective
- 1.3. Watersheds, Ecosystem Management, and Cumulative Effects
- 1.4. Preventive Strategies
- 1.5. Case Studies in Spain

### 2. Hydrologic Processes and Land Use

- 2.1. Precipitation and Interception
- 2.2. Evapotranspiration and Soil Water Storage
- 2.3. Infiltration, Runoff, and Streamflow

### 3. Erosion, Sediment Yield and Channel Processes

- 3.1. Surface Erosion and Control Erosion on Upland Watersheds
- 3.2. Gully Erosion and Soil Mass Movement
- 3.3. Sediment Yield and Channel Processes
- 3.4. Stream Channel Morphology and Stream Classification

### 4. Riparian and Wetland Management

### 5. Snow Hydrology

### 6. Techniques in Restoration

### 7. Socioeconomic Considerations in Watershed Management

## 6. Schedule

### 6.1. Subject schedule\*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	<b>Tema 1. Introduction</b> Duration: 02:00 Lecture			
2	<b>Tema 1. Introduction</b> Duration: 02:00 Lecture			
3	<b>Tema 2. Hydrologic Processes and Land Use</b> Duration: 02:00 Lecture			
4	<b>Tema 2. Hydrologic Processes and Land Use</b> Duration: 02:00 Lecture			<b>Evaluación progresiva</b> Written test Progressive assessment Presential Duration: 01:00
5	<b>Tema 3.</b> Duration: 02:00 Lecture			
6	<b>Tema 3.</b> Duration: 02:00 Lecture			
7	<b>Tema 3.</b> Duration: 02:00 Lecture	<b>Practices in the sediment transport channel of Laboratory</b> Duration: 01:00 Laboratory assignments		
8	<b>Tema 3.</b> Duration: 02:00 Lecture			<b>Evaluación progresiva</b> Written test Progressive assessment Presential Duration: 01:00
9		<b>Viaje de prácticas</b> Duration: 08:00 Practice field trip		
10		<b>Viaje de prácticas</b> Duration: 08:00 Practice field trip		
11	<b>Tema 4. Riparian restoration</b> Duration: 02:00 Lecture			<b>Evaluación progresiva</b> Written test Progressive assessment Presential Duration: 01:00

12	<b>Theme 5, TSnow Techniques</b> Duration: 02:00 Lecture			
13	<b>Theme 6, Techniques of restoration</b> Duration: 02:00 Lecture			
14	<b>Theme 6, Techniques of restoration</b> Duration: 02:00 Lecture			
15	<b>Theme 7. Socioeconomic Considerations in Watershed Management</b> Duration: 02:00 Lecture			
16				<b>Evaluación progresiva</b> Written test Progressive assessment Presential Duration: 01:00  <b>Evaluación global</b> Written test Global examination Presential Duration: 01:30
17				

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
4	Evaluación progresiva	Written test	Face-to-face	01:00	25%	5 / 10	CE 2.4 CE 6.1
8	Evaluación progresiva	Written test	Face-to-face	01:00	25%	5 / 10	CE 2.4 CE 6.1
11	Evaluación progresiva	Written test	Face-to-face	01:00	25%	5 / 10	CE 2.4 CE 6.1
16	Evaluación progresiva	Written test	Face-to-face	01:00	25%	5 / 10	CE 2.4 CE 6.1

#### 7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
16	Evaluación global	Written test	Face-to-face	01:30	100%	5 / 10	CE 2.4 CE 6.1

#### 7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Evaluación global	Written test	Face-to-face	01:30	100%	5 / 10	CE 2.4 CE 6.1

## 7.2. Assessment criteria

The evaluation criterion to be followed is Progressive Assessment and for this purpose, 4 exams have been arranged, which constitute 25% of the weight of the mark.

Those who do not follow this type of evaluation must express it at the beginning of the course and only the Final Evaluation of the subject will be carried out in Week 17th.

## 8. Teaching resources

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### 8.1. Teaching resources for the subject

Name	Type	Notes
Bibliografía	Bibliography	
Equipamiento	Equipment	En campo y laboratorio