COURSE DATA

DATA SUBJECT

Code: 33100
Name: Management and conservation of soil and water
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1104 - Degree in Environmental Sciences	Facultat de Ciències Biològiques	3	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	Management and conservation of soil and water	COMPULSORY

COORDINATION

CARBO VALVERDE ESTER

HERNANDEZ SANCHO FRANCESC

SUMMARY

MANAGEMENT AND CONSERVATION OF SOIL AND WATER is a compulsory third year module conservation, environmental planning and management, degree in Environmental Sciences. The course is structured in 6 credits, taught in the second quarter of third year.

Given the importance of soil and water resources for all living beings and their influence on maintaining the quality of the environment, the student is required to know these resources and to protect its quality problems and avoid any bad influence them.

This course addresses, offering integrative approach that requires the current environmental problems, management and conservation of soil and water. It is a discipline in the study of the conditions suffered by the environment, studies their environmental impact and socio-economic and reveals strategies for conservation and management.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

To be enrolled in all subjects of the modules "General Scientific Basis" and "Scientific bases of the natural environment"

The subject MANAGEMENT AND SOIL AND WATER CONSERVATION needs some previous knowledge of:
Soil
Botany
Cartography

COMPETENCES / LEARNING OUTCOMES

1104 - Degree in Environmental Sciences

Conocimiento y capacidad de aplicación de las estrategias para la gestión y conservación de suelos y aguas.

Conocimiento y capacidad de aplicacion de las metodologías y herramientas básicas para la gestión y planificación de los recursos hídricos.

Conocimiento y capacidad de aplicación de metodologías y herramientas básicas para la gestión y planificación de los recursos edáficos.

DESCRIPTION OF CONTENTS

1. Theme 01.- International conventions, legal framework and legislation (SECTION I: MANAGEMENT AND SOIL CONSERVATION).

Protecting the global environment: Convention on Climate Change, Desertification and Biodiversity. Agenda 2030. ODS 15. Policies, Plans and Programs for the management and soil conservation. National legislation on land management

2. Theme 02.- Use and land management: processes of degradation (SECTION I: MANAGEMENT AND SOIL CONSERVATION).

Soil quality and degradation. Causes and processes involved. Environmental effects and consequences. Types of degradation. Sustainable soil management.

3. Theme 03.- Soils affected by erosion, analysis, evaluation, management and conservation (SECTION I: MANAGEMENT AND SOIL CONSERVATION)

Erosive agents. Types of erosion. Causes, factors and processes involved. Effects of erosion erosive morphologies. Methods, techniques and evaluation models. Strategies for management and soil conservation, prevention and control practices

4. Theme 04.- Soils affected by salinisation, analysis, evaluation, management and conservation (SECTION I: MANAGEMENT AND SOIL CONSERVATION)

Origins and processes of salt accumulation in soil: natural and induced salinity. Types of sales: abundance, toxicity and effects. Salinity, sodicity and Alkalinization Methods, techniques and evaluation models. Spatial-temporal variability of salinity. Management of saline soils: influence of water quality and other factors involved

5. Theme 05.- Soils affected by loss of organic matter: analysis, evaluation, management and conservation (SECTION I: MANAGEMENT AND SOIL CONSERVATION)

Importance of organic matter in soil fertility. Soils as carbon sink. Causes of loss of organic matter, reduced biomass and reduced biodiversity: Processes. Environmental consequences. Evaluation methods. Use and poor soil management in organic matter. Mechanisms of stabilizing carbon. Carbon sequestration and climate change: soil management for storage and conservation of areas of special interest

6. Theme 06.- Land affected by contamination and other degradation processes: analysis, evaluation and management (SECTION I: MANAGEMENT AND SOIL CONSERVATION)

Point and nonpoint pollution. Mechanisms of degradation of pollutants. Soil as Chemical Time Bomb (BQT). Soil vulnerability to contamination. Compaction process, surface sealing and crusting. Artificial sealing process of the soil. Causes. Environmental effects. Study methodologies. Management Strategies and Practices

7. Theme 07.- Desertification (SECTION I: MANAGEMENT AND SOIL CONSERVATION)

Global problem of land degradation in arid, semiarid and dry sub-humid. Definition and causes. Triggers. Major processes involved in desertification. Desertification in the Mediterranean area. Effects. Evaluation. Measures to control and fight against desertification

8. Theme 08.- Evaluation and planning of land use (SECTION I: MANAGEMENT AND SOIL CONSERVATION)

Perspectives in soil evaluation: Productive vs. environmentalism. Study methods. Evaluation parameters intrinsic and extrinsic. Systems of ability and competence. Methodological approaches to land use planning. The planning of land uses in the Mediterranean

9. Theme 01.- Basic concepts in the management of water resources: Environmental and economic indicators (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Pressures and impacts on water use. Economic and environmental value of water. Water market and its regulation. Urban growth and supply requirements. Guarantee and security of supply. Situation of agricultural irrigation.

10. Theme 02.- Basic legislation on water: Water Framework Directive (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Institutional framework. Shared responsibilities in an autonomous State. Basic organizations of the water Administration. Coordination requirements. Implementation of measures for legislation compliance. Study of costs and quantification of the benefits of the measures. Valuation of environmental externalities.

11. Theme 03.- Optimal water management: resource availability, type of use, cost and quality requirements (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Tools for water management. Integration of socioeconomic and environmental variables in the management models. Adoption of measures in the correction of water deficits.

12. Theme 04.- Hydrological planning: River Basin Plans (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Watershed delineation. Objectives and structure of the River Basin Plans. Availability of resources and types of uses at basin level. Cost recovery of water services. Administrative management and coordination of competencies in a river basin.

13. Theme 05.- Conventional water resources: surface water and groundwater (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Uneven territorial use of resources. Criteria for the exploitation of aquifers. Influence of climate change. Cost of the resource and payment criteria. Distribution networks and water quality.

14. Theme 06.- Non-conventional water resources, desalination and reuse of reclaimed water (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Basics of desalination. Cost of the process and environmental impact. Advantages of desalination. Concept of reuse. Treatment of wastewater and effluent quality criteria. Legal aspects and types of uses of reclaimed water. Replacement of traditional resources for reclaimed water. Need for agreements between local authorities and communities of irrigators. Role of the Administration.

15. Theme 07.- Urban water demand: domestic and industrial use (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Distribution of competences and private suppliers. Water consumption and pricing. Cost-saving measures. Quality of the resource and the service.

16. Theme 08.- Demand for water in agriculture: irrigation efficiency (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Crop water requirements. Irrigation systems. Resource productivity and price fixing. Application of historical rights. Security of supply in times of drought.

17. Theme 09.- Optimal water management: resource availability, type of use, cost and quality requirements (SECTION II: MANAGEMENT AND WATER CONSERVATION)

Tools for water management. Integration of socioeconomic and environmental variables in the management models. Adoption of measures in the correction of water deficits.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	4,00
Theory	40,00
Laboratory	6,00
Classroom practices	10,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	25,00

Independent study and work	10,00
Preparation of lessons	45,00
Preparation for assessment activities	0,00
Resolution of case studies	10,00
Total hours	**90,00**

TEACHING METHODOLOGY

This will be done in groups

CLASROOM THEORETICAL

CLASROOM PRACTICAL

Use of various analytical tools in the management of the water

Application of the methodology of cost-benefit for different uses of water

Analysis of the economic and environmental viability of water reuse project

Study and resolution of practical cases.

PRACTICAL WORK IN LABORATORY AND CLASSROOM

Practical exercises related to soil degradation, management and conservation.

In the laboratory:

With different procedures that allow observing the effects on the soil of different management practices, interpreting the data of the analyses carried out and proposing appropriate soil management and conservation practices.

The writing of the report of these practices will be done in the form of a scientific article.

In the classroom:

With the handling of methodologies used in the evaluation, management and planning of soil resources.

Practical exercises related to soil degradation, management and conservation are raised.

In the laboratory:

with different procedures that allow observing the effects on the soil of different management practices, interpreting the data of the analyses carried out and proposing appropriate soil management and conservation practices.

The writing of the report of these practices will be done in the form of a scientific article.

SEMINARS

The National Action Plan to Combat DesertificationJúcar River Basin Authority

Wastewater Management Authority (EPSAR)

Urban Water Supplier

will be carried out individually or in groups smaller than the previous activities.

TUTORING

Resolve questions about issues or problems proposed to students related to the subject)

MONITORING

Monitoring of the course work

It provides the student with teaching material and selected bibliography in the Virtual Classroom of the matter.

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EVALUATION

During the development of the subject, both theoretical and practical classes, there will be a:

1. Continuous Valuation of each student, based on regular attendance at classes and classroom activities, participation and degree of involvement in the process of teaching and learning and skills and attitudes displayed during the development of activities.

2. Evaluation practical activities from the preparation of reports (mandatory) and exhibits the results obtained with the interpretation thereof.

Both continuous assessment and evaluation of practical activities correspond to a maximum of 20% of the final grade. Attendance at practices and Seminaris is mandatory, this evaluation will be considered for the following course only for the Laboratory Practical's activity, but NOT in the Classroom practical.

Evaluation of an objective test, consisting of a written exam consisting of theoretical and practical questions. In order to pass this exam it is necessary to pass with at least a 5 out of 10 each of the blocks in which the subject is divided. The test corresponds to a maximum of 80% of the final grade and must be passed with a 5 to be able to count the other parts and pass the course.

The student must complete the compulsory activities before to apply for the advancement of the exam.

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