



Universitat de Lleida

DEGREE CURRICULUM
**SUFACE HIDROLOGY AND SOIL
CONSERVATION**

Coordination: POCH CLARET, ROSA MARIA

Academic year 2023-24

Subject's general information

Subject name	SUFACE HIDROLOGY AND SOIL CONSERVATION			
Code	11385			
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Erasmus Mundus Master's Programme in Mediterranean Forestry and Natural Resources Management (MEDFOR)	1	OPTIONAL	Attendance-based
Course number of credits (ECTS)	5			
Type of activity, credits, and groups	Activity type	PRACAMP	PRAULA	TEORIA
	Number of credits	0.5	1	3.5
	Number of groups	1	1	1
Coordination	POCH CLARET, ROSA MARIA			
Department	ENVIRONMENT AND SOIL SCIENCES AND CHEMISTRY			
Teaching load distribution between lectures and independent student work	1 ECTS: 15 hours of personal work			
Important information on data processing	Consult this link for more information.			
Language	English			
Distribution of credits	2,5 ECTS theoretical classes 1.5 ECTS classroom practices 1 ECTS experiments and field visits			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
POCH CLARET, ROSA MARIA	rosa.poch@udl.cat	2,5	
RAMOS MARTIN, MARIA CONCEPCION	mariaconcepcion.ramos@udl.cat	2,5	

Learning objectives

1. Knowing the components of the hydrological cycle in the forest environment, remarking the role of the vegetation as a regulatory factor in the movement of the water in the ground and the production of surface and subsurface runoff.
2. Estimating the frequency of hydrological events in terms of likelihood extremes.
3. Calculating the maximum hydrological response from a basin during extraordinary events to design works of correction and restoration of rivers and torrents.
4. Identifying and evaluating the symptoms of the different forms of soil erosion and land degradation and to formulate hypotheses about their causes.
5. Quantifying the potential soil losses applying empirical models.
6. Selecting and designing forms of management of the vegetation and soil directed to prevent, mitigate or correct the effects of the erosion that ensure a sustainable land use.
7. Writing up works and reports in relation to the problems of the surface water dynamics and of the erosive processes

Subject contents

Programme topics:

1. The hydrologic cycle (1 ECTS)

General concepts. Hydrologic budget of a watershed. Morphometry. Precipitation. Probability analysis. Interception. Evapotranspiration. Soil water. Infiltration.

1. The water cycle
 2. Precipitation
 3. Interception
 4. Soil water
 5. Infiltration
 6. Evapotranspiration. The soil water budget
2. Surface hydrology (1 ECTS)

Processes of runoff formation. Hortonian flow. Saturation flow. Subsurface flow. Return flow. Discharge measurement. Hydrograph analysis. Rainfall-discharge relationships. Hydrological models.

3. Subsurface hydrology (0.5 ECTS)

Basic hydrogeology. Aquifers and hydraulic parameters. Baseflow separation. Hydrochemistry and subsurface water pollution.

4. Erosion processes (1 ECTS)

4.1. Erosion types, symptoms and causes.

4.2. Erosion mapping and controlling factors. Global erosion estimation. Erosion modelling.

5. Soil conservation measures (1 ECTS)

Strategies and erosion control measures. Soil restoration: Bioengineering

6. Design of terraces and waterways (0.5 ECTS)

Types of terraces. Hydrologic and hydraulic design of terraces and waterways.

Methodology

Theoretical lectures, study cases, practical lessons in the classroom, field experiments in hydrology, field trip to Conca de Tremp to see erosion and soil conservation, personal work.

Development plan

TBC

Evaluation

Assessment:

Course requirements include attendance (5%), the presentation of exercises (25%), field reports (25%) and a final exam (45%).

Bibliography

General References[1]:

Hydrology (topics 1, 2, 3)

DUNNE, T. & LEOPOLD, L.B. (1978): Water in environmental planning. W.H. Freeman.

HILLEL, D. (2003): Introduction to Soil Physics. Elsevier. E-resource UdL

PONCE, V.M. (1989): Engineering Hydrology. Principles and Practices. Prentice-Hall.

SHAW, E.M. (2011): Hydrology in Practice. 4th ed. Chapman & Hall, Londres, 569 p.

SOUTTER, M., MERMOUD, A., MESY, A. (2007): Ingénierie des eaux et du sol. Processus et aménagement general. PPVR.

THOMPSON, S.A. (1999): Hydrology for water management. AA Balkema, Rotterdam, 362 p.

VIESSMAN, W.; LEWIS, G.L. & KNAPP, J.W. (1996): Introduction to Hydrology. 4th ed. Harper & Row, New York, 780 p.

Soil Erosion and Conservation (topics 4, 5, 6)

BROOKS, K.N.; FOLLIOT, P.F.; GREGERSEN, H.M. & THAMES, J.L. (1992): Hydrology and the management of watersheds. Iowa State University Press.

MORGAN, R.P.C. (1995): Soil erosion and conservation. 2^a ed. Longman, Harlow, Essex, 198 p .

POCH, R.M. (1993): Tècniques de conservació de sòls. Col·lecció Eines, 3. Publ. Univ. De Lleida, Lleida, 82 p.

POCH, R.M. & BALASCH, J.C. (2011): Problemes resolts d'Hidrologia de Superfície. Col·lecció Eines. Publ. Univ. de Lleida, Lleida, 101 p.

SCHWAB, G.O.; FREVERT, R.K.; EDMISTER, T.W.; BARNES, K.K. (1993): Soil and water conservation engineering. J. Wiley & Sons.

[\[1\]](#) Specific references to special topics will be given during the lectures.