Universitat de Lleida

DEGREE CURRICULUM

HYDROMORPHOLOGICAL AND LIMNOLOGICAL PROCESSES

Coordination: BALASCH SOLANES, JOSE CARLOS

Academic year 2023-24

HYDROMORPHOLOGICAL AND LIMNOLOGICAL PROCESSES 2023-24

Subject's general information

<table>
<tr><td>Subject name</td><td>HYDROMORPHOLOGICAL AND LIMNOLOGICAL PROCESSES</td></tr>
<tr><td>Code</td><td>12192</td></tr>
<tr><td>Semester</td><td>1st Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
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<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Master's Degree in Soil and Water Management</td><td>2</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>3.5</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><th>PRAULA</th><th>TEORIA</th></tr>
<tr><th>Number of credits</th><td>1</td><td>2.5</td></tr>
<tr><th>Number of groups</th><td>1</td><td>1</td></tr>
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<tr><td>Coordination</td><td>BALASCH SOLANES, JOSE CARLOS</td></tr>
<tr><td>Department</td><td>ENVIRONMENT AND SOIL SCIENCES AND CHEMISTRY</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Catalan and Spanish</td></tr>
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HYDROMORPHOLOGICAL AND LIMNOLOGICAL PROCESSES 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BALASCH SOLANES, JOSE CARLOS	josepcarles.balasch@udl.cat	1	
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PALAU NADAL, ANTONI	antoni.palaunadal@udl.cat	,3	
POCH CLARET, ROSA MARIA	rosa.poch@udl.cat	,4	
VERICAT QUEROL, DAMIAN	damia.vericat@udl.cat	,6	

Learning objectives

To provide the conceptual and methodological foundations for understanding the operation of drainage and river basins with special emphasis on the interaction between surface and groundwater, and the dynamics of river and lake ecosystems.

The particular objectives are:

To analyze the hydrology of the basins and the dynamics of the groundwater.
Analyze the processes of functioning of the torrents and alluvial cones. Analyze the origin and functioning of wetlands
Analyze the physical processes of sediment transport and sedimentary dynamics at the riverbeds.
Achieve a good level of knowledge about epicontinental aquatic ecosystems, from the field of limnology.

Competences

People who take the subject, in their fields of work, whether in administrations, research, training or the private sector, may carry out tasks that lead to the following general competencies:

- Generate and interpret soil and water data.

- Manage forests by preserving or improving the quality of soils and waters.

- Control degradation and efficiently use water resources.

- Evaluate hydrological, geomorphological and edaphic risks, and plan measures to reduce and minimize their impacts.

- Adequately manage basins and rivers to control the quality and quantity of water and sediments.

People who pass the course will also be able to:

Know the main elements of the hydrological dynamics of the slopes and the generation of runoff.
Learn the basic criteria of experimental hydrology.
Know the principles of hydrogeology and applications to water resources management.

Know the main physical, chemical and biological processes that govern river and lake systems, to interpret their operation.
Know the main processes related to the generation and transport of sediments and the associated river dynamics and the implications for the management of river ecosystems.
Know the technical differences of analysis and sampling of water and sediments.
Generate and interpret information about physical processes in rivers: flows, sedimentary load, roughness and granulometry of the riverbed.
Know the operation of rivers, torrents and alluvial cones.
Know the types of epicontinental aquatic ecosystems, their internal organization and functioning and interrelationships.
Have criteria to plan and carry out the sampling and ecological study of aquatic ecosystems and diagnose their status.

Subject contents

TOPICS

- Management of basins

- Aspects of climate change applied to Hydrology

- River dynamics: Hydrodynamics, typology of rivers,

- Relationship between forests and waters

- Aquatic ecosystems: Notions of limnology of rivers, lakes and reservoirs. Measurement of variables related to aquatic habitats

- Frequency analysis of droughts

- Hydrometric series treatment. Selection, restitution of lost values. Test of homogeneity and consistency

- Experimental basins, Instrumentation. Types of devices

- Advanced hydrogeology.

- Methods of study of river dynamics

Methodology

- Lectures and classes, based on case studies and practical exercises.

- Visit to the fluvial sediments treatment laboratory.

- Field work, 2 days of practice in the Ribera Salada basin (together with the rest of the modules)

Development plan

Program of lectures and evaluations:

Watershed management (2 h)

Waters and Forests (4 h)

Advanced Hydrogeology (4 h)

Experimental basins (4)

Hydrometric data series (2 h)

Fluvial dynamics (4 h)

Sediment transport (4 h)

Drought analysis (2 h)

Limnology. General features. Biological types present in aquatic ecosystems. Organization patterns (2 h)

Rivers, lakes, reservoirs and humid areas. Organization and functioning as ecosystems (2 h)

Practical exercises with tools for limnological characterization of water courses and bodies (4 h)

Assessment test 1 (1-2 h)

Evaluation

The evaluation will consist of a theoretical exam test (50%), reports and exercises in class (10%), and the mark of the practical work of the field trip to the Ribera Salada (40%)

Evaluation	Percentage respect the global mark
Theoretical writed exam	50%
Solution of practical exercises	10%
Practica report of the Ribera Salada fieldtrip	40%

Law 2/2022 on university coexistence and the Regulations on the evaluation and qualification of learning in Degrees and Masters of the UdL (2023) regulate what is considered academic fraud: any premeditated behavior tending to falsify the results of an exam, own or someone else's, carried out as a requirement to pass a subject or accredit the academic performance. Offenses can be serious or very serious.

If the student requires an Alternative Assessment, this will consist of a global exam to be taken on the date set by the Center for the exam of the January call which will be worth 75% and the delivery of a course report which will be worth 25 % remaining.

Bibliography

REFERENCES

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Hewlett, J.D. (1982): Principles of Forest Hydrology. The University of Georgia Press, Athens, 183 p.

Makarieva A.M., Gorshkov V.G., Li B.-L. (2013) Revisiting forest impact on atmospheric water vapor transport and precipitation. Theoretical and Applied Climatology, 111: 79-96.

Sheil, D. & Murdiyarso,D. (2009): How forests attract rain: an examination of a new hypothesis. Bioscience, 59: 341-347

Brooks, K.N.; Folliot, P.F.; Gregersen, H.M.; Thames, J.L. (1992): Hydrology and the management of watersheds. Iowa State University Press.

Toebes, C. & Ouryvaev, V. (1970): Les basins représentatifs et expérimentaux. Guide international des pratiques en matière de recherche. Études et rapports d'hydrologie, 4, UNESCO, Paris, 380 p.