Universitat de Lleida

DEGREE CURRICULUM

HYDROLOGICAL RISKS

Coordination: BALASCH SOLANES, JOSE CARLOS

Academic year 2021-22

Subject's general information

Subject name	HYDROLOGICAL RISKS
Code	12193
Semester	1st Q(SEMESTER) CONTINUED EVALUATION
Typology	

Degree	Course	Character	Modality
Master's Degree in Soil and Water Management	2	OPTIONAL	Attendance-based

Course number of credits (ECTS)	3.5
Type of activity, credits, and groups	

Activity type	PRACAMP	PRAULA	TEORIA
Number of credits	0.4	1	2.1
Number of groups	1	1	1

Coordination	BALASCH SOLANES, JOSE CARLOS
Department	ENVIRONMENT AND SOIL SCIENCES
Important information on data processing	Consult this link for more information.
Language	Català Castellà

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BALASCH SOLANES, JOSE CARLOS	josepcarles.balasch@udl.cat	3,1	
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Subject's extra information

Es aconsellable que se hagin cursat crèdits de les següents matèries:

Hidrologia Forestal (grado forestal, 6c)

Geomorfologia fluvial

Estadística: Funcions de distribució de valors extrems

Geologia, Edafologia y Meteorologia

Climatologia regional

Learning objectives

The overall objective of the course is to provide students with basic knowledge to understand the dynamics and operation of the main types of hydrological risks that currently affect and have affected our society in the past and generate the ability to predict in the future, their occurrence in space and time, and develop global or specific protection plans for the various types of risk. Although the subject of the course addresses all the risks in the world, it will invest a greater time dedication to the processes and risks more active in our regions and, by extension, to the geographical characteristics of the Catalan territory.

In order to be able to carry out the objective, the student will acquire knowledge on the nature, magnitude, spatial dimension and frequency of the different types of risk and on the modern tools and methodologies of analysis and work for their monitoring and control.

From an applied point of view, the student will learn to integrate the knowledge provided by doing a practical work on some type of risk in our territory and proposing measures to act in an emergency situation in according to the legal framework.

Competences

Overall, students will acquire the following skills that coincide with the general skills of the master:

Generate and interpret soil and water data

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

Control degradation and efficiently use water resources.

Evaluate hydrological and geomorphological 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.

Own competences obtained through the subject:

1. Recognize the main types of risks that affect the territory and measure the magnitude of potential damage to exposed populations

2. Relate the magnitude of the episodes with their temporal frequency with the inclusion of historical information

3. Interpret thematic zoning cartography of potential risks prepared by the competent bodies and prepare their own

4. Simulate in a basic way with numerical models the dynamics of natural and anthropic processes and evaluate the uncertainty of the results.

5. Assess and identify risk situations related to land planning, urbanization and construction of road infrastructure and others.

6. Prepare works and studies of potential risk analysis and determination of prevention measures and action in case of emergency

7. Assess the impact on natural risks of the anticipated scenarios of climate change and anthropic activities, with special incidence on land use

Subject contents

TABLE OF CONTENTS:

Concepts of risk and natural hazard. Contributing factors of the risk. Magnitude of impacts

Flood runoff generation and flash flood generation processes

Frequency analysis of maximal caubals

Hydrologic and hydraulic simulation models. Model HMS. Model HEC-RAS. Zoning of floodplains

Historical hydrology and paleohydrology. Unsystematic data: limnimarcas and use of historical documents. Reconstruction of avenues

Megafloods

Basic elements of rock mechanics. Mass movements

Avalanches. Prevention and minimization methods

Anthropic imbalance factors

Methodology

Theoretical classes and practical classes based on cases and examples of the basins of Segre and Ebro.

Practical exercises using models (software) of hydrological and hydraulic simulation.

Analysis of real emergency plans for floods

Field visit to the Ondara river in Tàrrega

Development plan

Lectures and practices program and evaluations

Genesis and impact of floods (2 h)

Flow frequency analysis (2 h)

Mapping of floodplains. Practice (2 h)

Forecast: teleconnections and radar (2 h)

Climate variability and floods (2 h)

Historical hydrology (2 h)

Case study: examples of reconstruction of historical floods (2 h)

Manure cones and avalanches (2)

NC calibration with HEC-HMS. Practice (2 h)

Megacrescudes (2 h)

IBER Practice hydraulic model (2 h)

HEC-RAS hydraulic model. Practice (2 h)

Flood risk planning (2 h)

Case study: The Vajont dam (2 h)

Case study: The floods of the river Zion (2 h)

River environment study techniques. Practice (2 h)

Practical workshop on historical floods in Tàrrega. Field trip (4 h)

Assessment test 2 (1-2 h)

Evaluation

the evaluation of the course consist on:

	Avaluació	Pes en la nota final
Writed test	individual	70%
Classroom practices	individual	20%
Participation	individual	10%

Bibliography

REFERENCES

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THEMATIC MAPS OF INSTITUT CARTOGRÀFIC I GEOLÒGIC DE CATALUNYA (ICGC)

"Mapa geològic de catalunya 1:25.000. Geotreball VI. Mapa per a la prevenció dels riscos geològics"

"Mapa de zones d'allaus de Catalunya" 1:25.000