Course guide
250911 - 250911 - Debris Flow and Flash Flood. Risk, Vulnerability, Hazard and Resilience Concepts

Last modified: 27/05/2024

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: ERASMUS MUNDUS MASTER'S DEGREE IN FLOOD RISK MANAGEMENT (Syllabus 2019). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: VICENTE CÉSAR DE MEDINA IGLESIAS

Others: ALLEN BATEMAN PINZON, VICENTE CÉSAR DE MEDINA IGLESIAS, JUAN PEDRO MARTÍN VIDE

TEACHING METHODOLOGY

The course consists of 2 hours per week of classroom activity (large size group) and 0.8 hours weekly with half the students (medium size group).

The 2 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 0.8 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

LEARNING OBJECTIVES OF THE SUBJECT

The principal objective of the present course is to introduce the student to new phenomena as the debris flow and flash flood. The students learn how to evaluate the debris flows and flash floods mathematics and how to delimitate flooded areas, and also to calibrate and create new models. The students learn and apply concepts as risk, vulnerability and resilience.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	9,8	7.83
Self study	80,0	63.95
Hours large group	25,5	20.38
Hours small group	9,8	7.83

Total learning time: 125.1 h

CONTENTS

introduction

Description:
Introduction to the subject.

Full-or-part-time: 4h 48m
Theory classes: 2h
Self study : 2h 48m

Risk assessment

Description:
Quantitative description of risk analysis.
Introduction to hazard analysis-

Full-or-part-time: 12h
Theory classes: 5h
Self study : 7h

Initiation

Description:
Introduction to the initiation mechanisms of DFs.
Introduction to the DF start-up processes.
Use of qualitative initiation models.
Use of quantitative models of initiation.

Full-or-part-time: 19h 12m
Theory classes: 4h
Practical classes: 4h
Self study : 11h 12m

Propagation

Description:
Rehology
Hydrodynamics of DF.
Qualitative models.
Use of 1D models.
Use of 2D models.

Full-or-part-time: 24h
Theory classes: 4h
Practical classes: 6h
Self study : 14h

Risk management

Description:
Structural measures.
Risk exposure assessment.
Introduction to resilience.
Erosion processes in hydraulic structures.
Quantitative methodology for risk.

Full-or-part-time: 24h
Theory classes: 10h
Self study : 14h

experiments

Description:
Preparation of DF experiments.
Realization of the DF experiments.

Full-or-part-time: 24h
Laboratory classes: 10h
Self study : 14h

GRADING SYSTEM

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories and/or classroom computers.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The teachings of the laboratory grade is the average in such activities.

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

BIBLIOGRAPHY

Basic:
- Tamotsu Takahashi. Debris Flow: Mechanics, Prediction and Countermeasures. 2. CRC Press, 2019. ISBN 978-1138073678.