

Course guide

250913 - 250913 - Global Warming Effects, Flood and Drought Management

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:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: ALLEN BATEMAN PINZON
Others: ALLEN BATEMAN PINZON, VICENTE CÉSAR DE MEDINA IGLESIAS, JOSE MIGUEL DIEGUEZ GARCIA

TEACHING METHODOLOGY

The course consists of 1.2 hours per week of classroom activity (large size group) and 0.4 hours weekly with half the students (medium size group).

The 1.2 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 0.4 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

Description of global warming and the hydrological consequences into a river basin is presented to the student; river flows and water resources. Assess the effect of climate change due to green effect mechanism. Change in water resources and river flows over time and finally changes in water quality. A short introduction of drought assessment and management affected by the global warming effect is studied. Hydrological and meteorological droughts assess. Study of climate generators its utilities and difficulties

STUDY LOAD

Type	Hours	Percentage
Self study	48,0	63.91
Hours medium group	5,9	7.86
Hours large group	15,3	20.37



Type	Hours	Percentage
Hours small group	5,9	7.86

Total learning time: 75.1 h

CONTENTS

Introduction

Description:

Introduction to the problem of drought, spatial and temporal scales. Definition and type of drought.

Specific objectives:

General compression of the drought.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

Hydrological Drought

Description:

How is hydrological drought evaluated? Drought indices.

Exercises on hydrological drought indices using data from a real station.

Impart knowledge of R to know the code

Exercises to evaluate the different hydrological indices.

Specific objectives:

Understand hydrological drought indices.

Carry out practical exercises in Excel to assess the different indices

Level the knowledge of R in the group.

Learn to program in R and understand the hydrological drought from the indices

Full-or-part-time: 31h 12m

Theory classes: 2h

Practical classes: 2h

Laboratory classes: 9h

Self study : 18h 12m

Meteorological Drought

Description:

Definition of meteorological drought. Description of meteorological drought indices and climatic indices ONI, ENSO.
Detailed study of the valuation of the Palmer indices
Exercises in R for the evaluation of drought
How is drought risk assessed?
Drought risk assessment exercises

Specific objectives:

Understanding Meteorological Drought
Understand the concept of meteorological drought through the Palmer indices.
Understand the hydrological and meteorological drought indices.
Understand and assess drought risk
Consolidate the knowledge of the indices through the assessment of the danger of drought.

Full-or-part-time: 14h 23m

Theory classes: 3h

Practical classes: 3h

Self study : 8h 23m

climate change

Description:

Application in R of climate change. Possible scenarios.
Exercises in R on climate change
Session invited by an expert in drought management in Catalonia.

Specific objectives:

Understanding climate change and assessment of scenarios.
Understand climate change scenarios and their application.
Informative and explanatory session on assessment of the drought in Catalonia-

Full-or-part-time: 14h 23m

Theory classes: 4h

Practical classes: 2h

Self study : 8h 23m

GRADING SYSTEM

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the subject in terms of knowledge or understanding, and a complete exercise of application of drought connections.

EXAMINATION RULES.

It is a complete exercise of application of drought, using the R code and if necessary the QGIS.

BIBLIOGRAPHY

Basic:

- LM Tallaksen, HAJ Van Lanen. Hydrological drought: processes and estimation methods for streamflow and groundwater. London: elsevier, 2004. ISBN 978-0-444-51767-8.

Complementary:

- Chow,, V.T.; Maidment, D.R.; Mays, L.W. Applied hydrology. New York: McGraw-Hill, 1988. ISBN 0070108102.