

Global Warming Effects, Flood and Drought Management (250913)

General Information

School	ETSECCPB
Departments	Departament d'Enginyeria Civil i Ambiental (DECA) Departament de Màquines i Motors Tèrmics (MMT)
Credits	3.0 ECTS
Programs	MÀSTER UNIVERSITARI ERASMUS MUNDUS EN GESTIÓ DEL RISC PER INUNDACIÓ (pla 2019)
Course	2023/24

Main teaching language at each group

- Group 10Q1 English (Q1)

Faculty

Responsible Faculty: Allen Bateman Pinzon

Faculty: Allen Bateman Pinzon, Vicente César De Medina Iglesias, Jose Miguel Dieguez Garcia

Objectives of Education

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

Total hours of student work

		Hours	Percentage
Supervised Learning	Large group	15.3 h	56.67 %
	Medium group	5.85 h	21.67 %
	Laboratory classes	5.85 h	21.67 %
	Guided Activities	0.0 h	0.00 %
Self Study		48.0 h	

Contents

Introduction

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

Specific Objectives

General compression of the drought.

Hydrological Drought

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

Meteorological Drought

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.

climate change

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-

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.

Grading Rules

() The evaluation calendar and grading rules will be approved before the start of the course.*

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.

Test Rules

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

Office Hours

Every day after dry class, or staying with the teacher to answer questions. Also telematic consultation previously scheduled.

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.