

## SUBJECT TEACHING GUIDE

G1966 - Hydrology

Degree in Civil Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering			Type and Year	Compulsory. Year 2
Faculty	School of civil Engineering				
Discipline	FUNDAMENTALS OF HYDRAULIC ENGINEERING				
Course unit title and code	G1966 - Hydrology				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DEL AGUA Y DEL MEDIO AMBIENTE
Name of lecturer	MANUEL DEL JESUS PEÑIL
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Other lecturers	

### 3.1 LEARNING OUTCOMES

- To acquire a working knowledge of the hydrologic cycle and of all its physical process, allowing to quantify each of them.
- To learn the physical bases of the precipitation process , to be able to adapt different mathematical models for its modeling for its use in hydrologic models.
- To model the water balance, including the most important physical processes under specific conditions, using existing and ad hoc models.
- To quantify, in a simplified way, groundwater fluxes.
- To be able to use different models for evapotranspiration , learning to choose the most adequate ones depending on the specific application.
- To model river discharge and streamflow routing.
- To apply all the acquired knowledge to hydrologic engineering applications , especially to rainfall-runoff modeling and to the design of small infrastructures.

### 4. OBJECTIVES

- To teach students the physical processes that control the hydrologic cycle.
- To teach the students the tools required to model each of the processes of the hydrologic cycle
- To train the student to solve hydrologic problem making use of numerical models.

### 6. COURSE ORGANIZATION

#### CONTENTS

1	Hydrologic cycle and climate
1.1	Introduction to Hydrology. Climate and hydrologic cycle. Basic hydrologic concepts.
1.2	Precipitation: the physical process and its measurement. Statistical distribution fitting.
1.3	An introduction to Python. Python for hydrologic applications.
1.4	Environmental variables simulation and climate change.
2	Hydrologic fluxes
2.1	Infiltration and water in the soil. The Green and Ampt model.
2.2	Groundwater. The Dupuit approximation.
2.3	Runoff and river discharge. River discharge statistics.
2.4	Evapotranspiration and vegetation.
3	Hydrologic modeling.
3.1	Hydrologic model. The HEC-HMS model.
3.2	Basic operation of a hydrologic model to solve event reponse.
3.3	Evaluation of climate change effects on river discharge.

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Lesson quizzes	Written exam	No	Yes	50,00
Hydrologic modeling practical work	Work	Yes	Yes	50,00
TOTAL				100,00
<b>Observations</b>				
<p>If the quizzes block is not passed as a whole, the extraordinary exam will cover all the material of the course. The extraordinary practical work will be different from the ordinary one. If either the quizzes block or the practical work is passed during the ordinary evaluation, its grade will be kept for the extraordinary evaluation.</p> <p>As accorded by the relevant committees:</p> <ul style="list-style-type: none"> <li>+ As a general rule and unless stated otherwise anywhere in this guide, a student cannot request a reexamination if the original grade obtained in the evaluation was not a fail.</li> <li>+ As a general rule and unless stated otherwise anywhere in this guide, the reexamination activity will take the same form than the original evaluation activity.</li> </ul> <p>Grades are measured on a numeric scale going from 0 to 10, where values smaller than 5 are a Fail.</p> <p>Only for sufficiently justified reasons (i.e. sanitary restrictions), the evaluation activities could be organized online, if authorized by the School Director.</p>				
<b>Observations for part-time students</b>				
<p>Part-time students will need to agree with the responsible professor a teaching and evaluation plan to ensure an adequate transfer of knowledge as well as a fair evaluation procedure. The minimum requirement for this students will be to complete a piece of homework and to assist to the final exam of the subject. The weights of each part will be proportional to the weight those parts presents in the general evaluation scheme of the subject.</p>				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

Hidrología superficial y subterránea. F. Javier Sánchez San Román. Universidad de Salamanca. 2019  
(<https://gedos.usal.es/handle/10366/83384>)

Hidrología. Luis Mediero Orduña. Ed. Paraninfo. 2021