

SUBJECT TEACHING GUIDE

G1160 - Further Hydraulics

Degree in Civil Engineering

Academic year 2021-2022

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering			Type and Year	Optional. Year 3
Faculty	School of civil Engineering				
Discipline	Subject Area: Hydraulic Engineering				
Course unit title and code	G1160 - Further Hydraulics				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DEL AGUA Y DEL MEDIO AMBIENTE				
Name of lecturer	ANDRES GARCIA GOMEZ				
E-mail	andres.garcia@unican.es				
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 0. DESPACHO DE ANDRES GARCIA GOMEZ (0023)				
Other lecturers	CESAR ALVAREZ DIAZ				

3.1 LEARNING OUTCOMES
-Ability to determine basic geometric and hydraulic characteristics of a physical scale model.
-Ability to determine the flow rates and head loss of a pipeline system in steady flow conditions.
-Ability to analyze the effect of a control valve on the flow regime of a pressure pipe.
-Ability to determine, by empirical formulations, the pressure surge caused by water hammer phenomenon.
-Ability to use, basic form, standard software for modeling pressure pipe water distribution systems.
-Ability to determine the water surface profile of channels under gradually varied flow.
-Ability to determine the influence of a spill or overflow element on the water surface profile of a channel.
-Ability to use, basic form, standard software for modeling a open channel water distribution system.

4. OBJECTIVES

The main objective of the course is to get the student is able to apply all the learning outcomes in the design, planning, operation and maintenance of hydraulic structures and infrastructures, within a context of interdisciplinary work of universal scope.

6. COURSE ORGANIZATION

CONTENTS	
1	Introduction to the Navier Stokes equations
2	Physical models. Dimensional analysis. Similarity theory.
3	Water distribution piping systems. Steady flow equations Elements of pipe network facilities. The energy and hydraulic grade lines. Piping systems. Water hammer.
4	EPANET. A model of water distribution piping systems
5	Steady flow in open channel. Gradually varied flow. Backwater curves. Rapidly varied flow. Hydraulic jump. Location. Spill and discharge structures.
6	HEC-RAS. A River Analysis System.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Parts 1, 2 and 3	Written exam	No	Yes	35,00
Implementation of the program Epanet in a case study. Preparation of a report.	Work	No	Yes	20,00
Part 5	Written exam	Yes	Yes	25,00
Implementation of the program HEC-RAS in a case study. Preparation of a report.	Work	No	Yes	20,00
TOTAL				100,00

Observations

As accorded by the relevant committees, 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 .
- The reexamination activity will take the same form than the original evaluation activity.
- Grades are measured on a numeric scale going from 0 to 10, where values smaller than 5 are a Fail.

Marks obtained in the course evaluation activities will be kept until the re-sit examination period.

Only for duly justified reasons (eg sanitary restrictions) the evaluation tests may be organized remotely, with prior authorization from the Center's Administration.

Observations for part-time students

Part-time students will need to assist to the final exam of the subject and complete the course work activities.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
FRANZINI, J.B.; FINNEMORE, E.J. MECÁNICA DE FLUIDOS CON APLICACIONES EN INGENIERÍA. Mc GRAW HILL. 1999
GERHART, P.; GROSS, R.; HOCHSTEIN, J. FUNDAMENTOS DE MECÁNICA DE FLUIDOS. ADDISON-WESLEY. 1995
CHOW, V.T. HIDRÁULICA DE LOS CANALES ABIERTOS. ED. DIANA. 1985