

## SUBJECT TEACHING GUIDE

G1977 - Water Supply and Wastewater Treatment Systems

Degree in Civil Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering			Type and Year	Compulsory. Year 3
Faculty	School of civil Engineering				
Discipline	HEALTHCARE ENGINEERING				
Course unit title and code	G1977 - Water Supply and Wastewater Treatment Systems				
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	JAVIER TEMPRANO GONZALEZ				
E-mail	javier.temprano@unican.es				
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 2. DESPACHO - Area de Tecnologías del Medio Ambiente (2033)				
Other lecturers	JUAN JOSE AMIEVA DEL VAL				

### 3.1 LEARNING OUTCOMES

- Interpret the statement of environmental problems terminologically.
- Interpret a water quality analysis and evaluate it in view of the legislation.
- Estimate the water demand of a population and the design flows of different works .
- Estimate the flow and contamination of a wastewater discharge.
- Identify the effect of pollution from a spill in a river .
- Describe the operation of a wastewater treatment plant and a drinking water treatment plant.
- Trace and dimension the basic elements of the supply and sanitation systems of a population .

#### 4. OBJECTIVES

The student must be able to:

- Mastering the concepts related to the origin of environmental engineering (sanitary engineering, environmental management, demography, public health).
- Mastering the concepts of water quality and pollution, Wastewater, Receiving media, Management and control of water quality, Basic legislation.
- Analyze and diagnose problems of water pollution and self-purification of rivers.
- Design and diagnose in a basic way conventional systems for the treatment and purification of waste water and management of the sludge produced.
- Measure parameters and phenomena associated with water pollution.

#### 6. COURSE ORGANIZATION

CONTENTS	
1	Bases of Environmental Engineering. Historical introduction. Demography. Public health.
2	Water quality and pollution. Receiving media. Water management. Natural water. The water contamination. Sewage water. Water quality and its control. Water quality in rivers. Selfdeputation.
3	Urban water cycle. Demands and consumption. Data for design. Conductions. Types, materials and design. Water storage tanks. Drinking water distribution networks. Elements. Sewage networks. Elements. Quality and contamination in networks. Normative. Tests. Conservation and exploitation.
4	Introduction to drinking water treatment and wastewater treatment. Processes that make up an ETAP. Processes that make up the water line of a conventional WWTP. Processes that make up the sludge line of a conventional WWTP. Specific legislation.
5	- Sanitary engineering laboratory: two laboratory practices, self-purification and evaluation of the hardness of a water, measures to correct it. - Visit to a WWTP.

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
The exam will consist of two parts. The first part will correspond to the contents of the Blocks 1 and 2 and the second partial to those of blocks 3 and 4. The exam of the first part (first partial) will be done after having completed the contents of bloc	Written exam	No	Yes	70,00
The laboratory activities will be evaluated through the practical notebooks and the reports of the visits delivered by students. Being an eminently practical activity, attendance is mandatory.	Laboratory evaluation	No	No	30,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>In relation to the resolutions adopted in the ordinary session of the School Board held on June 10, 2010, it is established that, with respect to the evaluation activities that are recoverable,</p> <ul style="list-style-type: none"> <li>• As a general criterion and unless something different is specified in this guide , a student may only appear for recovery of those activities that he has not passed, that is, in which he has not obtained a minimum grade of five out of ten.</li> <li>• As a general criterion and unless something different is specified in this guide , in the recovery period the evaluation procedure of an activity will be the same as that of the activity that originates it.</li> </ul> <p>Note: According to Royal Decree RD 1125/2003 on the European credit system and the system of qualifications in official university degrees and valid throughout the national territory, the results obtained by the student in each of the subjects of the plan Studies will be graded according to the following numerical scale from 0 to 10, with an expression of one decimal place, to which their corresponding qualitative score may be added: 0.0-4.9: Suspense (SS). 5.0-6.9: Pass (AP). 7.0-8.9: Notable (NT). 9.0-10: Excellent (SB).</p> <p>Only for duly justified reasons (eg sanitary restrictions) the evaluation tests may be organized remotely, with prior authorization from the Center's Management</p> <p>If the health situation prevents the carrying out, in whole or in part, of the laboratory practices or the visit, the activity would be replaced by individual work.</p> <p>Each midterm exam will consist of theory and problems. To determine the grade, a weighting will be carried out, the weight of the problems being generally double with respect to the theory. The minimum unit of evaluation is the block (theory plus problems), not allowing the presentation only to theory or only to problems.</p> <p>In case of not passing the course in June, the approved partial exams will be kept for the extraordinary exam and the student must take the failed blocks.</p> <p>The results obtained in the extraordinary exam are final, not saving the marks obtained from each block for the following year. The labs and the visit are also not saved for subsequent courses.</p>				
<b>Observations for part-time students</b>				
<p>The part-time student has to attend the laboratory, pass it and will be evaluated by a final exam (in the event that they have not done the practices and presented the report throughout the course like the rest of the students). It is the responsibility of the part-time student to be attentive to the dates of completion of the practices and the dates of delivery of the practical works.</p>				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

- TEJERO, I.; SUAREZ, J.; JÁCOME, A.; TEMPRANO, J. (2004). "Introducción a la Ingeniería Sanitaria y Ambiental". Vol. 1 y 2. ISBN:84-89627-68-1. E.T.S.I.C.C.P., Universidad Cantabria.
- TEJERO; SUAREZ; TEMPRANO; JÁCOME; GARCÍA. (2000). Problemas de Ingeniería Sanitaria y Ambiental. ISBN: 84-607-0983-3. E.T.S.I.C.C.P. Universidad Cantabria. Universidad Coruña,