

## SUBJECT TEACHING GUIDE

M2122 - Wastewater Treatment Technologies

Master's Degree in Environmental Engineering and Management

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Master's Degree in Environmental Engineering and Management			Type and Year	Optional. Year 1
Faculty	School of civil Engineering				
Discipline	ENVIRONMENTAL TECHNOLOGIES				
Course unit title and code	M2122 - Wastewater Treatment Technologies				
Number of ECTS credits allocated	3	Term	Semester based (2)		
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	RUBEN DIEZ MONTERO				
E-mail	ruben.diezmontero@unican.es				
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 2. CIRCULACION 2029 (2029)				
Other lecturers	ANA LORENA ESTEBAN GARCIA CARLOS RICO DE LA HERA ANTONIO ORTIZ RUIZ				

3.1 LEARNING OUTCOMES
- Theoretical and critical analysis of Wastewater Treatment Technologies (WWTT), including its feasibility.
- Design of processes related to Wastewater Treatment Technologies (WWTT).
- Ability to identify and diagnose WWTT design and operation problems, and propose solutions.
- Ability to bibliographically research knowledge about any WWTT or its problems or special features.
- Ability to select WWTT alternatives based on different scenarios.
- Ability to improve and optimize WWTT processes.
- Ability to apply methods of measurement and assessment of the operation of WWTT processes.

#### 4. OBJECTIVES

To describe and explain the fundamental concepts related to wastewater treatment technologies, mainly biological processes, its design and operation, without the need for bibliographic support.

Analyze the wastewater treatment processes, identifying in each case the variables, processes, phenomena, behavior, design or operating parameters and elements of interest.

Sizing, with the aid of any type of material, the facilities for any wastewater treatment process or technology.

Diagnose and solve, with the aid of any type of material, the operation of any wastewater treatment process, especially biological ones.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	1.- Fundamentals of biological treatments (balances and kinetics). Suspension culture and biofilm processes.
2	2.- Nitrification and nitrogen removal processes.
3	3.- Phosphorus removal processes.
4	4.- Refinement of effluents. Desalination.
5	5.- Design, diagnosis, selection, feasibility, automation and innovation of treatment processes.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
An exam with theoretical and practical questions and problems, weighing 30%, at the end of the course	Written exam	Yes	Yes	30,00
Throughout the sessions of the course, different practical cases will be proposed that the students will have to solve and deliver. This activity will have a weight of 30%	Others	No	Yes	30,00
An individual work that students must deliver and present will be proposed, with a weight of 40%	Work	Yes	Yes	40,00
TOTAL				100,00
Observations				
Observations for part-time students				
Part-time students will have to do the exam, practical cases, individual work and visits. They are freed from group work.				

#### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Tchobanoglous George, Burton Franklin L., Stensel H. David (2003) Wastewater engineering: treatment and reuse. Metcalf & Eddy, Inc. McGraw-Hill, Boston, Estados Unidos.

EPA-USA. Environmental Protection Agency. Nutrient Control Design Manual. 2010.EPA/600/R-10/100.

