

## SUBJECT TEACHING GUIDE

### 623 - Optimization in Civil Engineering

#### Master's Degree in civil Engineering, Canal and Port Engineering

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	Master's Degree in civil Engineering, Canal and Port Engineering			Type and Year	Optional. Year 1
Faculty	School of civil Engineering				
Discipline	CROSS CURRICULAR EDUCATION				
Course unit title and code	623 - Optimization in Civil Engineering				
Number of ECTS credits allocated	3	Term	Semester based (2)		
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	FERNANDO JAVIER MENDEZ INCERA				
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Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 0. DESPACHO (0054)				
Other lecturers	PAULA CAMUS BRAÑA BEATRIZ PEREZ DIAZ				

### 3.1 LEARNING OUTCOMES

- To solve optimization problems in Civil Engineering using optimización algorithms
- To manage tools for addressing optimization problems
- To learn to parameterize and to code optimization problems
- To learn linear, non-linear and heuristic optimization algorithms
- To manage tools for designing metamodels

#### 4. OBJECTIVES

- To know the basis of optimization and to use widely used libraries
- To know techniques and optimization tools, needed for solving optimization problems in civil engineering
- To be able of parameterizing and coding optimization problems
- To know the techniques and tools to develop metamodels

#### 6. SUBJECT PROGRAM

##### CONTENTS

1	Introduction. Examples of Optimization Problems
2	Linear and Non-linear Optimization
3	Genetic Algorithms
4	Heuristic Algorithms
5	Metamodels

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Homework: Example of Optimization in Civil Engineering	Work	No	Yes	50,00
Homework: Heuristic Optimization and development of a Metamodel	Work	No	Yes	50,00
<b>TOTAL</b>				<b>100,00</b>
Observations				
Observations for part-time students				
Part-time students will apply the same assessment criteria as full-time students.				

#### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

##### BASIC

- Construyendo y Resolviendo Modelos de Programación Matemática en Ingeniería y Ciencia (2001). Enrique Castillo.
- Practical Genetic Algorithms, Haupt y Haupt (2004), Wiley