SUBJECT TEACHING GUIDE

623 - Optimization in Civil Engineering

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

Academic year 2023-2024

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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Other lecturers	PAULA CAMUS BRAÑA LAURA CAGIGAL GIL

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 tolls 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. COURSE ORGANIZATION

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
TOTAL				100,00

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