SUBJECT TEACHING GUIDE

528 - Characterization of Port Maritime Climate

Master's Degree in Coasts and Ports

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Master's Degree in Coasts and Ports			Type and Year	Optional. Year 1
Faculty	School of civil Engineering				
Discipline					
Course unit title and code	528 - Characterization of Port Maritime Climate				
Number of ECTS credits allocated	4	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	GABRIEL DIAZ HERNANDEZ
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Other lecturers	MELISA MENENDEZ GARCIA

3.1 LEARNING OUTCOMES
- The student will know each of the families of existing tools in the state of the art for the analysis of the processes related to port studies.
- The student will identify and appropriately apply each of the tools according to the needs, objectives, hypotheses and limitations that each study implies.
- The student will be able to apply the acquired knowledge to the solution of problems, situations and real projects of port and coastal studies.
- Knowing the techniques of analysis, pre and post treatment of maritime climate data in deep waters, its propagation towards the coast and ports.
- Learn, at an advanced user level, the management of the different numerical models developed by the Institute of Environmental Hydraulics of Cantabria for the propagation of waves based on hybrid techniques and statistics.
- Be able to interpret adequately the results that each of the wave propagation models, and determine the quality of them based on the type of port analysis study is presented.
- Be able to implement operational systems to help in port construction and exploitation.

4. OBJECTIVES
The overall objective is that students know the theoretical basis for the analysis and study of the marine climate in deep waters and in port areas. Students will perform the downscaling technique for wave climate for e port area numerical tools. Students will domain the techniques of interpolation and post-processing of time series of environmental variables commonly used in the port area. Students will be able le to understand and design from the theoretical basis the concept of operational systems in the port area.

6. COURSE ORGANIZATION	
CONTENTS	
1	Regional wave climate
2	Technical development and practical approximation of wave hindcast in front of a harbour. Langosteira Harbour.
3	Technical development and practical approximation of wave forecast in front of a harbour. Langosteira Harbour

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Homework 1	Work	No	Yes	35,00
Homework 2 - forecast and operational system	Work	No	Yes	35,00
Final test and presentation. Final document	Oral Exam	Yes	Yes	30,00
TOTAL				100,00

Observations

During the course, an unique Project will be developed, divide into three parts:

a) Technical development and practical approximation of wave hindcast in front of a harbour.
b) Technical development and practical approximation of wave forecast in front of a harbour.
c) Final presentation of results and development of operational system for wave and wind forecast.
During the last day of the course, the oral presentation of the results will be defended, along 2 hours.
The minimum pass mark is 5.0 (+ practical final test). The repeated absence and unpunctuality during the course may negatively impact the final evaluation.

Only for duly justified causes (eg sanitary restrictions), the evaluations may be organized remotely, with prior authorization from the Center's Directorate.

Observations for part-time students

Part-time students will apply the same assessment criteria as full-time students. The temporary distribution of activities will be adapted to the particular conditions of each student when deemed necessary.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Camus, P., F. J. Méndez, R. Medina, A.S. Cofiño (2011). Analysis of clustering and selection algorithms for the study of multivariate wave climate. Coastal Engineering, 58 (6), 453-462.

Camus, P., A. S. Cofiño, F. J. Méndez, R. Medina (2011). Multivariate wave climate using self-organizing maps. Journal of Atmospheric and Oceanic Technology, 28, 1554-1568.

Camus, P., F. J. Méndez, R. Medina (2011). A hybrid efficient method to downscale wave climate to coastal areas. Coastal Engineering, 58 (9), 851-862.

Mínguez, R., Tomás, A., Méndez, F. J., and Medina, R. Mixed extreme wave climate model for reanalysis databases. Stochastic Environmental Research and Risk Assessment , (2012), doi: 10.1007/s00477-012-0604

Reguero, B. J., Menéndez, M., Méndez, F. J., Mínguez, R., and Losada, I. J. A global ocean wave (GOW) calibrated reanalysis from 1948 onwards. Coastal Engineering 65 (2012), 38-55. doi: 10.1016/j.coastaleng.2012.03.003

Mínguez, R., Espejo, A., Tomás, A., Méndez, F. J., and Losada, I. J. Directional calibration of wave reanalysis databases using instrumental data. J. Atmos. Oceanic Technol. 28 (2011), 1466-1485, doi: 10.1175/JTECH-D-11-00008.1.

Tomas, A., Mendez, F., Losada, I.J. A method for spatial calibration of wave hindcast data bases. Continental Shelf Research (2008), (391-398), doi: 10.1016/j.csr.2007.09.009.