



UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: PORTS AND COASTS

Type: CORE COURSE

Degree: 2343 - MASTERS DEGREE PROGRAMME IN ENGINEERING OF ROADS, CANALS AND PORTS

Center: 603 - E.T.S. CIVIL ENGINEERS OF CR

Year: 1

Main language: Spanish

Use of additional languages:

Web site:

Code: 310805

ECTS credits: 4.5

Academic year: 2023-24

Group(s): 20

Duration: First semester

Second language: English

English Friendly: Y

Bilingual: N

Lecturer: M^a DEL CARMEN CASTILLO SANCHEZ - Group(s): 20

| Building/Office | Department | Phone number | Email | Office hours |
|-----------------|--------------------------------------|--------------|------------------------------|--|
| A-44 | INGENIERÍA CIVIL Y DE LA EDIFICACIÓN | 926052560 | mariacarmen.castillo@uclm.es | These hours are not final: Monday: from 12:30 to 14:30 and from 16:00 to 17:00 Tuesday: from 13:30 to 14:30 Wednesday: from 12:30 to 14:30 |

2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

The subject aims at providing the students with the fundamental knowledge to understand coastal processes and elements

4. Degree competences achieved in this course

Course competences

| Code | Description |
|------|---|
| CB06 | Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context. |
| CB07 | Apply the achieved knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to the area of study |
| CB08 | Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of knowledge and judgments |
| CB09 | Know how to communicate the conclusions and their supported knowledge and ultimate reasons to specialized and non-specialized audiences in a clear and unambiguous way |
| CB10 | Have the learning skills which allow to continue studying in a self-directed or autonomous way |
| G01 | Scientific-technical and methodological capacity for the continuous recycling of knowledge and the exercise of the professional functions of consultancy, analysis, design, calculation, project, planning, leadership, management, construction, maintenance, conservation and exploitation in the fields of civil engineering. |
| G02 | Understanding of the multiple technical, legal and property constraints that arise in the design of a public work, and the capacity to establish different valid alternatives, to choose the optimum one and to express it adequately, anticipating the problems of its construction, and using the most suitable methods and technologies, both traditional and innovative, with the aim of achieving the greatest efficiency and promoting the progress and development of a sustainable and respectful society with the environment. |
| G03 | Knowledge, understanding and ability to apply the necessary legislation in the exercise of the profession of Civil Engineer. |
| G06 | Ability to plan, design, inspect and manage land (roads, railways, bridges, tunnels and urban roads) or sea (port works and facilities) transport infrastructures. |
| G25 | Ability to identify, measure, enunciate, analyse, diagnose and scientifically and technically describe a civil engineering problem |
| G27 | Ability to communicate in a second language. |
| G28 | Ability to work in an international context. |
| G29 | Management capacity and teamwork. |
| TE07 | Knowledge and skills to understand the dynamic phenomena involved in the ocean-atmosphere-coast environment and be able to provide answers to littoral, port and coastal problems, including the impact of actions on the coastline. Capacity to carry out studies and projects of maritime works. |

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Students can determine the maritime climate for the design of interventions in the marine environment.

Students know the regulatory framework and technical recommendations, both national and international.

Students know the sources of information and the treatment of the data for the design.

Students are familiar with orders of magnitude and scales in coastal engineering.

Students understand coastal morphodynamics.

Students understand the performance principles of maritime works for their design.

Students identify and know the actions of the marine dynamics on the seabed, the coastline, maritime works and structures and those of the latter on the marine dynamics.

6. Units / Contents

Unit 1: Mathematical, physical and hydrodynamical preliminaries

Unit 2: Water wave theory formulation and solution

Unit 3: Kinematic and dynamic wave properties

Unit 4: Averaged values and energy flux for wave propagation

Unit 5: Wave transformation processes

Unit 6: Short-term and long-term wave analysis

Unit 7: Long waves and water level

Unit 8: Coastal structures

Unit 9: Shoreline processes

Unit 10: Technical documents

Unit 11: Numerical models

7. Activities, Units/Modules and Methodology

| Training Activity | Methodology | Related Competences (only degrees before RD 822/2021) | ECTS | Hours | As | Com | Description |
|---|------------------------|---|--|--------------|----|-----|---|
| Class Attendance (theory) [ON-SITE] | Lectures | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 TE07 | 0.66 | 16.5 | N | - | |
| Class Attendance (practical) [ON-SITE] | Combination of methods | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 G29 TE07 | 0.33 | 8.25 | Y | N | Active participation and exercises solved during class hours will be evaluated and cannot be retaken |
| Computer room practice [ON-SITE] | Combination of methods | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 G29 TE07 | 0.08 | 2 | Y | N | Working with software |
| Problem solving and/or case studies [ON-SITE] | Combination of methods | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 G29 TE07 | 0.28 | 7 | Y | N | Active participation and exercises solved during class hours will be evaluated and cannot be retaken |
| Writing of reports or projects [OFF-SITE] | Combination of methods | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 G29 TE07 | 0.43 | 10.75 | Y | Y | Small group work on a case with a final report and an oral exam based on case report (individually graded through group exam) |
| Study and Exam Preparation [OFF-SITE] | Combination of methods | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 G29 TE07 | 2 | 50 | N | - | Some tools will be available to help students study |
| On-line Activities [OFF-SITE] | Combination of methods | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 TE07 | 0.32 | 8 | Y | N | On-line tests |
| Other off-site activity [OFF-SITE] | Combination of methods | CB06 CB07 CB08 CB09 CB10 G01 G02 G03 G06 G25 G27 G28 G29 TE07 | 0.4 | 10 | Y | N | Students can solve exercises or cases as part of the evaluation |
| Final test [ON-SITE] | Assessment tests | | 0 | 0 | Y | Y | |
| Total: | | | 4.5 | 112.5 | | | |
| Total credits of in-class work: 1.35 | | | Total class time hours: 33.75 | | | | |
| Total credits of out of class work: 3.15 | | | Total hours of out of class work: 78.75 | | | | |

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

| Evaluation System | Continuous assessment | Non-continuous evaluation* | Description |
|--|-----------------------|----------------------------|---|
| Final test | 70.00% | 60.00% | Written exam 1 (Units 1 through 5/Tema 1 through Tema 5): WE1; Written exam 2 (Units 6 and 7/Tema 6 and Tema 7): WE2; Written exam 3 (Units 8 and 9/Tema 8 and Tema 9): WE3; Each WE includes theory (WE1T, WE2T, WE3T) and practice (WE1P, WE2P, WE3P) within 30% and 70% which have to be passed separately. They can be retaken For the non-continuous evaluation, just a final exam (FE) including theory (FET) and practice (FEP) |
| Assessment of active participation | 5.00% | 0.00% | Problem or case solving in class hours: (CH) They cannot be retaken |
| Assessment of problem solving and/or case studies | 5.00% | 0.00% | Problem or case solving outside of class hours: (OCH) They cannot be retaken |
| Assessment of activities done in the computer labs | 5.00% | 0.00% | Problem or case solving outside of class hours: (CS) They can be retaken |
| | | | On-line test including technical vocabulary which is the only |

| | | | |
|---|----------------|----------------|---|
| Test | 5.00% | 0.00% | part that can be retaken: (T) |
| Projects | 5.00% | 5.00% | Group work on a case: report (GWR) It can be retaken |
| Projects | 5.00% | 5.00% | Group work on a case: questions; Oral exam based on case report (individually graded through group exam) (GWQ) It can be retaken |
| Assessment of problem solving and/or case studies | 0.00% | 30.00% | On-site case studies on the same date as the final test. (OSCS) It can be retaken |
| Total: | 100.00% | 100.00% | |

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

In order to pass the subject, the following requirements must be satisfied: (at any time: progress tests, final exam o retake exam dates)

- WE1T, WE2T, WE3T \geq 2;
- WE1P, WE2P, WE3P \geq 2;
- WE1, WE2, WE3 \geq 4;
- GWR, GWQ \geq 4;
- Global mark: $(0.7*(WE1+WE2+WE3)/3+0.05*(GWR+GWQ+CH+OCH+CS+T))\geq 5$;

For notation, see the Grading System table (above).

Part of each written exam can be replaced by a problem/case to be solved outside of class hours individually (just applicable for progress tests).

An extra point can be awarded for each written exam. Format is decided throughout the semester.

A compulsory case/problem is to be solved in small groups and a report must be uploaded. After that, an oral group exam is held based on the report where the students are graded individually. Groups of only one member are not allowed.

Any plagiarism will be sanctioned with a 0 in the corresponding global activity. Global activities are described in the Grading System table.

Any details on content, extension and requirements of written exercises will be indicated on virtual campus at the beginning of the semester.

All minimum marks on this guide refer to (a maximum of) 10 points.

Non-continuous evaluation:

Unless stated otherwise, continuous evaluation criteria will be applied to all students.

Anyone choosing non-continuous assessment must notify it to the lecturer within the class period of the subject. The option is only available if the student's participation in evaluation activities (from the continuous assessment) has not reached 50% of the total evaluation for the subject.

For the retake exam, the assessment type used for the final exam will remain valid.

All activities are individual

Any plagiarism will be sanctioned with a 0 in the corresponding global activity. Global activities are described in the Grading System table.

In order to pass the subject, the following requirements must be satisfied:

- FET, FEP \geq 2;
- GWR, GWQ \geq 4;
- Global mark: $(0,6*FE+0,3*OSCS+0,05*(GWR+GWQ))\geq 5$;

The same criteria will be applied to the retake exam.

Specifications for the resit/retake exam:

In order to pass the subject the same criteria as in the final exam apply.

No possibility of replacing part of this exam by a problem/case to be solved outside of class hours individually.

No new extra points for this exam.

All activities to be retaken are indicated in the Grading System table.

Any plagiarism will be sanctioned with a 0 in the corresponding global activity. Global activities are described in the Grading System table.

For the retake exam, the assessment type used for the final exam will remain valid.

Specifications for the second resit / retake exam:

Same criteria as the non-continuous evaluation

| 9. Assignments, course calendar and important dates | |
|---|-------|
| Not related to the syllabus/contents | |
| Hours | hours |
| Writing of reports or projects [AUTÓNOMA][Combination of methods] | 10.75 |
| Unit 1 (de 11): Mathematical, physical and hydrodynamical preliminaries | |
| Activities | Hours |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 1 |
| Unit 2 (de 11): Water wave theory formulation and solution | |
| Activities | Hours |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 2 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | .5 |

| Unit 3 (de 11): Kinematic and dynamic wave properties | |
|---|--------------|
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 1 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 1 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 2 |
| On-line Activities [AUTÓNOMA][Combination of methods] | 1 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | 1 |
| Unit 4 (de 11): Averaged values and energy flux for wave propagation | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | .5 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | .25 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 1 |
| Unit 5 (de 11): Wave transformation processes | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 2 |
| Computer room practice [PRESENCIAL][Combination of methods] | .5 |
| Problem solving and/or case studies [PRESENCIAL][Combination of methods] | 2 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 9 |
| On-line Activities [AUTÓNOMA][Combination of methods] | 1 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | 1.5 |
| Unit 6 (de 11): Short-term and long-term wave analysis | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 2 |
| Computer room practice [PRESENCIAL][Combination of methods] | .5 |
| Problem solving and/or case studies [PRESENCIAL][Combination of methods] | 2 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 9 |
| On-line Activities [AUTÓNOMA][Combination of methods] | 2 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | 1.5 |
| Unit 7 (de 11): Long waves and water level | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 2 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 1 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 6 |
| On-line Activities [AUTÓNOMA][Combination of methods] | 1 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | 1.5 |
| Unit 8 (de 11): Coastal structures | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 4 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 2 |
| Computer room practice [PRESENCIAL][Combination of methods] | .5 |
| Problem solving and/or case studies [PRESENCIAL][Combination of methods] | 1 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 9 |
| On-line Activities [AUTÓNOMA][Combination of methods] | 1.5 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | 2 |
| Unit 9 (de 11): Shoreline processes | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3 |
| Computer room practice [PRESENCIAL][Combination of methods] | .5 |
| Problem solving and/or case studies [PRESENCIAL][Combination of methods] | 2 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 7 |
| On-line Activities [AUTÓNOMA][Combination of methods] | 1 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | 2 |
| Unit 10 (de 11): Technical documents | |
| Activities | Hours |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 2 |
| On-line Activities [AUTÓNOMA][Combination of methods] | .5 |
| Unit 11 (de 11): Numerical models | |
| Activities | Hours |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 2 |
| Global activity | |
| Activities | hours |
| Computer room practice [PRESENCIAL][Combination of methods] | 2 |
| Problem solving and/or case studies [PRESENCIAL][Combination of methods] | 7 |
| Writing of reports or projects [AUTÓNOMA][Combination of methods] | 10.75 |
| Study and Exam Preparation [AUTÓNOMA][Combination of methods] | 50 |
| On-line Activities [AUTÓNOMA][Combination of methods] | 8 |
| Other off-site activity [AUTÓNOMA][Combination of methods] | 10 |
| Class Attendance (practical) [PRESENCIAL][Combination of methods] | 8.25 |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 16.5 |

10. Bibliography and Sources

| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
|---|--|---|------|---------------------|------|-------------|
| | Advances in coastal and ocean engineering | World Scientific | | 981-02-1824-9 (v.1) | 1995 | |
| | Design of coastal structures and sea defenses / | World Scientific, | | 978-981-4611-00-8 | 2015 | |
| | Diques de abrigo en los puertos de interés general del Estad | Puertos del Estado, | | 978-84-88975-80-5 | 2012 | |
| | Environmental design guidelines of low crested coastal struc | Elsevier | | 0-08-044951-4 | 2007 | |
| | Handbook of coastal and ocean engineering | World Scientific | | 981-281-929-0 | 2010 | |
| | Handbook of coastal engineering | McGraw-Hill | | 0-07-134402-0 | 2000 | |
| | International compendium of coastal engineering / | World Scientific, | | 978-981-4449-42-7 | 2015 | |
| | PIV and water waves | World Scientific | | 981-238-949-0 | 2004 | |
| Rebeca Gómez; Rafael Molina; Carmen Castillo; Ignacio Rodríguez; José Damián López. | Conceptos y herramientas probabilísticas para el cálculo del riesgo en el ámbito portuario | Puertos del Estado | | 978-84-88740-09-0 | 2018 | |
| Young, Ian R. | Wind generated ocean waves | Elsevier | | 0-08-043317-0 (hc) | 1999 | |
| BRUNN, P. | Port Engineering, Vol 1. Harbor Planning, Breakwaters and Marine Terminals, | Gulf Publishing Company. | | | 1989 | |
| BRUNN, P. | Port Engineering, Vol 2. Harbor Transportation, Fishing Ports, Sediment Transport, Geomorphology, Inlets and Dredging. | Gulf Publishing Company | | | 1989 | |
| Dean, Robert G. | Coastal processes: with engineering applications | Cambridge University Press | | 0-521-60275-0 | 2004 | |
| Dean, Robert G. | Water wave mechanics for engineers and scientists | World Scientific | | 981-02-0421-3 | 2006 | |
| Dingemans, Maarten W. | Water wave propagation over uneven bottoms | World Scientific Pub. | | 981-02-0426-4 | 2000 | |
| Dyke, P. P. G. | Modeling coastal and offshore processes | Imperial College Press | | 978-1-86094-675-2 | 2007 | |
| Fredsoe, Jorgen | Mechanics of coastal sediment transport | World Scientific | | 981-02-0841-3 | 2005 | |
| Hudspeth, Robert T. | Waves and wave forces on coastal and ocean structures | World Scientific | | 981-238-612-2 | 2006 | |
| Hughes, Steven A. | Physical models and laboratory techniques in coastal enginee | World Scientific | | 981-02-1540-1 | 1995 | |
| Kamphuis, J. William | Introduction to coastal engineering and management | World Scientific | | 981-02-4417-7 | 2002 | |
| Kim, Cheung Hun | Nonlinear waves and offshore structures | World Scientific | | 978-981-02-4885-7 | 2008 | |
| Le Méhauté, Bernard | Water waves generated by underwater explosion | World Scientific | | 981-02-2083-9 | 1996 | |
| Losada, M.A. et al. | Apuntes de Puertos y Costas. Parte 1: Fundamentos del movimiento oscilatorio | Universidad de Granada | | | 2000 | |
| Massel, Stanislaw R. | Ocean surface waves: their physics and prediction | World Scientific | | 981-02-2109-6 | 2005 | |
| Goda, Y. | Random seas and design of maritime structures | World Scientific | | 981-02-3256-X | 2000 | |
| Masselink, Gerhard | Introduction to coastal processes and geomorphology | Arnold | | 0-340-76411-2 | 2003 | |
| Mei, Chiang C. | The Applied dynamics of ocean surface waves | World Scientific | | 9971-50-789-7 | 2003 | |
| Mei, Chiang C. | Theory and applications of ocean surface waves | World Scientific | | 981-238-894-X | 2005 | |
| NEGRO, V., VARELA, O., GARCÍA, J. H. y LÓPEZ, J. S. | Diseño de diques verticales. | Colegio de Ingenieros de Caminos, Canales y Puertos | | | 2001 | |
| NEGRO, V., VARELA, O., GARCÍA, J. H. y MORA, J. I. | Diseño de diques rompeolas. | Colegio de Ingenieros de Caminos, Canales y Puertos | | | 2002 | |
| PUERTOS DEL ESTADO | Guía de buenas prácticas para la ejecución de obras marítimas | | | | 2008 | |

| | | | | | |
|--------------------------------|--|--|-------------------|--|------|
| PUERTOS DEL ESTADO | ROM 0.0, Procedimiento general y bases de cálculo en el proyecto de obras marítimas y portuarias. | | | | 2001 |
| PUERTOS DEL ESTADO | ROM 0.2-90, Acciones en el proyecto de obras marítimas y portuarias | | | | 1990 |
| PUERTOS DEL ESTADO | ROM 0.3-91, Clima marítimo en el litoral español: Oleaje | | | | 1991 |
| PUERTOS DEL ESTADO | ROM 0.4-95, Clima marítimo en el litoral español: Viento. | | | | 1995 |
| PUERTOS DEL ESTADO | ROM 0.5-05, Recomendación geotécnica para las obras marítimas y/o portuarias | | | | 2005 |
| PUERTOS DEL ESTADO | ROM 0.5-94, Recomendaciones geotécnicas para el proyecto de obras marítimas y portuarias. | | | | 1994 |
| PUERTOS DEL ESTADO | ROM 1.0-09, Recomendaciones del diseño y ejecución de las obras de abrigo | | | | 2009 |
| PUERTOS DEL ESTADO | ROM 2.0-11, Recomendaciones para el proyecto y ejecución en las obras de atraque y amarre | | | | 2011 |
| U. S. Army. | Coastal Engineering Manual. | Coastal Engineering Research Center. | | | 2002 |
| PUERTOS DEL ESTADO | ROM 3.1-99, Proyecto de la configuración marítima de los puertos, canales de acceso y áreas de navegación. | | | | 1999 |
| PUERTOS DEL ESTADO | ROM 4.1-94, Proyecto y construcción de pavimentos portuarios | | | | 1994 |
| PUERTOS DEL ESTADO | ROM 4.1-94, Recomendaciones para proyectar y construir pavimentos portuarios | | | | 1994 |
| PUERTOS DEL ESTADO | ROM 5.1-05, Calidad de las aguas litorales en aguas portuarias | | | | 2005 |
| Pedlosky, Joseph | Waves in the ocean and atmosphere: introduction to wave dyna | Springer | 3-540-00340-1 | | 2003 |
| Peña Olivas, José Manuel de la | Guía técnica de estudios litorales: (manual de costas) | Colegio de Ingenieros de Caminos, Canales y Puerto | 978-84-380-0342-8 | | 2007 |
| TAKAHASHI, S. | Design of vertical breakwaters | | | | 1996 |
| Tucker, M. J.Malcolm John1924- | Waves in ocean engineering | Elsevier | 0-08-043566-1 | | 2001 |