English version at the end of this document

Ano Letivo	2022-23
Unidade Curricular	ONDAS E NÍVEL DO MAR
Cursos	RISCOS COSTEIROS, IMPACTOS DAS ALTERAÇÕES CLIMÁTICAS E ADAPTAÇÃO - COASTHazar (2º CICLO) ERASMUS MUNDUS
Unidade Orgânica	Faculdade de Ciências e Tecnologia
Código da Unidade Curricular	19391001
Área Científica	CIÊNCIAS DA TERRA
Sigla	
Código CNAEF (3 dígitos)	443
Contributo para os Objetivos de Desenvolvimento Sustentável - ODS (Indicar até 3 objetivos)	13
Línguas de Aprendizagem	English

Modalidade de ensino

Face to face

Docente Responsável

Óscar Manuel Fernandes Cerveira Ferreira

DOCENTE	TIPO DE AULA	TURMAS	TOTAL HORAS DE CONTACTO (*)

* Para turmas lecionadas conjuntamente, apenas é contabilizada a carga horária de uma delas.

ANO	PERÍODO DE FUNCIONAMENTO*	HORAS DE CONTACTO	HORAS TOTAIS DE TRABALHO	ECTS
1º	S1	30T; 20TP	125	5

* A-Anual;S-Semestral;Q-Quadrimestral;T-Trimestral

Precedências

Sem precedências

Conhecimentos Prévios recomendados

N/A

Objetivos de aprendizagem (conhecimentos, aptidões e competências)

SCOPE :

The main scope of this course will be to expose the students to the fundamental characteristics and governing equations of coastal dynamics.

LEARNING OUTCOMES:

Students will be able identify the main characteristics (forcings, time and length scales) of the different coastal dynamics and their implications on other relevant coastal processes.

Students will be able to find the main sources of observations of the most relevant coastal dynamics and how to use this information to characterize both waves and sea level components.

Students will have the capacity to understand the governing equations of the different dynamics and to obtain solutions ranging from analytic solutions to numerical models in order to model and predict waves and sea level.

Students will be able to provide a critical assessment of how to used observed and modelled coastal dynamics to assess different coastal problems considering a given geographic location.

Conteúdos programáticos

Introduction (overall introduction to coastal dynamics: drivers, time and spatial scales)

Linear wave theory (fundamentals and applications)

Wave transformation (transformation processes, modelling)

Long wave theory (fundamentals and applications)

Other wave theories and applications (Boussinesq + Stokes higher order for offshore applications)

Mean water level (definition, datum, contributors and relevant processes, spatial variations, observations and trends, long-term changes and projections)

Astronomical tides (processes, observations and prediction/modelling)

Storm surges (processes, observations and predictions)

Extreme water level (definition, contributors, statistics and modelling)

Surf zone hydrodynamics (fundamental processes, time and length scales, governing equations, observations and modelling)

Tsunamis (fundamental processes, observations and modelling)

Metodologias de ensino (avaliação incluída)

Teaching methodologies will combine classroom theoretical teaching and problems solving, together with seminars.

ASSESSMENT

1. Online exam 1: test (questionnaire) 10%

2. Online exam 2: test (questionnaire) 10%

3. Online exam 3: test (questionnaire) 10%

4. Classroom exam 1: Written exam (problems) 25%

5. Classroom exam 2: Written exam (problems) 25%

6. Assignment 1: Problems- Homework 10%

7. Assignment 2: Paper on selected topics 10%

8. Final Exam: will include parts 1 to 6 of the evaluation not passed (max. 80%)

Paper on selected topics:

- The effects of sea level rise on our coasts
- Giant waves in Nazaré (Portugal)
- Tsunami early warning systems
- Rip currents and drowning
- Hurricane induced storm surges: genesis and consequences
- Tidal energy
- The physics of surfing waves
- Meteotsunamis: Rissagas in the Balearic Islands
- Measuring waves and water level with satellites

80% class attendance is compulsory.

Bibliografia principal

Losada, I.J and Lara, J.L. Class notes

Bosboom, J. and Stive, M.J.F (2022) Coastal Dynamics. TU Delft Open.

Dean R.G., Dalrymple, R.A. (1992). Water Wave Mechanics for Engineers and Scientists. Advances Series on Ocean Engineering, Vol. 2. World Scientific.

Pugh, D. and Woodworth, P. (2014). Sea-level Science. Cambridge University Press.

Academic Year	2022-23
Course unit	
Courses	Coastal Hazards - Risks, Climate Change Impacts and Adaption (COASTHazar)
Faculty / School	FACULTY OF SCIENCES AND TECHNOLOGY
Main Scientific Area	
Acronym	
CNAEF code (3 digits)	443
Contribution to Sustainable Development Goals - SGD (Designate up to 3 objectives)	13
Language of instruction	English
Teaching/Learning modality	Face to face

Coordinating teacher Óscar Manuel Fernandes Cerveira Ferreira

Teaching staff	Type	Classes	Hours (*)

* For classes taught jointly, it is only accounted the workload of one.

Contact hours

T	TP	PL	TC	S	E	OT	O	Total
30	20	0	0	0	0	0	0	125

T - Theoretical; TP - Theoretical and practical ; PL - Practical and laboratorial; TC - Field Work; S - Seminar; E - Training; OT - Tutorial; O - Other

Pre-requisites

no pre-requisites

Prior knowledge and skills

N/A

The students intended learning outcomes (knowledge, skills and competences)

SCOPE :

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LEARNING OUTCOMES:

Students will be able identify the main characteristics (forcings, time and length scales) of the different coastal dynamics and their implications on other relevant coastal processes.

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Students will have the capacity to understand the governing equations of the different dynamics and to obtain solutions ranging from analytic solutions to numerical models in order to model and predict waves and sea level.

Students will be able to provide a critical assessment of how to used observed and modelled coastal dynamics to assess different coastal problems considering a given geographic location.

Syllabus

Introduction (overall introduction to coastal dynamics: drivers, time and spatial scales)

Linear wave theory (fundamentals and applications)

Wave transformation (transformation processes, modelling)

Long wave theory (fundamentals and applications)

Other wave theories and applications (Boussinesq + Stokes higher order for offshore applications)

Mean water level (definition, datum, contributors and relevant processes, spatial variations, observations and trends, long-term changes and projections)

Astronomical tides (processes, observations and prediction/modelling)

Storm surges (processes, observations and predictions)

Extreme water level (definition, contributors, statistics and modelling)

Surf zone hydrodynamics (fundamental processes, time and length scales, governing equations, observations and modelling)

Tsunamis (fundamental processes, observations and modelling)

Teaching methodologies (including evaluation)

Teaching methodologies will combine classroom theoretical teaching and problems solving, together with seminars.

ASSESSMENT

1. Online exam 1: Type: test (questionnaire) 10%

2. Online exam 2: Type: test (questionnaire) 10%

3. Online exam 3: Type: test (questionnaire) 10%

4. Classroom exam 1: Type: Written exam (problems) 25%

5. Classroom exam 2: Type: Written exam (problems) 25%

6. Assignment 1: Type: Problems- Homework 10%

7. Assignment 2: Type: Paper on selected topics 10%

8. Final Exam: Type: will include parts 1 to 6 of the evaluation not passed (max. 80%)

Paper on selected topics:

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