
Ano Letivo 2022-23

Unidade Curricular MODELAÇÃO DE PERIGOS COSTEIROS

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 19391008

Área Científica INFORMÁTICA

Sigla

Código CNAEF (3 dígitos) 480

**Contributo para os Objetivos de
Desenvolvimento Sustentável - 11 13**
ODS (Indicar até 3 objetivos)

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 (*)
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* 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	S2	35T; 35TP	140	5

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

Precedências

Sem precedências

Conhecimentos Prévios recomendados

N/A

Objetivos de aprendizagem (conhecimentos, aptidões e competências)

- Solve a flow problem on a simple geometry using commonly used numerical techniques
- Select appropriate data from open source databases to support modeling setup and evaluation
- Create hydrodynamic and morphodynamic models using state-of-the-art systems in a practical situation
- Construct boundary conditions using input reduction and schematisation techniques for simulation speedup
- Build and execute the appropriate model setup for a given problem
- Critically evaluate the results of complex models
- Translate model results into practical outcomes and communicate them to stakeholders

Conteúdos programáticos

- Introduction to numerical methods for hydrodynamical modelling
- Data sources for modelling: tides, waves, winds, bathymetry
- Regional modelling of tides, waves and surge with Delft3D
- Compound flood and erosional hazard modelling with SFINCS and XBeach
 - Long term shoreline modeling using Shorelines
- Group exercise: computing multi-hazards at Beira, Mozambique, for the case of cyclone Idai

Metodologias de ensino (avaliação incluída)

The course has 5 ECTS, corresponding to a total of 140 hours of work, distributed over 70 hours of contact and 70 hours of autonomous work. The contact hours are spread over 35 T and 35 TP. Theoretical classes will be based on oral presentations with image support, and include demonstrations of different modelling concepts. The practical sessions allow the students to set up models and analyse the outcomes. Results are presented to their peers in short pitches. The autonomous group work will focus on the analysis and presentation of the hindcast of tropical cyclone Idai in Mozambique.

Summative assessments: Assignment Numerical Methods (25%), Group exercise Idai (75%)

Bibliografia principal

Roelvink, D. J., & Reniers, A. J. H. M. (2011). A Guide To Modeling Coastal Morphology (Vol. 12). World Scientific.

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) 480

Contribution to Sustainable Development Goals - SGD (Designate up to 3 objectives) 11 13

Language of instruction English

Teaching/Learning modality Face to face

Coordinating teacher Óscar Manuel Fernandes Cerveira Ferreira

Teaching staff	Type	Classes	Hours (*)
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* For classes taught jointly, it is only accounted the workload of one.

Contact hours

T	TP	PL	TC	S	E	OT	O	Total
35	35	0	0	0	0	0	0	140

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)

- Solve a flow problem on a simple geometry using commonly used numerical techniques
- Select appropriate data from open source databases to support modeling setup and evaluation
- Create hydrodynamic and morphodynamic models using state-of-the-art systems in a practical situation
- Construct boundary conditions using input reduction and schematisation techniques for simulation speedup
- Build and execute the appropriate model setup for a given problem
- Critically evaluate the results of complex models
- Translate model results into practical outcomes and communicate them to stakeholders

Syllabus

- Introduction to numerical methods for hydrodynamical modelling
- Data sources for modelling: tides, waves, winds, bathymetry
- Regional modelling of tides, waves and surge with Delft3D
- Compound flood and erosional hazard modelling with SFINCS and XBeach
 - Long term shoreline modeling using Shorelines
- Group exercise: computing multi-hazards at Beira, Mozambique, for the case of cyclone Idai

Teaching methodologies (including evaluation)

The course has 5 ECTS, corresponding to a total of 140 hours of work, distributed over 70 hours of contact and 70 hours of autonomous work. The contact hours are spread over 35 T and 35 TP. Theoretical classes will be based on oral presentations with image support, and include demonstrations of different modelling concepts. The practical sessions allow the students to set up models and analyse the outcomes. Results are presented to their peers in short pitches. The autonomous group work will focus on the analysis and presentation of the hindcast of tropical cyclone Idai in Mozambique.

Summative assessments: Assignment Numerical Methods (25%), Group exercise Idai (75%)

Main Bibliography

Roelvink, D. J., & Reniers, A. J. H. M. (2011). A Guide To Modeling Coastal Morphology (Vol. 12). World Scientific.