Guía Docente				
Datos Identificativos				2021/22
Asignatura (*)	Manobrabilidade e Hidrodinámica en Augas Someras		Código	730542012
Titulación	Master Universitario Erasmus Mundus en Sostibilidade e Industria 4.0 aplicada ao Sector Marítimo			
Descriptores				
Ciclo	Período	Curso	Tipo	Créditos
Mestrado Oficial	2º cuadrimestre	Primeiro	Obrigatoria	3
Idioma	Inglés			
Modalidade docente	Presencial			
Prerrequisitos				
Departamento	Enxeñaría Naval e Industrial			
Coordinación	Díaz Casás, Vicente	Correo electrónico	vicente.diaz.casas@udc.es	
Profesorado	Díaz Casás, Vicente Santiago Caamaño, Lucía	Correo electrónico	vicente.diaz.casas@udc.es lucia.santiago.caamano@udc.es	
Web	http://www.master-seas40.unina.it			
Descrición xeral	The main objective of this course is to introduce the students to the basic concepts for the assessment and prognosis of ship maneuverability and to the development of methods for the analysis of maneuvering behavior of ships, including also the basics of characteristics of flows around ships regarding ship propulsion and manoeuvrability.			
Plan de continxencia	1. Modifications to the content: - No changes will be made 2. Methodologies: Teaching methodologies that are maintained: - Supervised work. Teaching methodologies that are modified: - Mixed objective/subjective test: will be done using Moodle or equivalent institutional application. 3. Mechanisms for personalized attention to students: - Email/MS Teams: Daily, following the student´s request.. 4. Modifications in the evaluation: - No changes will be made 5. Modifications of the bibliography or webgraphy: - No changes will be made			

Competencias / Resultados do título	
Código	Competencias / Resultados do título
A2	CE2 - Demonstrate knowledge, understanding and competences in using model and simulation tools related with ship structures, motions and fluid dynamics (SIM).

B2	CB6 - Acquire and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, usually in a research context.
B3	CB7 - That students know how to apply the acquired knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
B4	CB8 - That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
B5	CB9 ? That students are able to communicate their conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized publics in a clear and unambiguous way.
B6	CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
B7	CG1 ? To display the adequate intercultural competence to successfully navigating within multicultural learning environments and to implement basic management principles suitable for a multicultural working environment.
B8	CG2 ? To express an attitude of intellectual inquisitiveness and open-mindedness.
B11	CG5 ? To have the capability to identify, formulate and solve engineering problems within realistic constraints.
B13	CG7 ? To have the capability to critically analyse, synthesise, interpret and summarise complex scientific processes.
C2	CT2 - Mastering oral and written expression in a foreign language.
C4	CT4 - Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective.
C6	CT6 - Acquiring skills for healthy lifestyles, and healthy habits and routines.
C7	CT7 -Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development.

Resultados da aprendizaxe			
Resultados de aprendizaxe	Competencias / Resultados do título		
Students will acquire knowledge about the basic motion equations of the ship, and the hydrodynamic forces which influence its manoevrability characteristics. Students will acquire the ability to develop methods for analysis of manoeuvring behaviour of ships, including the evaluation of rudder design and to design a rudder by themselves. Students will acquire the capabilities to assess the manoeuvrability capabilities of a ship, including also the basic principles and the influence of flows around ships regarding ship propulsion and manoeuvrability.	AM2	BM1 BM2 BM3 BM4 BM5 BM6 BM7 BM10 BM12	CM2 CM4 CM6 CM7

Contidos	
Temas	Subtemas
Coordinates & degrees of freedom	
Nonlinear governing equations of motion hydrodynamic forces & moments	
Rudder forces and rudder design	
Yaw stability	
Manoeuvring tests (constraint & unconstraint model tests)	
Slender body approximation	
Application of CFD simulations	
Influence of shallow water, waves and wind.	

Planificación

Metodoloxías / probas	Competencias / Resultados	Horas lectivas (presenciais e virtuais)	Horas traballo autónomo	Horas totais
Traballos tutelados	A2 B2 B3 B5 B11 B13 C2 C7	5	34	39
Proba mixta	A2 B2 B3 B4 B5 B6 B8 B11 B13 C2 C4	2	0	2
Sesión maxistral	A2 B2 B4 B6 B7 B8 C4 C6	16	16	32
Atención personalizada		2	0	2
*Os datos que aparecen na táboa de planificación son de carácter orientativo, considerando a heteroxeneidade do alumnado				

Metodoloxías	
Metodoloxías	Descrición
Traballos tutelados	Supervised learning process aimed at helping students to work independently in a range of contexts (academic and professional). Focused primarily on learning ?how to do things? and on encouraging students to become responsible for their own learning.
Proba mixta	Oral Test covering the contents of the subject.
Sesión maxistral	Oral presentation (using audiovisual material and student interaction) designed to transmit knowledge and encourage learning. Presentations of this type are variously referred to as ?expository method?, ?guest lectures? or ?keynote speeches?. (The term ?keynote? refers only to a type of speech delivered on special occasions, for which the lecture sets the tone or establishes the underlying theme; it is characterised by its distinctive content, structure and purpose, and relies almost exclusively on the spoken word to communicate its ideas.)

Atención personalizada	
Metodoloxías	Descrición
Sesión maxistral Traballos tutelados	The personalized attention to students, understood as a support in the teaching-learning process, will take place in the hours of tutoring of the professor.

Avaliación			
Metodoloxías	Competencias / Resultados	Descrición	**Cualificación**
Proba mixta	A2 B2 B3 B4 B5 B6 B8 B11 B13 C2 C4	Oral examination of the concepts covered in the course.	60
Traballos tutelados	A2 B2 B3 B5 B11 B13 C2 C7	Preparation of a simulation project with the scope described in the virtual campus. - Explanatory memorandum of the project : 20% - Oral defense: 20%	40

Observacións avaliación
In the second opportunity and in the advanced one the students will have to make the delivery of the totality of the tutored works and the oral presentation of the same.The delivery of the documentary works that are carried out in this matter: It will be requested in virtual format and / or computer support. It will be done through Moodle, in digital format without the need to print them.General EMJMD Sustainable Ship and Shipping SEAS 4.0 evaluation rules: - Students will have only two oportunities to pass a course. If failing to do so, they may be forced to leave the degree. - No part time or lecture attendance exemption are allowed in this degree.

Fontes de información

Bibliografía básica	- Lewandowski, Edward M. (2004). The dynamics of marine craft : maneuvering and seakeeping . New Jersey - Fossen, Thor I. (2011). Handbook of marine craft hydrodynamics and motion control vademecum de navium motu contra aquas et de motu gubernando . Wiley
Bibliografía complementaria	

Recomendacións
Materias que se recomenda ter cursado previamente
Comportamento do Buque na Mar/730542008
Materias que se recomenda cursar simultaneamente
Sistemas Intelixentes de Soporte ás Decisións/730542013
Materias que continúan o temario
Observacións
To help in achieving a sustainable environment and to get the objective of number 5 action of the "Ferrol Green Campus Action Plan" (Healthy and environmentaly and socially sustainable research and teaching):The assignments to be done in this course:- Will be required in digital format.- Will be delivered using Moodle, with no need to print them.In case it is necessary to print them:- Plastics won´t be used.- Two side printing will be used.- Recycled paper will be used.- Printing drafts will be avoided.A sustainable use of the resources should be done, together with the prevention of negative impacts on the environment.