Guia docente				
Datos Identificativos				2022/23
Asignatura (*)	Maniobrabilidad e Hidrodinámica en Aguas Someras		Código	730542012
Titulación	Master Universitario Erasmus Mundus en Sostibilidade e Industria 4.0 aplicada ao Sector Marítimo			
Descriptores				
Ciclo	Periodo	Curso	Tipo	Créditos
Máster Oficial	2º cuatrimestre	Primero	Obligatoria	3
Idioma	Inglés			
Modalidad docente	Presencial			
Prerrequisitos				
Departamento	Enxeñaría Naval e Industrial			
Coordinador/a	Díaz Casás, Vicente	Correo electrónico	vicente.diaz.casas@udc.es	
Profesorado	Díaz Casás, Vicente	Correo electrónico	vicente.diaz.casas@udc.es	
Web	http://www.master-seas40.unina.it			
Descripción general	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.			

Competencias / Resultados del título	
Código	Competencias / Resultados del 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 de aprendizaje	
Resultados de aprendizaje	Competencias / Resultados del 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

Contenidos	
Tema	Subtema
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				
Metodologías / pruebas	Competencias / Resultados	Horas lectivas (presenciales y virtuales)	Horas trabajo autónomo	Horas totales
Trabajos tutelados	A2 B2 B3 B5 B11 B13 C2 C7	5	34	39
Prueba mixta	A2 B2 B3 B4 B5 B6 B8 B11 B13 C2 C4	2	0	2
Sesión magistral	A2 B2 B4 B6 B7 B8 C4 C6	16	16	32
Atención personalizada		2	0	2
(*)Los datos que aparecen en la tabla de planificación són de carácter orientativo, considerando la heterogeneidad de los alumnos				

Metodologías	
Metodologías	Descripción
Trabajos 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.
Prueba mixta	Oral Test covering the contents of the subject.
Sesión magistral	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	
Metodologías	Descripción

Sesión magistral Trabajos 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.

Evaluación			
Metodologías	Competencias / Resultados	Descripción	**Calificación**
Prueba mixta	A2 B2 B3 B4 B5 B6 B8 B11 B13 C2 C4	Mixed test consisting of essay-type and objective test questions. Essay section consists of open (extended answer) questions; objective test may contain multiple-choice, ordering and sequencing, short answer, binary, completion and/or multiple-matching questions.	60
Trabajos 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

Observaciones evaluación
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.

Fuentes de información	
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
Complementária	

Recomendaciones
Asignaturas que se recomienda haber cursado previamente
Comportamiento del Buque en la Mar/730542008
Asignaturas que se recomienda cursar simultáneamente
Sistemas Inteligentes de Soporte a las Decisiones/730542013
Asignaturas que continúan el temario
Otros comentarios
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.