Guia docente				
Datos Identificativos				2022/23
Asignatura (*)	Sistemas Inteligentes de Soporte a las Decisiones		Código	730542013
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	6
Idioma	Inglés			
Modalidad docente	Presencial			
Prerrequisitos				
Departamento	Enxeñaría Naval e Industrial			
Coordinador/a	Miguez Gonzalez, Marcos	Correo electrónico	marcos.miguez@udc.es	
Profesorado	Miguez Gonzalez, Marcos Santiago Caamaño, Lucía	Correo electrónico	marcos.miguez@udc.es lucia.santiago.caamano@udc.es	
Web	http://www.master-seas40.unina.it			
Descripción general	The overall aim of the course is to provide an understanding of the engineering and mathematical analyses that form the basics of monitoring and decision support systems used for onboard/navigational guidance of ships. These techniques are used by naval architects and engineers in the technical departments of ship owners, in classification societies and ship consultancies. Moreover, the student will be trained in advanced methods to evaluate ship operations with regards to the increased focus on energy consumption and emissions from ship.			

Competencias del título	
Código	Competencias del título
A6	CE6 - Demonstrate knowledge, understanding and competences in fulfilling safety, economic and sustainability requirements in ship operation and management (SO).
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.
B12	CG6 ? To appreciate the impact of sustainable development goals in maritime transport.
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.
C3	CT3 - Using ICT in working contexts and lifelong learning.
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 del título		
Understanding of monitoring and decision support systems used for onboard/navigational guidance of ships and capability to evaluate and optimize ship operations with regards to energy consumption and emissions and safety.	AM6	BM1 BM2 BM3 BM4 BM5 BM6 BM7 BM10 BM11 BM12	CM2 CM3 CM4 CM6 CM7

Contenidos	
Tema	Subtema
Random processes	Mathematical representation and tools for analysis of stochastic processes (time and frequency domains); ocean waves.
Modelling of dynamical systems	State space and input-output models for linear systems; response amplitude operators.
Seakeeping	Methods for computation and assessment of ship responses in waves; motions, loads and fuel consumption.
Signal processing	Methods and tools for processing of noisy signals in the time and frequency domain.
Estimation theory	Parametric methods for estimation of signals; Kalman filtering and particle filtering; sea state estimation.
Detection theory	Statistical learning; detection methods for Gaussian and non-Gaussian processes.
Decision support systems	Design of decision support systems; human factors; study cases on safe marine operations and fuel efficiency.

Planificación				
Metodologías / pruebas	Competéncias	Horas presenciales	Horas no presenciales / trabajo autónomo	Horas totales
Sesión magistral	A6 B2 B3 B4 B7 B12 C2 C4 C6	28	42	70
Prueba mixta	A6 B2 B3 B4 B6 B11 B13 C2	2	0	2
Trabajos tutelados	A6 B2 B3 B4 B5 B6 B7 B8 B11 B13 C2 C3 C4 C7	5	42.5	47.5
Presentación oral	B5 B13 C2 C3 C7	1	4	5
Prácticas a través de TIC	A6 B3 B11 C3	9	13.5	22.5
Atención personalizada		3	0	3
(*)Los datos que aparecen en la tabla de planificación són de carácter orientativo, considerando la heterogeneidad de los alumnos				

Metodologías	
Metodologías	Descripción

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?. In this course, these presentations will be made by different proffessors, both from the UDC and from DTU.
Prueba mixta	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.
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. In this course, the supervised project will consist on a group based technical report based on an assignment done by the proffessors, and dealing about some of the topics of the course. This report may be presented in front of the rest of students. This fact will be announced in Moodle/Teams at the beggining of the course.
Presentación oral	Core component of teaching-learning process involving coordinated oral interaction between student and teacher, including proposition, explanation and dynamic exposition of facts, topics, tasks, ideas and principles. In this course, the oral presentation will consist on the presentation of the technical report in front of the rest of students and the proffessors.
Prácticas a través de TIC	Practice-based learning method for theoretical subject content using ICT resources (demonstrations, simulations, etc.) ICT is an excellent medium for practical knowledge applications and information processing, and a key aid to student learning and skills development. In this course, MATLAB will be used to implement some of the systems described during the theoretical lectures.

Atención personalizada	
Metodologías	**Descripción**
Sesión magistral Trabajos tutelados Prácticas a través de TIC	The proffessors will provide personalized attention to the students both personally and remotely using MS Teams or email. In this course, this personalized attention will consist on support while developing the supervised projects, the ICT practicals and doubts and questions related to the contents ellaborated during the lectures.

Evaluación			
Metodologías	**Competéncias**	**Descripción**	**Calificación**
Trabajos tutelados	A6 B2 B3 B4 B5 B6 B7 B8 B11 B13 C2 C3 C4 C7	The qualification of the group based technical report will represent a 40 % of the student´s final qualification. In case the oral presentation is not finally programmed, the percentage of the supervised projects will be 50 %.	40
Prueba mixta	A6 B2 B3 B4 B6 B11 B13 C2	The qualification of the theoretical exam of this course will represent a 50 % of the student´s final qualification.	50
Presentación oral	B5 B13 C2 C3 C7	In case the oral presentation is finally programmed, the percentage of its qualification will be a 10 %, including the presentation and the answers to the questions formulated by the proffessors and other students.	10

Observaciones evaluación

According to the degree regulations, the students will have the oportunity to pass this course in two oportunities (first and second oportunity).
In order to pass the course, an overall mark of 5 out of 10 should be obtained by applying the percentages above to each of the methodologies, considering each of them evaluated in a scale from 0 to 10.At the beggining of the course, dates for presenting the technical reports and doing the oral presentation will be published in Moodle/ MS Teams.In the second oportunity, students will be able to repeat the exam and correct/modify the technical reports; however, in order to pass the course, both the technical report and the oral presentation should have been done in any case fullfilling the prescribed deadlines set during the course.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	
Complementária	

Recomendaciones
Asignaturas que se recomienda haber cursado previamente
Criterios de Estabilidad de Segunda Generación/730542006 Comportamiento del Buque en la Mar/730542008
Asignaturas que se recomienda cursar simultáneamente
Maniobrabilidad e Hidrodinámica en Aguas Someras/730542012
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.