



## Guía Docente

Datos Identificativos					2023/24
Asignatura (*)	Simulación e Optimización de Procesos de Fabricación do Buque		Código	730542024	
Titulación	Master Universitario Erasmus Mundus en Sostibilidade e Industria 4.0 aplicada ao Sector Marítimo				
Descritores					
Ciclo	Período	Curso	Tipo	Créditos	
Mestrado Oficial	1º cuatrimestre	Segundo	Optativa	6	
Idioma	Inglés				
Modalidade docente	Presencial				
Prerrequisitos					
Departamento	Empresa				
Coordinación	Pernas Álvarez, Javier		Correo electrónico	javier.pernas2@udc.es	
Profesorado	Lamas Rodríguez, Adolfo		Correo electrónico	adolfo.lamasr@udc.es	
	Pernas Álvarez, Javier			javier.pernas2@udc.es	
Web					
Descrición xeral	The goal of this subject is to provide a basic theoretical and practical understanding of modelling and simulation technologies (M&S) applied to shipbuilding. M&S is considered one of the Industry 4.0 technologies that allows shipyards to optimize manufacturing processes and logistics. The simulation software Flexsim will be used to solve practical cases based on real problems solved in shipyards.				

## Competencias / Resultados do título

Código	Competencias / Resultados do título
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.
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 da aprendizaxe

Resultados de aprendizaxe	Competencias / Resultados do título	
To have basic knowledge about the modelling and simulation methodology.	BM6	CM2
	BM7	CM3
	BM10	CM4
	BM12	CM6
		CM7
To solve realistic problems about process optimization and planning in shipyards using simulation.	BM6	CM2
	BM7	CM3
	BM10	CM4
	BM12	CM6
		CM7

## Contidos



Temas	Subtemas
Modelling and Simulation	The M&S methodology. M&S technologies. Simulation projects.
Model development in Flexsim	Flexsim basics. Fixed resource library. Task executers. Networks and conveyors. Introduction to process flows.
Shipbuilding processes	Cutting-welding. Block assembly. Outfitting. Painting. Blocks erection.
Shipyards simulation.	Material receipts. Assembly workstations. Blocks erection. Cranes. Planning.
Optimization	Input data analysis. Simulation experiments. Optimization concepts. Linear models. Heuristics. Evolutionary algorithms.

Planificación				
Metodoloxías / probas	Competencias / Resultados	Horas lectivas (presenciais e virtuais)	Horas traballo autónomo	Horas totais
Prácticas a través de TIC	A2 A3 B7 B8 B11 B13 C2 C3 C4 C6 C7	15	15	30
Estudo de casos	B7 B8 B11 B13 C2 C3 C4 C6 C7	4.5	22.5	27
Traballos tutelados	A2 A3 B7 B8 B11 B13 C2 C3 C4 C6 C7	1.5	40.5	42
Proba mixta	B7 B8 B11 B13 C2 C3 C4 C6 C7	2	2	4
Sesión maxistral	A2 A3 B8 B11 B13	21	21	42
Atención personalizada		5	0	5

\*Os datos que aparecen na táboa de planificación son de carácter orientativo, considerando a heteroxeneidade do alumnado

Metodoloxías	
Metodoloxías	Descrición
Prácticas a través de TIC	Solving practical problems and case studies using Flexsim.
Estudo de casos	Solving practical cases proposed by the teachers
Traballos tutelados	Simulation project proposed by the teachers
Proba mixta	Final exam about the contents of this subject.
Sesión maxistral	Lectures on the subject contents

Atención personalizada	
Metodoloxías	Descrición
Prácticas a través de TIC Proba mixta Sesión maxistral Estudo de casos Traballos tutelados	During tutorial time, students can meet the teachers to clarify the doubts of the subject, as well as the ones concerning the supervised projects

Avaliación			
Metodoloxías	Competencias / Resultados	Descrición	Cualificación
Proba mixta	B7 B8 B11 B13 C2 C3 C4 C6 C7	Assessment of the final exam	20
Estudo de casos	B7 B8 B11 B13 C2 C3 C4 C6 C7	Assessment of the practical cases assigned to the students.	20



Traballos tutelados	A2 A3 B7 B8 B11 B13 C2 C3 C4 C6 C7	Assessment of the supervised project assigned to the students.	60
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**Observacións avaliación**

**Critérios de avaliación**

**Segunda oportunidade**

Os criterios de avaliación son iguais tanto na primeira como na segunda oportunidade..

**Cualificación 'Non Presentado'**

Os alumnos que non fagan entrega do traballo tutelado terán cualificación de "Non presentado"

**Información Adicional**

De acordo co artigo 11, apartado 4 b) do Regulamento disciplinar do estudiantado da UDC, o comportamento fraudulento en calquera dos apartados sometidos a avaliación suporá a cualificación de "Suspense (0)" na avaliación final tanto na primeira como na segunda oportunidade e independentemente da oportunidade na que se cometese a falta.

General EMJMD Sustainable Ship and Shipping SEAS 4.0 evaluation rules:

- Students will have only two opportunities 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**

- Robinson, Stewart (2004). Simulation : The Practice of Model Development and Use. John Wiley & Sons
- Flexsim (2022). Flexsim Tutorials.
- Banks, Jerry Carson, Jhon S. Nelson, Barry L. Nicol, David M. (2010). Discrete-Event System Simulation. Prentice Hall

**Bibliografía complementaria**

**Recomendacións**

**Materias que se recomenda ter cursado previamente**

**Materias que se recomenda cursar simultaneamente**

**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 environmentally and socially sustainable research and teaching):&nbsp;The assignments to be done in this course:&nbsp;- Will be required in digital format.&nbsp;- Will be delivered using Moodle, with no need to print them.&nbsp;In case it is necessary to print them:&nbsp;- Plastics won't be used.&nbsp;- Two side printing will be used.&nbsp;- Recycled paper will be used.&nbsp;- Printing drafts will be avoided.&nbsp;A sustainable use of the resources should be done, together with the prevention of negative impacts on the environment.In this course, an effort will be pursued towards the incorporation of gender inclusion aspects: no sexist language will be allowed, bibliography from authors of both genders will be used, and the participation of students of both gender in class will be promoted.The situations of gender discrimination will be detected, and actions will be implemented to correct them.The full integration of students who for physical, sensorial, psychic, or socio-cultural reasons may have difficulties in their academic life will be promoted.

(\* )A Guía docente é o documento onde se visualiza a proposta académica da UDC. Este documento é público e non se pode modificar, salvo casos excepcionais baixo a revisión do órgano competente dacordo coa normativa vixente que establece o proceso de elaboración de guías