Teaching Guide				
Identifying Data				2019/20
Subject (*)	Analysis and Optimization of the Life Cycle		Code	730496210
Study programme	Mestrado Universitario en Enxeñaría Naval e Oceánica (plan 2018)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	Second	Obligatory	4.5
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Naval e Industrial			
Coordinador	Castro Santos, Laura	E-mail	laura.castro.santos@udc.es	
Lecturers	Castro Santos, Laura	E-mail	laura.castro.santos@udc.es	
Web				
General description				

Study programme competences	
Code	Study programme competences
A14	A13 - Coñecemento da enxeñaría de sistemas aplicada á definición dun buque, artefacto ou plataforma marítima mediante a análise e optimización do seu ciclo de vida.
B5	CB10 Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que haberá de ser en boa medida autodirixido ou autónomo.
B6	G01 Capacidade para resolver problemas complexos e para tomar decisións con responsabilidade sobre a base dos coñecementos científicos e tecnolóxicos adquiridos en materias básicas e tecnolóxicas aplicables na enxeñaría naval e oceánica, e en métodos de xestión.
B11	G06 Capacidade para realizar investigación, desenvolvemento e innovación en produtos, procesos e métodos navais e oceánicos.
B12	G07 Capacidade de integración de sistemas marítimos complexos e de tradución en solucións viables.
C2	C1 Capacidade pra desenrolar a actividade profesional nun entorno multilingue
C3	ABET (a) An ability to apply knowledge of mathematics, science, and engineering.
C4	ABET (b) An ability to design and conduct experiments, as well as to analyze and interpret data.
C7	ABET (e) An ability to identify, formulate, and solve engineering problems.
C12	ABET (j) A knowledge of contemporary issues.
C13	ABET (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Learning outcomes			
Learning outcomes	Study programme competences		
Knowledge of systems engineering applied to the definition of a ship, artifact or maritime platform through the analysis and optimization of its life cycle.	AJ13	BC5 BJ1 BJ6 BJ7	CC2 CC3 CC4 CC7 CC12 CC13

Contents	
Topic	Sub-topic
The following blocks or themes develop the contents established in the Verification Report, which are:	- General concepts. - Reliability - Maintainability - Effectiveness

BLOCK I: GENERAL CONCEPTS	Unit 1: Introduction to systems engineering. Unit 2: Utility of the systems.
BLOCK II: RELIABILITY	Unit 3: Introduction to reliability. Unit 4: Reliability over time.
BLOCK III: MAINTENANCE	Unit 5: Introduction to maintainability. Unit 6: Concept of maintenance of systems and maintenance plan. Unit 7: Figures of maintainability merit. Unit 8: Reliability-maintainability connection. Unit 9: Predictions of maintainability. Unit 10: Assignment of maintainability objectives. Unit 11: Preventive maintenance policies.
BLOCK IV: EFFECTIVENESS	Unit 12: Introduction to availability. Unit 13: Traditional model of availability. Unit 14: Model of effectiveness of multifunctional models.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Problem solving	A14 B5 B6 B11 B12 C2 C3 C4 C7 C12 C13	10	15	25
Supervised projects	A14 B5 B6 B11 B12 C2 C3 C4 C7 C12 C13	5	20	25
Case study	A14 B5 B6 B11 B12 C2 C3 C4 C7 C12 C13	10	15	25
Guest lecture / keynote speech	A14 B5 B6 B11 B12 C2 C3 C4 C7 C12 C13	20	17.5	37.5
Personalized attention		12.5	0	12.5
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Problem solving	Applied learning method in which student is required to use knowledge gained from study to propose a solution to a specific problem, where more than one solution may be possible.
Supervised projects	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.
Case study	Teaching-learning method in which students are presented with a specific set of real-life circumstances and a problem (?case?) which they must attempt to understand, assess and solve as a group through a process of discussion. Students should be able to analyse a series of facts relating to a particular area of knowledge or activity, and arrive at a rational conclusion via a process of discussion within small work groups.
Guest lecture / keynote speech	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.)

Personalized attention	
Methodologies	**Description**
Problem solving Supervised projects Case study	Os traballos tutelados, a solución de problemas e o estudo de casos serán propostos ao longo do curso, polo que o alumnado será guiado no desenvolvemento dos mesmos, requirindo unha atención personalizada.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Supervised projects	A14 B5 B6 B11 B12 C2 C3 C4 C7 C12 C13	It will consist in the accomplishment of diverse deliveries during the course	80
Case study	A14 B5 B6 B11 B12 C2 C3 C4 C7 C12 C13	It will consist in the accomplishment of diverse deliveries during the course	20

Assessment comments
In the case of students with some suspended delivery, must deliver it at the second opportunity (July), keeping the notes of the approved deliveries of the supervised work and in the case study until the call for second chance. Students with recognition of part-time dedication and academic exemption of attendance exemption will be evaluated according to their specific characteristics

Sources of information	
Basic	- Jezdimir Knezevic (1996). Mantenimiento. Isdefe - Jezdimir Knezevic (1996). Mantenibilidad. Isdefe - Joel A. Nachlas (1996). Fiabilidad. Isdefe - Francisco Javier González Fernández (2015). Teoría y Práctica del Mantenimiento Industrial Avanzado. FC Editorial
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

To help achieve an immediate sustainable environment and meet the objective of action number 5: "Healthy and sustainable environmental and social teaching and research" of the "Green Campus Ferrol Action Plan":

1. The delivery of the documentary works that are made in this subject:
 1.1. It will be requested in digital format and / or computer support.
 1.2. It will be done through Moodle, in digital format without the need to print them.
 1.3. To be made on paper:
  - Plastics will not be used.
  - Double-sided prints will be made.
  - Recycled paper will be used.
  - Printing of drafts will be avoided.

2. The importance of ethical principles related to the values ??of sustainability in personal and professional behaviors must be taken into account.

3. According to the different application regulations for university teaching, the gender perspective should be incorporated in this subject (non-sexist language will be used, bibliography of authors of both sexes will be used, intervention in class of students and students will be encouraged). female students, ...)