UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2023/24
Subject (*)	Ship's Energy and auxiliary systems		Code	631G01204
Study programme	Grao en Náutica e Transporte Marítimo			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatory	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Navegación e Enxeñaría Mariña			
Coordinador	Orosa Garcia, Jose Antonio	E-mail	jose.antonio.orosa@udc.es	
Lecturers	Orosa Garcia, Jose Antonio	E-mail	jose.antonio.orosa@udc.es	
Web				
General description				

Study programme competences	
Code	Study programme competences
A57	RA4C-Collecting and interpreting relevant data
A58	RA5C-Identify ship components.
A59	RA6C-Identify critical situations and use available means in order to resolve them effectively.
B31	RA9H-Effectively solve practical problems associated with the subject by applying the knowledge acquired.
B33	RA11H-Develop both individual and group work
B35	RA13H-Handle with ease the tools, techniques, equipment and/or material/instrumental of each subject.
B53	RA50H?Operate the remote controls of propulsion installations and machine systems and services
B61	RA62H?Contributing to the safe operation of tanker and chemical tanker cargoes
B67	RA68H?To contribute to the safe operation of liquefied gas tankers.
C15	RA17X-Communicating effectively in a work environment.
C16	RA18X-Reviewing compliance with maritime legislative requirements
C24	RA32X?Ensuring compliance with pollution prevention requirements
C25	RA33X?Maintaining the seaworthiness of the ship

Learning outcomes			
Learning outcomes	Study programme competences		
RA33X-Maintaining the seaworthiness of the ship			C25
RA5C-Identify ship components.	A58		
RA4C-Collecting and interpreting relevant data	A57		
RA6C-Identify critical situations and use available means in order to resolve them effectively.	A59		
RA9H-Effectively solve practical problems associated with the subject by applying the knowledge acquired.		B31	
RA11H-Develop both individual and group work		B33	
RA13H-Handle with ease the tools, techniques, equipment and/or material/instrumental of each subject.		B35	
RA50H-Operate the remote controls of propulsion installations and machine systems and services		B53	
RA62H-Contributing to the safe operation of tanker and chemical tanker cargoes		B61	
RA17X-Communicating effectively in a work environment.			C15
RA18X-Reviewing compliance with maritime legislative requirements			C16
RA32X-Ensuring compliance with pollution prevention requirements			C24
RA33X-Maintaining the seaworthiness of the ship			C25
RA68H-To contribute to the safe operation of liquefied gas tankers.		B67	

Contents	
Topic	**Sub-topic**
Introduction	Introduction. The ship.
Naval Construction	Materials science. Properties. Classification. Test.
Applied Thermodynamics	Principles of thermodynamics irreversibility. entropy. steam cycles gas cycles Psychrometric analysis of processes Refrigeration and air conditioning technology
Main Engine	Fundamental physical concepts on heat engines. Internal combustion engines. Steam turbines. Gas Turbines. Machine elements. electric propulsion Maintenance and inspection of equipment (oil analysis, water analysis...) Others: Outboard motors
Auxiliary equipments	Generadores térmicos. Sistemas hidráulicos y neumáticos Maquinaria de cubierta Tuberías Bombas Ventiladores y Compresores Válvulas Líneas de ejes Otros equipos auxiliares

Ship Systems	Hull services: Loading and unloading service, government service Mooring and anchoring service ballast service Drainage, flushing and fire fighting service Services of the propulsion installation: Fuel system Lubrication system Compressed air system Cooling sea water system fresh water service Engine room ventilation and exhaust system Boiler and steam feedwater system Electrical and electronic systems: Power generation system: Power plant of a ship Electronic and automatic systems (bridge equipment, introduction to sensorics, introduction to automatics) Other services: Oily water systems and incinerator Sewage treatment Greasing and lubrication Ventilation and air conditioning service (habilitation) Cooling system (Gambuza) LNG vessels; cargo containment system, BOG and Vapor control inert gas system gas washing system
Understanding of ship plans	Symbology Synoptic diagrams Plans of services in real ships
The development and overcoming of these contents, together with other matters that include the acquisition of specific competencies of the degree, guarantor or knowledge, understanding and sufficiency of the competencies collected in chart AII/2, of the STCW Agreement, related to the level of management of Primero Officer of the Merchant Marine Bridge, with no gross tonnage limitation and Merchant Marine Captain up to a maximum of 3000 GT.	Table A-II/2 of the STCW Agreement. Specification of the minimum competency standards applicable to Captains and first deck officers of ships with a gross tonnage equal to or greater than 3000 GT.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Objective test	A57 A58 A59 B31 B67 C15	9	9	18
Collaborative learning	A1 B2 B4 B33 B67	11	11	22

Guest lecture / keynote speech	A10 A9 A2 A1 A12 A15 A22 A24 A25 A27 A30 A31 A32 A57 A58 A59 A62 B2 B4 B13 B40 B42 B53 B61 C15 C16 C24 C25 C27 C34	30	30	60
Laboratory practice	A1 A10 A15 A22 A24 A25 A27 A30 A32 B2 B4 B13 B31 B35 B40 B42 B53 B61 C16 C24 C25	10	10	20
Personalized attention		30	0	30
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Objective test	Evaluation of knowledge and understanding of the basic contents of the subject, considering the abilities and skills of the student, their strategies and approaches in solving problems. The degree of evolution of the student and his ability to analyze, prosecute and solve specific problems will be valued expressly, requiring a balanced theoretical-practical training.
Collaborative learning	The most complex calculations will be solved in groups, during small group classes
Guest lecture / keynote speech	Explanation of theoretical contents for its later application to the reading of plans and laboratory practices
Laboratory practice	Workshop, special classrooms. Attendance and/or preparation of the memory/work sessions are mandatory

Personalized attention	
Methodologies	**Description**
Laboratory practice	Analysis and individual recognition of each of the main and auxiliary energy systems of a ship. Interpretation of plans. Theoretical description of the components and the principle of operation of the energy and auxiliary systems of a ship.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Laboratory practice	A1 A10 A15 A22 A24 A25 A27 A30 A32 B2 B4 B13 B31 B35 B40 B42 B53 B61 C16 C24 C25	Continuous evaluation, taking into account the attitude and participation of the student and the degree of compliance reflected in the memory/report of the work carried out. Participate in a final 10% wool grade for wool subject.	10
Objective test	A57 A58 A59 B31 B67 C15	Continuous evaluation based on objective tests throughout the course. In case of not following the continuous evaluation, an objective test will be carried out, which will consist of an exam divided into two parts. 1- Theoretical part: 50% of the final grade. 2- Practical part: 40% gives a final mark. To pass the subject, it will be necessary to pass both parts.	90

Assessment comments
The evaluation criteria included in tables A-III/1 and A-III/3 of the STCW Code, and collected in the Quality Assurance System, will be taken into account when designing and carrying out the evaluation. The students with recognition of part-time dedication and academic dispensation of attendance exemption, as established by the "RULE REGULATING THE STUDY REGIME FOR UNDERGRADUATE STUDENTS AT UDC (Arts. 2.3; 3.b; 4.3 and 7.5) (04/05/2017): You will have the right to take an objective test with the possibility of obtaining a 100% grade. On the other hand, the fraudulent performance of tests or assessment activities, once proven, will directly involve the grade of failure "0" in the subject in the corresponding call, thereby invalidating any qualification obtained in all assessment activities for the extraordinary call. The fraudulent completion of tests or assessment activities, once proven, will directly result in a "0" failing grade in the subject in the corresponding call, leaving the grade obtained in all assessment activities for the extraordinary call without effect .

Sources of information	
Basic	- José A. Orosa García y José A. Pérez Rodríguez (2008). Termodinámica Aplicada con EES. Tórculo - Ángel M. Costa Rial y José A. Orosa García (2019). Apuntes de Sistemas Energétcios y Auxiliares del Buque. UDC - José A. Orosa García, Ángel M. Costa Rial, Rebeca Bouzón Otero, Stefan Kluj (2019). Servicios del BUque. Simulador de Máquinas. Cartamar
Complementary	- Knack C. ((1990)). Diesel motor ships engines and machiney. Institute of Marine Engineers - McGeorge ((1995)). Marine auxiliary machinery. Oxford

Recommendations
Subjects that it is recommended to have taken before
Física/631211101 Debuxo/631211102 Matemáticas/631211104 Química/631211110 Phisics/631G01103 Naval Construction/631G01105
Subjects that are recommended to be taken simultaneously
Electricity and Electronics/631G01206 Ship's Theory I/631G01208 Maritime Technical English/631G01275
Subjects that continue the syllabus
Maritime Safety /631G01211 Marine and atmospheric pollution/631G01304 Tankers/631G01308 Maritime Surveys/631G01314
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.