SUBJECT TEACHING GUIDE

G2155 - Hydrodynamics

First Degree in Nautical Engineering and Maritime Transport

Academic year 2026-2027

1. IDENTIFYING DATA					
Degree	First Degree in Nautical Engineering and Maritime Transport			Type and Year	Compulsory. Year 3
Faculty	School of Maritime Engineering				
Discipline					
Course unit title and code	G2155 - Hydrodynamics				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Knowledge Field	Industrial engineering, mechanical engineering, automation engineering, industrial organization engineering and navigation engineering				
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DE LA NAVEGACION Y DE LA CONSTRUCCION NAVAL
Name of lecturer	PEDRO FREIJE LEON
E-mail	pedro.freije@unican.es
Office	
Other lecturers	

4. OBJECTIVES
In accordance with Regulation III/1 of the STCW Convention, as amended: knowledge of the basic construction and operating principles of marine engineering systems, including shafting arrangements and propeller alignment, to achieve competence in operating main and auxiliary machinery and their associated control systems.
In accordance with Section A-II/1 of the STCW Code, as amended: knowledge of the effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances, together with the effects of wind, current, squat and shallow water, to achieve competence in ship manoeuvring.
In accordance with Section A-II/1 of the STCW Code, as amended: ability to consider the ship's estimated speed, together with the effects of wind, tides and currents, in dead reckoning and route planning, to achieve competence in planning and conducting a voyage and determining the ship's position.
To further develop the student's knowledge of hydrodynamics as applied to navigation and ship manoeuvring , propulsion systems, propeller characteristics, and power–revolutions–speed curves. To provide basic and applied knowledge of ship resistance, hydrodynamic model testing, extrapolation of model-scale results to the full-scale ship, hull–propeller interaction, propeller characteristics, and the relationship between speed, power and revolutions, as a basis for safe decision-making during navigation and manoeuvring.

6. SUBJECT PROGRAM	
CONTENTS	
1	Dimensional Analysis and Similitude. Buckingham p Theorem.
2	Ship Resistance. Viscous Resistance.
3	Wave-Making Resistance and Additional Resistances
4	Model–Ship Correlation Methods.
5	Power Estimation Methods.
6	Power Measurement and Performance Efficiencies
7	Propeller Geometry
8	Propeller Theory
9	Propeller–Hull Interaction
10	Cavitation
11	Propeller Design Using Systematic Series
12	The Propeller as a Component of the Propulsion System
13	Alternative and Special Propulsion Systems

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Modular Exam – Block 1	Written exam	No	Yes	40,00
Online Test – Block 1	Activity evaluation with Virtual Media	No	No	10,00
Modular Exam – Block 2	Written exam	No	Yes	40,00
Online Test – Block 2	Activity evaluation with Virtual Media	No	No	10,00
TOTAL				100,00

Observations

The average between blocks will only be calculated if a minimum score of 4 is obtained in each modular exam.
The completion of the online test is subject to a minimum attendance of 80% of the class sessions.

Observations for part-time students

No attendance requirements for lectures or classroom practice sessions will be imposed on part-time students enrolled in this course.
All other conditions will be the same as those applicable to full-time students. They may participate in the same assessment activities under the same evaluation criteria.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

MARINE PROPELLERS AND PROPULSION, CARLTON, ELSEVIER
PRINCIPLES OF NAVAL ARCHITECTURE, LEWIS, SNAME
REGLAMENTOS DIVERSAS SSCC