

## SUBJECT TEACHING GUIDE

### G1113 - Internal Combustion Engines I

#### Degree in Maritime Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Maritime Engineering			Type and Year	Compulsory. Year 3
Faculty	School of Maritime Engineering				
Discipline	Topic Module: Specific Technology Propulsion and Ship Services				
Course unit title and code	G1113 - Internal Combustion Engines I				
Number of ECTS credits allocated	6	Term	Semester based (1)		
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	JESUS MIGUEL ORIA CHAVELI				
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Other lecturers	MARIO CASTILLA ROYUELA ALFONSO GARCIA LOPEZ				

### 3.1 LEARNING OUTCOMES

- Knowledge of the operating principles of the reciprocating internal combustion engine. Fundamentals of application in the naval field.

#### 4. OBJECTIVES

Knowledge of construction elements, design characteristics, mechanisms and operating principles of alternative internal combustion engine.

Acquire theoretical knowledge about thermodynamic cycles, thermal efficiency and energy balances of alternative internal combustion engine.

Determine criteria and procedures for start up, operation, failures detection, and other measures to avoid breakdowns in main and auxiliary energy systems based in of alternative internal combustion engine.

Operation of main and auxiliary energy systems and corresponding control systems required by section AIII /1 of enmended STCW code.

Operation management of propulsion machinery system. Planification and scheduled of operations required by section AIII/1 of enmended STCW code.

#### 6. SUBJECT PROGRAM

##### CONTENTS

1	Basic knowledge about alternative combustion diesel engines.
2	Thermodynamic theory applied to the study of alternative combustion diesel engines.
3	Power and efficiency of alternative combustion diesel engines.
4	Stoichiometry. Energy and mass balance.
5	Injection systems in diesel marine engines. Valves, pumps and combustion chambers.
6	Combustion in diesel marine engines.
7	Distillate and residual marine fuels. Classification and characteristics according to ISO 8217:2017. Installations and fuel equipment.
8	Atmospheric pollution and CO2 emissions produced by diesel engines. legal framework of IMO. Inspection and certification.
9	Intake and exhaust processes in 4-stroke engines.
10	Intake and exhaust processes in 2-stroke engines.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Continuous Assessment: Written Exam	Written exam	No	Yes	70,00
Laboratory practices and presentation of a report.	Laboratory evaluation	No	Yes	20,00
Teamwork	Work	No	No	10,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>The final grade of the continuous evaluation will be the sum of the the written examination, laboratory practice and teamwork , each with their corresponding percentages. You can not only pass the course by passing a written examination . Attendance at this course be taken into account in the final assessment and this will be done daily firms control a minimum attendance of 80% to be necessary for evaluation . Mails and inquires are preferency attended in Moodle virtual course.</p>				
<b>Observations for part-time students</b>				
<p>For those students who do not follow continuous assessment , the final exam will consist of a written test theory and problems and a practical test in the laboratory prior to the written examination and approval will be necessary to qualify for the written test.</p> <p>You will need to get forty percent of each type of assessment to do average .</p>				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
<b>BASIC</b>
Otero González, Félix M.(2014). Apuntes de motores de combustión interna alternativos. Sección de publicaciones de la ETS Náutica. Santander.
Cabronero Mesas, Daniel (2003). Motores de combustión interna y turbinas de gas. 3ª Edición. Barcelona.
Kees Kuiken (2012). Diesel engines for ship propulsion and power plants. Ed. Target Global Energy Training. The Netherlands.
Woodyard, Doug (2004). Pounder´s marine diesels engine and gas turbines. Ed. Elsevier. 8ª Edition. London.
Wright, A.A. (2000). Exhaust emissions from combustion machinery. Institute of Marine Engineers. London.
Aynós Maza, G [y otros], (2014). Manual de aplicación del Anexo VI de MARPOL. Dirección General de La Marina Mercante; Ministerio de Fomento.
Convenio internacional para prevenir la contaminación por los buques (MARPOL 73/78). Edición enmendada. Organización Marítima Internacional. 2017.
Giacosa, Dante (1998). Motores endotérmicos. Ed. Omega S.A. 14ª Edición. Barcelona
Petroleum products - Fuels (class F) - Specifications of marine fuels = Produits pétroliers - Combustibles (classe F) - Spécifications des combustibles pour la marine: ISO 8217:2017 / ISO.