

## SUBJECT TEACHING GUIDE

### G1086 - Internal Combustion Engines II

#### Degree in Marine Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Marine Engineering			Type and Year	Compulsory. Year 3
Faculty	School of Maritime Engineering				
Discipline	Topic				
Course unit title and code	G1086 - Internal Combustion Engines II				
Number of ECTS credits allocated	6	Term	Semester based (2)		
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

To provide basic knowledge about regulation and tuning of a marine engine according to the manuals.
Prepare for service an engine room layout with alternative diesel engines. Operating safe, starting and stopping the engines. Checking the main parameters of the system.
Tuning an engine. Prepare, Start and control the operation.
Conduct a safe engine watch in accordance with the requirements of section AIII/1 of the STCW code as amended.
Apply fundamentals of safe maintenance of propulsion installation and auxiliary machinery and the evaluation of performance.
Planning speed, power and fuel consumption of a 2 and 4 stroke diesel engine. Thermal balance and performance.
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	Cooling of alternative combustion diesel engine. Thermal balance and loss of heat. Refrigeration systems used in 2 T and 4T engines.
2	Lubrication of alternative combustion diesel engine. Lubrication theory and processes. Lubrication systems of 2 T and 4T engines. Oils and fats.
3	Starting of combustion diesel engine. Systems. Overall squeme of starting 2T and 4T engines. Safeties.
4	Propeller inversion. Systems according to type of ship and engine
5	Kinematics, dynamics and balance of internal combustion diesel engines.
6	Regulation of alternative diesel engine. Torque regulation. Flywhells. Speed regulators.
7	Thermal recovery of exhaust gas energy. Supercharging. Systems constituent elements. Turboblwers.
8	Atmospheric pollution produced by diesel engines. Basic knowledge of engineering pollution control.
9	Characteristics curves of diesel engine: speed, power, fuel consumption. Engine map. Diesel engine test benches.
10	Engine room layout. Types of auxiliary and main engines.
11	Procedures for start up and control in engine room. Breakdowns. Watchkeeping in sea and port.

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.
Payri F., Desantes J.M. Motores (2011). Motores de combustión interna alternativos. 5ª 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.
Cafronero Mesas, Daniel (2003). Motores de combustión interna y turbinas de gas. 3ª Edición. Barcelona.