**Course guide**  
**280726 - 280726 - Maintenence Engineering and Management**

**Unit in charge:** Barcelona School of Nautical Studies  
**Teaching unit:** 742 - CEN - Department of Nautical Sciences and Engineering.  
**Degree:** MASTER'S DEGREE IN THE MANAGEMENT AND OPERATION OF MARINE ENERGY FACILITIES (Syllabus 2016). (Compulsory subject).

**Academic year:** 2023  
**ECTS Credits:** 5.0  
**Languages:** Catalan, Spanish

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**LECTURER**

**Coordinating lecturer:** RAMON GRAU MUR  
**Others:** Primer quadrimestre: RAMON GRAU MUR - MGOIE

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**DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUITS**

**Specific:**
- CE5-MGOIEM. Capacitat per conèixer, entendre i utilitzar els principis d'inspecció i certificació d'instal·lacions marines
- CE7-MGOIEM. Capacitat per conèixer, entendre i utilitzar els principis de control avançat de processos d'operació, manteniment i reparació
- CE13MGOIEM. Coneixement i capacitat per projectar operacions de manteniment de sistemes de màquines i motors tèrmics i hidràulics i màquines elèctriques marines

**General:**
- CG1-MGOIEM. Conocimientos suficientes en materias básicas y tecnológicas, que le capaciten para el desarrollo de nuevos métodos y procedimientos
- CG2-MGOIEM. (ENG) Capacidad para resolver problemas complejos y tomar decisiones con responsabilidad sobre bases científicas y tecnológicas en el ámbito de su especialidad
- CG4-MGOIEM. (ENG) Capacidad para gestionar, optimizar y controlar los procesos de operación, reparación, rediseño, conversión, mantenimiento e inspección de las instalaciones anteriores
- CG5-MGOIEM. (ENG) Capacidad de integración de sistemas marítimos complejos y de traducción en soluciones viables
- CG6-MGOIEM. (ENG) Capacidad para desarrollar los conocimientos para el análisis e interpretación de mediciones, cálculos, valoraciones, tasaciones, peritaciones, estudios, informes y documentos técnicos en el ámbito de su especialidad
- CG10MGOIEM. Capacitat per re-disseny i modificació d'equips i instal·lacions energètiques i de seguretat marines, dins l’àmbit de la seva especialitat, és a dir, operació, manteniment i explotació
- CG11MGOIEM. Capacitat per realitzar tasques d'investigació, desenvolupament i innovació en l’àmbit de la seva especialitat
- CG9-MGOIEM. Capacitat per a la gestió de l'explotació i operació de vaixells i artefactes marítimes, la seva seguretat, prevenció de la contaminació i riscos laborals, salvament i rescats, suport logístic i manteniment
Transversal:

CT2. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.

CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

CT1. ENTREPRENEURSHIP AND INNOVATION: Knowing and understanding the organization of a company and the sciences that govern the activity; be able to understand the business rules and relationships between planning, industrial and commercial strategies, quality and profit.

Basic:

CB6. Possess knowledge and understanding that provide a basis or opportunity be original in the development and / or application of ideas, often in a research context.

CB7. That the students can apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their study area.

CB8. Students should be able to integrate knowledge and handle the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the responsibilities social and ethical linked to the application of their knowledge and judgments.

CB9. That students can communicate their conclusions and the knowledge and Latest rationale underpinning to specialists and non Speciality clearly and unambiguously.

CB10. Students must possess the learning skills that enable them continue studying in a way that will be largely self-directed or autonomous.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

Competences STCW:

4. Manage fuel, lubrication and ballast operations
4.1. Operation and maintenance of machinery, including pumps and piping systems
7. Manage safe and effective maintenance and repair procedures
7.1. Marine engineering practice
Practical knowledge
7.2. Manage safe and effective maintenance and repair procedures
7.3. Planning maintenance, including statutory and class verifications
7.4. Planning repairs
8. Detect and identify the cause of machinery malfunctions and correct faults
Practical knowledge
8.1. Detection of machinery malfunction, location of faults and action to prevent damage
8.2. Inspection and adjustment of equipment
8.3. Non-destructive examination
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>45,0</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Total learning time:** 45 h

CONTENTS

**Organization of maintenance work**

**Description:**
Organization of safe maintenance and repair procedures.  
Maintenance planning, including mandatory and class reviews.  
Planning of the repairs of the different systems and equipment of the ship.

**Specific objectives:**
Maintenance planning and its activities  
Tests, non-destructive tests, inspections and equipment adjustments

4. Manage fuel, lubrication and ballast operations  
4.1. Operation and maintenance of machinery, including pumps and piping systems  
7. Manage safe and effective maintenance and repair procedures  
7.1. Marine engineering practice  
7.2. Manage safe and effective maintenance and repair procedures  
7.3. Planning maintenance, including statutory and class verifications  
7.4. Planning repairs

**Full-or-part-time:** 26h 18m  
Theory classes: 1h 18m  
Self study : 25h
46/5000 Methods of analysis applied to maintenance

Description:

199/5000
Analysis methods.
Detection of malfunctions of the machines, location of faults and measures to prevent them.
Inspection and adjustment of equipment.
Non-destructive testing and testing.

Specific objectives:
Materials technology operation, monitoring, performance evaluation and effective maintenance of on-board systems and equipment
Detection of malfunctions, fault location and means to prevent breakdowns

8. Detect and identify the cause of machinery malfunctions and correct faults
   Practical knowledge
8.1. Detection of machinery malfunction, location of faults and action to prevent damage
8.2. Inspection and adjustment of equipment
8.3. Non-destructive examination

Full-or-part-time: 26h 12m
   Theory classes: 1h 12m
   Practical classes: 25h

Total Productive Maintenance

Description:
Generalities of the total productive maintenance.
Objectives of the total productive maintenance.
Implementation of total productive maintenance.

Specific objectives:
Productive maintenance

Full-or-part-time: 16h 30m
   Theory classes: 1h 30m
   Self study : 15h

36/5000 Computer Aided Maintenance

Description:
Development and implementation
Choice of a computer application for maintenance management.
Basic structure of a computer application for maintenance management.

Specific objectives:
Computer assisted maintenance

Full-or-part-time: 16h
   Theory classes: 15h
   Practical classes: 1h
## Maintenance Audits

**Description:**
Organizational chart of maintenance management.
Objectives of maintenance audits.
Types of maintenance audits.
Conducting maintenance audits.

**Specific objectives:**
Organization chart of maintenance management
Maintenance audits
Analysis and control of maintenance costs

**Full-or-part-time:** 21h 06m
Theory classes: 1h 06m
Self study : 20h

## Contracted Maintenance

**Description:**
General considerations.
Causes of hiring in maintenance.
Types of maintenance contracts.
Structure of maintenance contracts.

**Specific objectives:**
Maintenance contracts

7. Manage safe and effective maintenance and repair procedures
7.2. Manage safe and effective maintenance and repair procedures
7.3. Planning maintenance, including statutory and class verifications
7.4. Planning repairs

**Full-or-part-time:** 17h 24m
Theory classes: 1h 24m
Practical classes: 16h

## GRADING SYSTEM

It will be evaluated with three tests
First test 20%
60% work
Final test 20%
BIBLIOGRAPHY

Basic:

RESOURCES

Hyperlink:
- www.aem.es. Resource