Course guide
280726 - 280726 - Maintenence Engineering and Management

Last modified: 27/05/2024

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: 2024 **ECTS Credits:** 5.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: RAMON GRAU MUR

Others: Primer quadrimestre:
RAMON GRAU MUR - MGOIE

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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

Generical:
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 marítims, 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 Specialty 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. Nonâ□□destructive examination

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	36.00
Self study	80,0	64.00

Total learning time: 125 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
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

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. Nonâ□□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:
- Kobbacy, Khairy A.H.; Murthy, D.N. Prabhakar. Complex system maintenance handbook [on line]. London: Springer, 2008 [Consultation: 30/05/2022]. Available on: https://link-springer-com.recursos.biblioteca.upc.edu/book/10.1007/978-1-84800-011-7. ISBN 9781848000100.
- Hattangadi, A.A. Plant and machinery failure prevention. New York: McGraw-Hill, 2005. ISBN 0071457917.
- Rey Sacristán, Francisco. Técnicas de resolución de problemas : criterios a seguir en la producción y el mantenimiento. 2a ed. Madrid: Fundación Confemetal, 2008. ISBN 9788496743694.
- Roldán Viloria, José. Manual de mantenimiento de instalaciones. Madrid: Paraninfo, 1997, Reimpr. 2004. ISBN 8428323933.
- Smith, David J. Reliability, maintainability, and risk : practical methods for engineers [on line]. 8th ed. Waltham, MA: Elsevier Butterworth-Heinemann, 2011 [Consultation: 01/09/2022]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780080969022/reliability-maintainability-and-risk. ISBN 9780080969022.

RESOURCES

Hyperlink:
- www.plant-maintenance.com.
- www.solomantenimiento.com.
- www.aem.es. Resource