280658 - Installations and Maintenance

**Coordinating unit:** 280 - FNB - Barcelona School of Nautical Studies  
**Teaching unit:** 742 - CEN - Department of Nautical Sciences and Engineering  
**Academic year:** 2019  
**Degree:** BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)  
BACHELOR'S DEGREE IN MARINE TECHNOLOGIES (Syllabus 2010). (Teaching unit Compulsory)  
BACHELOR'S DEGREE IN MARINE TECHNOLOGIES/BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2016). (Teaching unit Compulsory)  
**ECTS credits:** 4,5  
**Teaching languages:** Catalan, Spanish

### Teaching staff

**Coordinator:** RAMON GRAU MUR  
**Others:** Primer quadrimestre:  
RAMON GRAU MUR - 1  
Segon quadrimestre:  
RAMON GRAU MUR - 1

### Opening hours

**Timetable:** Students are informed at the beginning of the semester once schedules have been set

### Degree competences to which the subject contributes

**Specific:**  
1. Knowledge and capacity to the operation, maintenance, redesign and repair of all existing systems on board a ship and ability to identify and address the different types of faults.

### Teaching methodology

Receive, understand and synthetic knowledge.  
Develop the reasoning and critical spirit and defend it in an oral and written way.

### Learning objectives of the subject

Know the fundamentals of maintaining marine systems.  
Know the principles of redesign and repair of existing systems on board.  
Know and identify the types of failures that can occur in marine systems.

Manila STCW competences A-III/1  
4. Operate main and auxiliary machinery and associated control systems  
4.1 Basic construction and operation principles of machinery systems  
4.2 Safety and emergency procedures for operation of propulsion plant machinery, including control systems  
4.3 Preparation, operation, fault detection and necessary measures to prevent damage for the following machinery items and control systems  
5. Operate fuel, lubrication, ballast and other pumping systems and associated control systems
5.1 Operational characteristics of pumps and piping systems, including control systems
5.2 Operation of pumping systems
5.3 Oily-water separators (or-similar equipment) requirements and operation
7. Maintenance and repair of electrical and electronic equipment
7.1 Safety requirements for working on shipboard electrical systems, including the safe isolation of electrical equipment required before personnel are permitted to work on such equipment
7.2 Maintenance and repair of electrical system equipment, switchboards, electric motors, generator and DC electrical systems and equipment
7.3 Detection of electric malfunction, location of faults and measures to prevent damage
7.4 Construction and operation of electrical testing and measuring equipment
7.5 Function and performance tests of the following equipment and their configuration
7.6 The interpretation of electrical and simple electronic diagrams
9. Maintenance and repair of shipboard machinery and equipment
9.1 Safety measures to be taken for repair and maintenance, including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment
9.2 Appropriate basic mechanical knowledge and skills
9.3 Maintenance and repair, such as dismantling, adjustment and reassembling of machinery and equipment
9.4 The use of appropriate specialized tools and measuring instruments
9.5 Design characteristics and selection of materials in construction of equipment
9.6 Interpretation of machinery drawings and handbooks
9.7 The interpretation of piping, hydraulic and pneumatic diagrams

**Study load**

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong> 112h 30m</td>
<td>26h</td>
<td>7h</td>
<td>6h</td>
<td>6h</td>
<td>67h 30m</td>
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<tr>
<td></td>
<td>23.11%</td>
<td>6.22%</td>
<td>5.33%</td>
<td>5.33%</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
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## Content

| Introduction to Maintenance | **Learning time**: 6h  
Theory classes: 6h |
<table>
<thead>
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</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Introduction of the foundations and conditions of maintenance. Types and models of maintenance. Relationship between the activity developed and the type of maintenance. Own actions.</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td>STCW KUPs 4.1 4.2</td>
</tr>
</tbody>
</table>
| Failures | **Learning time**: 3h  
Theory classes: 3h |
| **Description:** | Introduction to the study of failures and resolution procedures. Classification and typing of failures. Activities to eliminate faults. |
| **Specific objectives:** | STCW KUPs 4.1 4.2 4.3 5.1 5.2 |
| Reliability, maintainability and availability | **Learning time**: 9h  
Theory classes: 9h |
| **Description:** | Study and calculation of the reliability, maintainability and availability of a system and its effects on maintenance |
| **Specific objectives:** | STCW KUPs 4.3 |
| Maintenance documentation | **Learning time**: 3h  
Theory classes: 3h |
| **Description:** | Introduction to the need for documentation in maintenance. Its use and classification |
| **Specific objectives:** | STCW KUPs 7.6 9.6 9-7 |
## Qualification system

The final grade is the sum of the following partial grades:

\[ N_{\text{final}} = 0.2 \times N_{1p} + 0.2 \times N_{2p} + 0.6 \times N_{pf} \]

- **Nfinal:** final grade of the subject
- **N1p:** qualification of the first evaluation
- **N2p:** qualification of the second evaluation
- **Npf:** qualification of the final evaluation

A final reassessment test will be performed for students who meet the requirements established by the center's regulations, which will consist of a single test in which all the matter of the course will be evaluated.

## Regulations for carrying out activities

If one of the assessment activities is not carried out, it will be considered not rated.
It will be considered Not Presented when a minimum of 80% of the assessment activities is not carried out.

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### Organization and management of maintenance

**Description:**
Need, typology and control of the maintenance warehouse

**Specific objectives:**
STCW KUPs 9.5

**Learning time:** 3h
Theory classes: 3h

### Failure inspection and diagnosis techniques

**Description:**
Recognition and inspection techniques plus employees in maintenance

**Specific objectives:**
STCW KUPs 4.2 4.3 5.1 5.2 5.3 7.3

**Learning time:** 9h
Theory classes: 9h

### Ship repairs

**Description:**
Typology of the repairs carried out on board, development and control

**Specific objectives:**
STCW KUPs 7.1 7.2 7.3 7.4 7.5 7.6 9.1 9.2 9.3 9.4

**Learning time:** 6h
Theory classes: 6h

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**Universitat Politècnica de Catalunya**
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Bibliography

Basic:

