Degree competences to which the subject contributes

Specific:
2. Knowledge of the organization and project management of repair, installation, modification, redesign and maintenance of machines and systems of ships, within the scope of its special ad, ie, operation and exploitation.
4. Knowledge and capacity for implementation and management of energy audits.

Transversal:

Teaching methodology

Receive, understand and synthesize knowledge.
Document practical cases.
Develop reasoning and critical thinking and defend it orally or in writing.
Perform an individual work.
Application of knowledge through the engine room simulator.

Learning objectives of the subject

Conocer los elementos, la operación i el mantenimiento de los sistemas marinos.

Competencias STCW Manila A-III/1
1. Maintain a safe engineering watch
1.1 Thorough knowledge of Principles to be observed in keeping an engineering watch
280656 - Operation and Maintenance of Marine Engines and Systems

1.2 Safety and emergency procedures; change-over of remote/automatic to local control of all systems
1.4 Knowledge of engine-room resource management principles
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>Total learning time: 150h</th>
<th>Hours large group: 50h</th>
<th>33.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group: 4h</td>
<td>2.67%</td>
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<tr>
<td>Hours small group: 3h</td>
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<tr>
<td>Guided activities: 3h</td>
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</tr>
<tr>
<td>Self study: 90h</td>
<td>60.00%</td>
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</table>
# Content

## Generalities of the systems.

| Description: | General and introduction to systems. |
| Related activities: | Description of the facilities on board, identification and distribution of spaces and systems in a vessel |
| Specific objectives: | STCW KUPs 1.2  1.3  1.4  4.1  9.1  9.4  9.5  9.7 |
| Learning time: | 2h |
| Theory classes: | 2h |

## Operation and maintenance of pumps.

| Description: | Description of the operation of the different types of pumps and of the maintenance activities carried out on them. |
| Specific objectives: | STCW KUPs 4.3  5.1  5.2  9.2  9.3  9.6 |
| Learning time: | 2h |
| Theory classes: | 2h |

## Operation and maintenance of valves.

| Description: | Description of the operation of the different types of valves and of the maintenance activities carried out. |
| Specific objectives: | STCW KUPs 4.3  5.1  9.2  9.3  9.6 |
| Learning time: | 2h |
| Theory classes: | 2h |

## Operation and maintenance of heat exchangers.

<p>| Description: | Description of the operation of the different types of heat exchangers and of the maintenance activities carried out in them. |
| Specific objectives: | STCW KUPs 4.3  9.2  9.3  9.6 |
| Learning time: | 2h |
| Theory classes: | 2h |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time:</th>
<th>Theory classes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation and maintenance of filters and sewage treatment plants.</td>
<td>2h</td>
<td>2h</td>
</tr>
<tr>
<td>Description: Description of the operation of the filters and treatment plants and of the maintenance activities carried out in these.</td>
<td></td>
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</tr>
<tr>
<td>Specific objectives: STCW KUPs 4.3 9.2 9.3 9.6</td>
<td></td>
<td></td>
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<tr>
<td>Operation and maintenance of oleohydraulic systems and lubrication</td>
<td>6h</td>
<td>6h</td>
</tr>
<tr>
<td>Description: Oleohydraulic components, their operation and operation of oleohydraulic installations on board.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific objectives: STCW KUPs 4.3 5.1 5.2 7.1 7.2 7.3 7.4 7.5 7.6 9.2 9.3 9.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation and maintenance of pneumatic systems, start-up and ventilation</td>
<td>6h</td>
<td>6h</td>
</tr>
<tr>
<td>Description: Pneumatic components, their operation, operation and maintenance of the on-board facilities and the start-up and ventilation system.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific objectives: STCW KUPs 4.3 5.1 5.2 7.1 7.2 7.3 7.4 7.5 7.6 9.2 9.3 9.6</td>
<td></td>
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<tr>
<td>Bilge and bilge service.</td>
<td>2h</td>
<td>2h</td>
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<tr>
<td>Description: Concept, functions, components and operative.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific objectives: STCW KUPs 4.3 5.1 5.2 5.3 9.2 9.3 9.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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**Saltwater and freshwater services**

*Learning time:* 4h  
Theory classes: 4h

**Description:**  
Concept, functions, components and operative of the services of fire, wash, ballast, refrigeration and potable.

**Specific objectives:**  
STCW KUPs 4.3  5.1  5.2  9.2  9.3  9.6

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**Fuel service.**

*Learning time:* 2h  
Theory classes: 2h

**Description:**  
Fuel service.

**Specific objectives:**  
STCW KUPs 4.3  5.1  5.2  9.2  9.3  9.6

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**Operation by simulator**

*Learning time:* 30h  
Laboratory classes: 30h

**Description:**  
Operation by simulator

**Specific objectives:**  
STCW KUPs 1.1  1.4  4.1  4.2  4.3  5.1  5.2  5.3  7.1  7.6  9.6  9.7

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**Qualification system**

The final grade is the sum of the following partial grades:  
\[ N_{\text{final}} = 0.6 N_t + 0.4 N_s \]

- **N_{\text{final}}:** Final qualification  
- **N_t:** Qualification of the theory part  
- **N_s:** evaluation rating simulator

To take into account the theory note, a minimum grade of 3.0 must be obtained in the control of the theoretical part. A final re-evaluation test will be carried out for students who meet the requirements established by the center's regulations, which will consist of a single test in which the entire subject of the course will be evaluated.

**Regulations for carrying out activities**

If any of the evaluation activities is not carried out, it will be considered as not punctuated. A student who doesn't complete any of the assessment activities will receive the qualification of absent.
Bibliography

Basic:


Complementary:


