Degree competences to which the subject contributes

Specific:
2. Process and technology related to mechanical assemblies and metrotecnia in their applications to ships.

Transversal:
1. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

Teaching methodology

Attendance at the internship is mandatory. The subject can not be approved if the practices are not approved. The attendance to the theoretical classes will be taken into account at the time of the final evaluation.

Learning objectives of the subject

Know the processes of obtaining metals, metallurgy and steel.
Know the processes of manufacturing and mechanical technology and its application on board.
Know the main techniques of joining metals by welding and its application.
Know and apply the principles of metrotechnics.
Be able to work as a member of a team, whether as a member or performing management functions with the aim of contributing to develop projects with pragmatism and sense of responsibility, assuming commitments considering the available resources.

This course will evaluate the following STCW A-III/1 competences:
8. Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repairs on board
8.1 Characteristics and limitations of materials used in construction and repair of ships and equipment
8.2 Characteristics and limitations of processes used for fabrication and repair
8.3 Properties and parameters considered in the fabrication and repair of systems and components
8.4 Methods for carrying out safe emergency/temporary repairs
8.5 Safety measures to be taken to ensure a safe working environment and for using hand tools, machine tools and measuring instruments
8.6 Use of hand tools, machine tools and measuring instruments
8.7 Use of various types of sealants and packings
# Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>20h</td>
<td>13.33%</td>
</tr>
<tr>
<td></td>
<td>Hours small group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>10h</td>
<td>6.67%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time:</th>
<th>Description</th>
<th>Related activities</th>
<th>Specific objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metals in the mechanical industry</strong></td>
<td>2h</td>
<td>This topic presents an introduction to the history of the use of materials throughout history, ferrous and non-ferrous alloys, ceramic materials, plastic materials, protective materials and lubricants, all from the point of view of the mechanical technology.</td>
<td>Throughout the practices the tools that are being used, their use and their care are shown.</td>
<td>STCW KUPs 8.1 i 8.3</td>
</tr>
<tr>
<td><strong>Basic tools</strong></td>
<td>2h</td>
<td>The most used manual tools in mechanical technology works are treated.</td>
<td><strong>Related activities:</strong> Throughout the practices the tools that are being used, their use and their care are shown.</td>
<td>STCW KUPs 8.4 8.5 8.6</td>
</tr>
<tr>
<td><strong>Metrology</strong></td>
<td>5h</td>
<td>Study of the concepts of metrology, measurement errors and units, the elements of measurement, the adjustments and tolerances.</td>
<td><strong>Related activities:</strong> There is a practice dedicated solely to the use of the micrometer and the calipers, in addition to other practices are used squares, rules, marbles, calibrated blocks and combs of thread to go using various means of measurement.</td>
<td>STCW KUPs 8.6</td>
</tr>
</tbody>
</table>
### Casting and molding

**Description:**
The metals and alloys conformable by casting are studied, the stages of the foundry, the types of molding, the procedures of fusion, filling of molds, demolding and finishing and the processes involved in the project of pieces obtained by casting.

**Specific objectives:**
STCW KUPs 8.2 8.3

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

### Plastic deformation processes

**Description:**
Cold and hot work, inlay, pressing, forging, extrusion, drawing and rolling.

**Specific objectives:**
STCW KUPs 8.2 8.3 8.5

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

### Machining processes

**Description:**
Machine tools, drilling, sawing, filing, turning, milling and grinding.

**Related activities:**
In the practices, the topics of drilling, sawing, turning and milling are worked on.

**Specific objectives:**
STCW KUPs 8.2 8.3 8.5

**Learning time:** 16h
- Theory classes: 4h
- Laboratory classes: 12h

### Heat treatments

**Description:**
Thermomechanical, thermal, thermophysical and superficial treatments.

**Specific objectives:**
STCW KUP 8.3

**Learning time:** 2h
- Theory classes: 2h
280642 - Mechanics Technology

**Union systems**

<table>
<thead>
<tr>
<th>Learning time: 18h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 4h</td>
</tr>
<tr>
<td>Laboratory classes: 14h</td>
</tr>
</tbody>
</table>

**Description:**
Temporary and permanent bonding systems

**Related activities:**
In the practices, different welding types and techniques are carried out

**Specific objectives:**
W KUPs 8.4 8.7

---

**Qualification system**

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

\[ N_{\text{final}} = 0.15 \times N_{\text{pc}} + 0.35 \times N_{\text{sc}} + 0.5 \times N_{\text{pt}} \]

- \( N_{\text{final}} \): Final note of the subject
- \( N_{\text{pc}} \): Note of the first control
- \( N_{\text{sc}} \): Note of the second control
- \( N_{\text{pt}} \): Note of Workshop practices

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 course subject will be evaluated.

**Bibliography**

**Basic:**