Degree competences to which the subject contributes

Specific:

1. Knowledge, use and application of the ship from the principles of the theory of the ship.

2. Knowledge of the fundamental concepts of fluid mechanics and its application to the hulls of ships and artifacts, and machines, equipment and naval systems.

Teaching methodology

- Receive, understand and synthesize knowledge.
- Solve problems.
- Develop the reasoning and critical Thinking.
- Incorporate the gender perspective.

Learning objectives of the subject

Reach a good understanding of the principles of buoyancy and stability of the vessel. The student begins to calculate weight movements, stability and vessel drafts.

On the other hand, one of the objectives of this subject is provide the knowledge, understanding and proficiency of the competency "Maintain seaworthiness of the ship"(A-III/1-11), competency required and defined in Section A-III/1 of the Seafarers' Training, Certification and Watchkeeping (STCW) International Code.

This course is included in the first UPC Gender and Teaching Project whose main aim is to incorporate the gender perspective in different degree courses.
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### Study load

| Total learning time: 150h | Hours large group: 30h 20.00% | Hours medium group: 15h 10.00% | Hours small group: 0h 0.00% | Guided activities: 15h 10.00% | Self study: 90h 60.00% |
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## Content

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
<th>Learning time</th>
<th>Theory classes:</th>
<th>Practical classes:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Approximate methods to calculate buoyancy and stability.</td>
<td>Calculation of areas, moments, centers of gravity, inertia and volumes. Method of trapezoids and the Simpson's first rule.</td>
<td>26h</td>
<td></td>
<td>6h</td>
<td>10h</td>
<td>10h</td>
</tr>
</tbody>
</table>

*Learning time:*

- Theory classes: 6h
- Self study: 10h
- Practical classes: 6h
- Guided activities: 10h
- Self study: 10h
## Chapter 5. Centre of Gravity

**Learning time:** 14h
- Theory classes: 2h
- Practical classes: 2h
- Self study: 10h

**Description:**
Weight movements. Using moments to find the center of gravity. TPC.

## Chapter 6. Center of Buoyancy

**Learning time:** 14h
- Theory classes: 2h
- Practical classes: 2h
- Self study: 10h

**Description:**
Isocarenas and isoclines, definition. Properties of the center of buoyancy. Properties of the submerged volume curve.

## Chapter 7. Initial stability

**Learning time:** 18h
- Theory classes: 6h
- Practical classes: 2h
- Self study: 10h

**Description:**
The final score is the sum of the following partial grades:

\[ N_{\text{final}} = N_{\text{pf}} \cdot 0.4 + N_{\text{pp}} \cdot 0.4 + 0.2 N_{\text{ac}} \]

- **Nfinal**: final score
- **Npf**: final exam
- **Npp**: partial exam
- **Nac**: continuous assessment

Partial and final exam consists of some issues associated with the learning objectives of the course so that respects the knowledge and understanding concepts, and a set of application exercises. The continuous assessment consists of different activities cumulative and formative character, both individual and group, made during the course.

Criteria for evaluating STCW A-III/1-11: The stability conditions comply with the IMO intact stability criteria under all conditions of loading. Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice.

The act of re-evaluation will be done through a final exam where all the course material will be assessed.

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**Chapter 8. Stability at large angles of inclination**

<table>
<thead>
<tr>
<th><strong>Learning time:</strong> 22h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td>Practical classes: 6h</td>
</tr>
<tr>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**
- Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment. (This knowledge is necessary in accordance with Table A-III/1-11.1 of STCW Code).
- Understanding of the fundamentals of watertight integrity. (This knowledge is necessary in accordance with Table A-III/1-11.2 of STCW Code).
- Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy. (This knowledge is necessary in accordance with Table A-III/1-11.3 of STCW Code).

**Chapter 9. Dynamical stability**

<table>
<thead>
<tr>
<th><strong>Learning time:</strong> 13h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 1h</td>
</tr>
<tr>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**
- Definition and calculation. Stability criteria.

**Qualification system**
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**Regulations for carrying out activities**

You can't pass the course if all work activities and continuous assessment are carried out and submitted. The exams average must be as minimum 4, to compute the final mark of the subject. (Systems And MUENO group)

If the student does not carried out partial and/or final exam, he or she will be considered as: Not Presented

In any case, the student can use any kind of predesigned form in controls or tests.

**Bibliography**

**Basic:**


**Complementary:**


