Course guide
280615 - 280615 - Ship Theory

Unit in charge: Barcelona School of Nautical Studies
Teaching unit: 742 - CEN - Department of Nautical Sciences and Engineering.

Degree: BACHELOR’S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Compulsory subject).

Academic year: 2022  ECTS Credits: 6.0   Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: MARDEL·LA CASTELLS SANABRA
 Others: Segon quadrimestre: MARCEL·LA CASTELLS SANABRA - Grup: GNTM

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.

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-II/1-13), and part of the competency “Monitor the loading, stowage, securing, care during the voyage and the unloading of cargoes”(A-II/1-10), competencies required and defined in Section A-II/1 (Mandatory minimum requirements for certification of officers in charge of a navigational watch on ships of 500 gross tonnage or more) 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.

STUDY LOAD

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

CONTENTS

Chapter 1. Definitions

Description:

Understanding of the fundamentals of watertight integrity (this knowledge is necessary in accordance with Table A-II/1-13.1.3 of STCW Code)

Full-or-part-time: 16h
Theory classes: 6h
Self study: 10h

Chapter 2. Approximate methods to calculate buoyancy and stability.

Description:
Calculation of areas, moments, centers of gravity, inertia and volumes. Method of trapezoids and the Simpson's first rule.

Full-or-part-time: 26h
Practical classes: 6h
Guided activities: 10h
Self study: 10h

Chapter 3. Tonnage and maximum load lines.

Description:

Full-or-part-time: 13h
Theory classes: 2h
Practical classes: 1h
Self study: 10h

Chapter 4. Drafts

Description:

Full-or-part-time: 14h
Theory classes: 2h
Practical classes: 2h
Self study: 10h
### Chapter 5. Centre of Gravity

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

**Full-or-part-time:** 14h  
Theory classes: 2h  
Practical classes: 2h  
Self study: 10h

### Chapter 6. Center of Buoyancy

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

**Full-or-part-time:** 14h  
Theory classes: 2h  
Practical classes: 2h  
Self study: 10h

### Chapter 7. Initial stability

**Description:**

**Full-or-part-time:** 18h  
Theory classes: 6h  
Practical classes: 2h  
Self study: 10h

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

**Description:**
ATWOOD formula. KN Curves. Free surfaces. Stability curves. Analyzing a statical stability curve. Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment. (This knowledge is necessary in accordance with Table A-II/1-13.1 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-II/1-13.2 of STCW Code).

Knowledge of the effect of cargo, including heavy lifts, on the seaworthiness and stability of the ship. (This knowledge is necessary in accordance with Table A-II/1-10.1 of STCW Code).

**Full-or-part-time:** 22h  
Theory classes: 6h  
Practical classes: 6h  
Self study: 10h
Chapter 9. Dynamical stability

Description:
Definition and calculation. Stability criteria.

Full-or-part-time: 13h
Theory classes: 1h
Practical classes: 2h
Self study : 10h

GRADING SYSTEM

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

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

\( N_{\text{final}} \): final score
\( N_{\text{pf}} \): final exam
\( N_{\text{pp}} \): partial exam
\( N_{\text{ac}} \): 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-II/1.13 and STCW A-II/1.10 competences: 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.

EXAMINATION RULES.

You can't pass the course if all work activities and continuous assessment are carried out and submitted.

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: