280710 - Propulsion and Auxiliary Systems

Degree competences to which the subject contributes

Specific:
CE9MENTM. Operating and managing auxiliary machinery that is responsible for graduates in sailing.

CE10MENTM. Apply basic knowledge of marine engines, marine propulsion and estimates of income and consumption.

General:
CG2MENTM. Apply general knowledge of the structure and behavior in the Sea ship.

Teaching methodology

MD1. Lectures
MD3. Cooperative learning
MD4. Self study by solving exercises
MD5. Learning based in problems / projects

Learning objectives of the subject

Acquire a basic knowledge of engines and auxiliary ship systems as well as ship resistance calculation and ship power and ship fuel consumption.

On the other hand, one of the objectives of this subject is provide the knowledge, understanding and proficiency of the competency "Operate remote controls of propulsion plant and engineering systems and services", competency required and defined in Section A-II/2-11 (Mandatory minimum requirements for certification of masters and chief mates on ships of 500 gross tonnage or more) of the Seafarers' Training, Certification and Watchkeeping (STCW) International Code.

This competence will be partially evaluated thought the simulator in accordance of STCW Code.
## Study load

<table>
<thead>
<tr>
<th>Total learning time: 45h</th>
<th>Hours large group:</th>
<th>45h</th>
<th>100.00%</th>
</tr>
</thead>
</table>
### Content

<table>
<thead>
<tr>
<th>Chapter 1. Ship Resistance</th>
<th>Learning time: 33h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Guided activities: 12h</td>
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<tr>
<td></td>
<td>Self study: 21h</td>
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</tbody>
</table>

**Description:**
The resistance of ships can be predicted by several methods. This chapter will explain different kinds of resistances and their influence on the final resistance of the ship.

<table>
<thead>
<tr>
<th>Chapter 2. Types of power in ships</th>
<th>Learning time: 17h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
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<tr>
<td></td>
<td>Guided activities: 3h</td>
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<tr>
<td></td>
<td>Self study: 11h</td>
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</tbody>
</table>

**Description:**
When a ship generates a certain power within the Engine Room, this power will be transmitted along the propeller shaft and eventually to the tips of the propeller blades. This chapter shows the powers between the Engine Room and the propeller tips (Effective power, thrust power, delivered power, shaft power, brake power and Indicated power) and will analyse losses of power enroute.

<table>
<thead>
<tr>
<th>Chapter 3. Fuel consumption</th>
<th>Learning time: 8h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Guided activities: 3h</td>
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<tr>
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<td>Self study: 5h</td>
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</tbody>
</table>

**Description:**
This chapter will calculate the types of fuel consumption (hour, mile and CV-hour) and the concepts of endurance and economical speed.

<table>
<thead>
<tr>
<th>Chapter 4. Type of marine engines</th>
<th>Learning time: 17h</th>
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<tbody>
<tr>
<td></td>
<td>Guided activities: 6h</td>
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<tr>
<td></td>
<td>Self study: 11h</td>
</tr>
</tbody>
</table>

**Description:**
This chapter will describe the operating principles of marine power plants (this knowledge is necessary in accordance with STCW Code A-II/2-11.1) and the general knowledge of marine engineering terms (in accordance with STCW Code A-II/2-11.3)
The final score is the sum of the following partial grades:

\[ N_{\text{final}} = 0.25N_{\text{pf}} + 0.25N_{\text{pp}} + 0.50N_{\text{ec}} \]

- \( N_{\text{pf}} \): final score
- \( N_{\text{pp}} \): partial exam
- \( N_{\text{ec}} \): score of the continuous assessment

Examination and assessment of evidence of competence A-II/2-11 will be obtained from approved engine room simulator training.

Criteria of evaluate competence A-II/2-11: Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times.

Qualification system

Chapter 5. Ship's auxiliary machinery

**Description:**
Ships' auxiliary systems knowledge will be described in this chapter (this knowledge is necessary in accordance with STCW Code A-II/2-11.2).

**Learning time:** 25h
- Guided activities: 9h
- Self study: 16h

Chapter 6. Ship weather routing design and optimization

**Description:**
This chapter is oriented to provide skills for ship routing design and optimization (using SIMROUTE® software) to assess the impact of the meteo-oceanographic variables (such as wind, waves or currents) on ship navigation and to highlight the relevance of ship routing in terms of sailing time, fuel consumption and harmful emissions for the environment.

**Learning time:** 25h
- Guided activities: 9h
- Self study: 16h

**Regulations for carrying out activities**
- You can't pass the course if all test, work activities and continuous assessment are carried out and submitted.
- In any case, the student can use any kind of predesigned form in controls or tests.
- If the student does not carried out partial and/or final exam, he or she will be considered as: Not Presented.
- If student pass the partial exam, topics passed shall be approved and will not enter at the final exam.
Bibliography

Basic:


Complementary: