Degree competences to which the subject contributes

Specific:
1. Knowledge of navigation techniques based on the determination of the position, heading, time, speed and distance. Ability to perform calculations: navigation co-ster kinematics of the ship, reckoning, plane sailing, navigation, great circle, celestial navigation, electronic navigation and inertial navigation. Lift charts.

CE4MENTM. Develop a travel plan, including the ship's track and the management and correction of charts and publications.

CE19.GEN. Ability to carry out the installation, repair and optimize elements of navigation and marine safety.

Teaching methodology

MD1. Lectures
MD2. Participative lectures
MD3. Self-study by solving exercises
MD5. Learning based in problems / projects

Learning objectives of the subject

Knowledge and use of the navigation techniques based on the determination of the position, the course, the time, the speed and distance. Be able of carrying out calculations for loxodromic and rhumb line, navigation. Knowledge the installations, repair and optimization principles of the maritime navigation elements.

Knowledge, understanding and proficiency to determine and allow for errors of the magnetic and gyro-compasses.

Knowledge of the principles of magnetic and gyro-compasses
An understanding of systems under the control of the master gyro and a knowledge of the operation and care of the main types of gyro-compass

Competencies
The specific competency CE 18 together to the ones of the chart A-II/1 of the STCW convention: "Plan and conduct a passage and determine position" in its section Compass - magnetic and gyro and steering control system and the ones in chart A-II/2 "Determine and allow for compass errors".
### Study load

<table>
<thead>
<tr>
<th></th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total learning time: 112h 30m</td>
<td>21h</td>
<td>18.67%</td>
</tr>
<tr>
<td>Hours medium group:</td>
<td>20h</td>
<td>17.78%</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>4h</td>
<td>3.56%</td>
</tr>
<tr>
<td>Self study:</td>
<td>67h 30m</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
# 280626 - Routes & Compasses

## Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Learning time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic 1. Orthodromic route</strong></td>
<td>Description and mathematical development of orthodromic route. Know its advantages and disadvantages of the orthodromic navigation on the loxodromic. Course calculation and orthodromic distance. Study of the constants of the orthodromic route and its calculation. Particular cases of orthodromic routes. Equation of the orthodromic and its calculation.</td>
<td><strong>Learning time:</strong> 13h 20m</td>
</tr>
<tr>
<td><strong>Topic 2. Composite great circle route</strong></td>
<td>Topic 2. Composite great circle route. Discussion. Orthodromic route points. Drawn orthodromic routes on the mercator charts and in the gnomonic charts also.</td>
<td><strong>Learning time:</strong> 0h 16m</td>
</tr>
<tr>
<td><strong>Topic 3. Route Planning</strong></td>
<td>Route Planning. Voyage plan, Marine charts, sailing directions, pilot books, books of headlights and radios, etc. Best routes. Combination of routes.</td>
<td><strong>Learning time:</strong> 0h 06m</td>
</tr>
<tr>
<td><strong>Topic 4. Compasses</strong></td>
<td>Introduction to magnetism. Calculation of the deflection equation.</td>
<td><strong>Learning time:</strong> 0h 10m</td>
</tr>
</tbody>
</table>
During the course a first partial examination of the subject of Routes will be carried out and if it is overcome, it is considered that the knowledge of this part of the syllabus is consolidated.

In the second exam or final exam, you will have two parts corresponding to the part of Routes and Compass. Students who have passed the partial examination of Routes, will be exempt from this part of the final exam agenda.

**Qualification system**

During the course a first partial examination of the subject of Routes will be carried out and if it is overcome, it is considered that the knowledge of this part of the syllabus is consolidated.

In the second exam or final exam, you will have two parts corresponding to the part of Routes and Compass. Students who have passed the partial examination of Routes, will be exempt from this part of the final exam agenda.

**Regulations for carrying out activities**

The student will not be presented as not present in the Routes and / or Compass tests. In the performance of the tests, the students will only be able to have pens, pencil and calculator.
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**Bibliography**

**Basic:**


**Others resources:**

**Audiovisual material**

- Nom recurs
  - Magnetic compass, Gyroscope