# 280626 - Routes & Compasses

**Coordinating unit:** 280 - FNB - Barcelona School of Nautical Studies  
**Teaching unit:** 742 - CEN - Department of Nautical Sciences and Engineering  
**Academic year:** 2019  
**Degree:** BACHELOR'S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Teaching unit Compulsory)  
**ECTS credits:** 4,5  
**Teaching languages:** Catalan, Spanish

### Teaching staff

**Others:** Segon quadrimestre:  
JOSÉ FRANCISCO GONZÁLEZ LA FLOR - 1

### Opening hours

**Timetable:** To be determined according to schedules

### Prior skills

All the acquired capacities in previous courses, especially Mathematics, Physics and Coastal Navigation

### Requirements

Coastal Navigation (280610)

### 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".

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total learning time:</td>
<td>112h 30m</td>
<td>21h</td>
<td>17.78%</td>
<td>0h</td>
<td>67h 30m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20h</td>
<td>18.67%</td>
<td>0h</td>
<td>18.67%</td>
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<tr>
<td></td>
<td></td>
<td>0h</td>
<td>0.00%</td>
<td>4h</td>
<td>3.56%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>67h 30m</td>
<td>60.00%</td>
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</tbody>
</table>
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## 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>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>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>0h 06m</td>
</tr>
<tr>
<td><strong>Topic 4. Compasses</strong></td>
<td>Introduction to magnetism. Calculation of the deflection equation.</td>
<td>0h 10m</td>
</tr>
</tbody>
</table>
Topic 5. Preliminary compensation and rectification.

Learning time: 0h 27m
- Theory classes: 0h 08m
- Practical classes: 0h 04m
- Guided activities: 0h 04m
- Self study: 0h 11m

Description:
Preliminary compensation and rectification. Components of the coefficients B and C. Elements used in compensation.


Learning time: 0h 16m
- Theory classes: 0h 10m
- Self study: 0h 06m

Description:
Fundamental principles of the gyroscope. Effects of the gyroscope in any geographical position. Different types of compensators in the gyroscope. Movement diversions. 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

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