Course guide
280626 - 280626 - Routes & Compasses

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: 2023  ECTS Credits: 4.5  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: ANTONI MORRAL OYAMBURU

Others: ANTONI MORRAL OYAMBURU
ÁFRICA UYÀ JUNCADELLA

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 gyrocompass. Knowledge of the principles of magnetic and gyrocompass

An understanding of systems under the control of the master gyro and a knowledge of the operation and care of the main types of gyrocompass

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>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>20,0</td>
<td>17.78</td>
</tr>
<tr>
<td>Guided activities</td>
<td>4,0</td>
<td>3.56</td>
</tr>
<tr>
<td>Hours large group</td>
<td>21,0</td>
<td>18.67</td>
</tr>
<tr>
<td>Self study</td>
<td>67,5</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 112.5 h

CONTENTS

**Topic 1. Orthodromic route**

**Description:**
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.

**Full-or-part-time:** 13h 20m
Theory classes: 4h
Practical classes: 4h
Self study: 5h 20m

**Topic 2. Composite great circle route**

**Description:**
Topic 2. Composite great circle route. Discussion. Orthodromic route points. Drawn orthodromic routes on the mercator charts and in the gnomonic charts also.

**Full-or-part-time:** 0h 16m
Theory classes: 0h 04m
Practical classes: 0h 04m
Self study: 0h 08m
**Topic 3. Route Planning.**

**Description:**
Route Planning. Voyage plan, Marine charts, sailing directions, pilot books, books of headlights and radios, etc. Best routes. Combination of routes.

**Full-or-part-time:** 0h 06m  
Theory classes: 0h 02m  
Practical classes: 0h 01m  
Self study: 0h 03m

**Topic 4. Compasses**

**Description:**
1. Different types of compasses  
2. Magnetic compass, gyroscope mechanical and optical,  
3. Introduccion of magnetisme. Electronic deflection equation.

**Full-or-part-time:** 0h 10m  
Theory classes: 0h 04m  
Practical classes: 0h 02m  
Self study: 0h 04m

**Topic 5. Preliminary compensation and rectification.**

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

**Full-or-part-time:** 0h 27m  
Theory classes: 0h 08m  
Practical classes: 0h 04m  
Guided activities: 0h 04m  
Self study: 0h 11m

**Tema 6. Gyrocompass.**

**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 gyrocompass

**Full-or-part-time:** 0h 16m  
Theory classes: 0h 10m  
Self study: 0h 06m

**GRADING 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.
EXAMINATION RULES.

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.

BIBLIOGRAPHY

Basic:
- Moreu Curbera, José María; Martínez Jiménez, Enrique. Astronomía y navegación. Vol. 3. 3a ed.. Vigo: [s.n.], 1972.

Complementary:

RESOURCES

Audiovisual material:
- Nom recurs. Magnetic compass, Gyroscope