280715 - Advanced Ship's Manoeuvring

**Degree competences to which the subject contributes**

**Specific:**
CE9-MNGTM. Conocimiento del comportamiento del buque en la mar y de su maniobrabilidad.

**Generical:**
CG4-MNGTM. Capacitat per gestionar, planificar i coordinar la seguretat del vaixell i la protecció de les persones a bord
CG16-MNGTM. (ENG) Capacidad para ejercer el practicaje portuario y el remolque marítimo
CG21-MNGTM. (ENG) Capacidad para realizar tareas de investigación, desarrollo e innovación en el ámbito de su especialidad

**Transversal:**
CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.
CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

**Teaching methodology**

MD2. Participating expositive class
MD4. Autonomous learning by resolution of exercises
MD5. Learning based on problems/projects

**Learning objectives of the subject**

Ensure that the student has the necessary knowledge/skills to understand the operation and handling of the different propulsion and steering equipments.

Ensure that the student has the necessary knowledge/skills to plan a berthing, unberthing and anchoring maneuver, taking into account: the equipment and maneuverability of the ship; the effect of wind and current; the effect of shallow waters, narrow channels and interaction between ships, and shipyard entrance.
Ensure that the student has a global vision of the maneuver with all its phases.
Ensure that the student is able to perform the proper maneuver in case of emergency, as well as a search and rescue maneuver.

On the other hand, one of the objectives of this subject is provide the knowledge, understanding and proficiency of the competence MANEUVER AND HANDLE A SHIP IN ALL CONDITIONS (complete competence: Table A-II/2-10):

10.1. Manoeuvring and handling a ship in all conditions, including:
.1 manoeuvres when approaching pilot, stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances
.2 handling ship in rivers, estuaries and having regard to the effects of current, wind and restricted water on helm response
.3 application of constant rate of turn techniques
.4 manoeuvring in shallow water, including the reduction in underkeel clearance caused by squat, rolling and pitching
.5 interaction between passing ships and between own ship and nearby banks (canal effect)
.6 berthing and unberthing under various conditions of wind, tide and current with and without tugs
.7 ship and tug interaction
.8 use of propulsion and manoeuvring systems
.9 choice of anchorage; anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
.10 dragging anchor; clearing fouled anchors
.11 drydocking, both with and without damage
.12 management and handling of ships in heavy weather, including assisting a ship or aircraft in distress; towing operations; means of keeping an unmanageable ship out of trough of the sea, lessening drift and use of oil
.13 precautions in manoeuvring to launch rescue boats or survival craft in bad weather
.14 methods of taking on board survivors from rescue boats and survival craft
.15 ability to determine the manoeuvring and propulsion characteristics of common types of ships, with special reference to stopping distances and turning circles at various draughts and speeds
.16 importance of navigating at reduced speed to avoid damage caused by own ship’s bow wave and stern wave
.17 practical measures to be taken when navigating in or near ice or in conditions of ice accumulation on board
.18 use of, and manoeuvring in and near, traffic separation schemes and in vessel traffic service (VTS) areas

<table>
<thead>
<tr>
<th>Study load</th>
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<tbody>
<tr>
<td><strong>Total learning time:</strong> 45h</td>
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<tr>
<td>Hours large group:</td>
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<td>45h</td>
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## Theme 1: Revision of principles of maneuver

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 33h 20m</th>
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<tbody>
<tr>
<td>Revision of principles of maneuver: turning circle, stopping tracks, pivot point, effects of the rudder and propeller. Effect of the wind and current, and effect/handling of two propellers and two rudders.</td>
<td>Self study: 33h 20m</td>
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### Specific objectives:
Knowledge, understanding and proficiency of part of the competence MANEUVER AND HANDLE A SHIP IN ALL CONDITIONS (Table A-II/2-10):

1.1 manoeuvres when approaching pilot, stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances
1.2 handling ship in rivers, estuaries and having regard to the effects of current, wind and restricted water on helm response
1.3 application of constant rate of turn techniques
1.6 berthing and unberthing under various conditions of wind, tide and current with and without tugs
1.8 use of propulsion and manoeuvring systems
1.9 choice of anchorage; anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
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### Theme 2: Main maneuvers in conventional vessels

**Description:**
Main maneuvers for berthing and unberthing in conventional ships (practices in simulator).
Main maneuvers for anchoring, picking up and ship to ship in conventional ships, in different circumstances, and berthing to a buoy.

**Related activities:**
Exercises

**Specific objectives:**
Knowledge, understanding and proficiency of part of the competence MANEUVER AND HANDLE A SHIP IN ALL CONDITIONS (Table A-II/2-10):
10.1. Maneuuvring and handling a ship in all conditions, including:
.1 manoeuvres when approaching pilot, stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances
.2 handling ship in rivers, estuaries and having regard to the effects of current, wind and restricted water on helm response
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.8 use of propulsion and manoeuvring systems
.9 choice of anchorage; anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used

### Theme 3: Interactions

**Description:**
Effect of shallow water and narrow channels (squat, bank) and interaction between ships.

**Specific objectives:**
Knowledge, understanding and proficiency of part of the competence MANEUVER AND HANDLE A SHIP IN ALL CONDITIONS (Table A-II/2-10):
10.1. Maneuuvring and handling a ship in all conditions, including:
.2 handling ship in rivers, estuaries and having regard to the effects of current, wind and restricted water on helm response
.4 manoeuvring in shallow water, including the reduction in underkeel clearance caused by squat, rolling and pitching
.5 interaction between passing ships and between own ship and nearby banks (canal effect)
### Theme 4: Ships equipped with: two propellers, two rudders, azimuthal thrusters or waterjets

**Description:**
Azimuthal thruster: mecanical (L-drive, Z-drive) and electrical (pods) transmission, and their handling. Waterjet propulsion and other kind of propulsors.

Maneuvers with ships equipped with two propellers, two rudders, azimuthal thrusters and waterjets in simulator.

**Related activities:**
Exercises

**Specific objectives:**
Knowledge, understanding and proficiency of part of the competence MANEUVER AND HANDLE A SHIP IN ALL CONDITIONS (Table A-II/2-10):
10.1. Manoeuvring and handling a ship in all conditions, including:
- .1 manoeuvres when approaching pilot, stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances
- .2 handling ship in rivers, estuaries and having regard to the effects of current, wind and restricted water on helm response
- .3 application of constant rate of turn techniques
- .6 berthing and unberthing under various conditions of wind, tide and current with and without tugs
- .8 use of propulsion and manoeuvring systems

### Theme 5: Planning a maneuver with its phases

**Description:**
Planning a manoeuver, its phases, communication with traffic service and Pilots, and tug assistance.

**Specific objectives:**
Knowledge, understanding and proficiency of part of the competence MANEUVER AND HANDLE A SHIP IN ALL CONDITIONS (Table A-II/2-10):
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- .1 manoeuvres when approaching pilot, stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances
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- .17 practical measures to be taken when navigating in or near ice or in conditions of ice accumulation on board
- .18 use of, and manoeuvring in and near, traffic separation schemes and in vessel traffic service (VTS) areas
Theme 6: Emergencies

Learning time: 16h 40m
Self study: 16h 40m

Description:
Keep proper course in fire; keep a heading in a blackout if it is possible; response in failure of any element (engine, rudder, rope, anchor).
Search and rescue: tracks for searching, MOB manouvers and rescue boat handling.

Specific objectives:
Knowledge, understanding and proficiency of part of the competence MANEUVER AND HANDLE A SHIP IN ALL CONDITIONS (Table A-II/2-10):
10.1. Manoeuvring and handling a ship in all conditions, including:
.12 management and handling of ships in heavy weather, including assisting a ship or aircraft in distress; towing operations; means of keeping an unmanageable ship out of trough of the sea, lessening drift and use of oil
.13 precautions in manoeuvring to launch rescue boats or survival craft in bad weather
.14 methods of taking on board survivors from rescue boats and survival craft
.16 importance of navigating at reduced speed to avoid damage caused by own ship’s bow wave and stern wave

Qualification system

The final qualification is the sum of the following partial qualifications:
Qfinal = 0.52*Qfe + 0.48*Qce
Qfinal: Final qualification
Qfe: Qualification of the final exam
Qce: Qualification of the exercices (continuous evaluation)
Bibliography

Basic:


Complementary:


