280715 - Advanced Ship's Manoeuvring

Degree competences to which the subject contributes

Specific:
CE8MENTM. Develop plans and manage maneuver (docking / undocking, anchoring, navigation channels and narrow steps, entrance to dock, etc.) in all ship types.

General:
CG3MENTM. Manage and exercise control the direction of the ship.

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.

Teaching methodology

MD1. Expositive method / Magistral lecture
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, and the effect of shallow waters, narrow channels and interaction between ships.
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.
Ensure that the student understands the principles of dynamic position.

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
280715 - Advanced Ship’s Manoeuvring

.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

**Study load**

| Total learning time: 45h | Hours large group: | 45h | 100.00% |
280715 - Advanced Ship's Manoeuvring

Content

<table>
<thead>
<tr>
<th>Theme 1: Revision of principles of maneuver</th>
<th>Learning time: 16h 40m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study : 16h 40m</td>
</tr>
</tbody>
</table>

Description:
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.

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
.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 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:**
Maneuvers in simulator

**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
- .4 manouevring 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 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. Manoeuvring 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 manouevring 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, azimutal thrusters or waterjets**  
**Learning time:** 38h 53m  
Laboratory classes: 8h  
Self study: 30h 53m

**Description:**  
Azimutal thruster: mecanical (L-drive, Z-drive) and electrical (pods) transmission, and their handling. Waterjet propulsion and other kind of propulsors.  
Maneuvers with ships equiped with two propellers, two rudders, azimutal thrusters and waterjets in simulator.

**Related activities:**  
Maneuvres in simulator

**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**  
**Learning time:** 8h 20m  
Self study: 8h 20m

**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):  
10.1. Manoeuvring and handling a ship in all conditions, including:  
.7 ship and tug interaction  
.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  
.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  
.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
The final qualification is the sum of the following partial qualifications:

\[ Q_{\text{final}} = 0.52 \times Q_{\text{fe}} + 0.48 \times Q_{\text{ce}} \]

- **Qfinal**: Final qualification
- **Qfe**: Qualification of the final exam
- **Qce**: Qualification of the exercises and practices (continuous evaluation)

### Theme 6: Emergencies

**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 manoeuvres 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

### Theme 7: Dynamic position

**Description:**
Dynamic position: description; reference systems; redundant systems; requirements; kinds of ships; propulsors and maneuver systems; operational procedures; blackout prevention; analysis and incidents.

**Learning time:** 16h 40m

**Self study:** 16h 40m
Bibliography

Basic:


Complementary:


