



## Course guides

# 280715 - 280715 - Advanced Ship's Manoeuvring

**Last modified:** 24/03/2020

**Unit in charge:** Barcelona School of Nautical Studies  
**Teaching unit:** 742 - CEN - Department of Nautical Sciences and Engineering.

**Degree:** MASTER'S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT MANAGEMENT (Syllabus 2016).  
(Compulsory subject).

**Academic year:** 2020    **ECTS Credits:** 5.0    **Languages:** English, Spanish

### LECTURER

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**Coordinating lecturer:** Moncunill Marimon, Jorge

**Others:**

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**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

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MD2. Participating expositive class

MD4. Autonomous learning by resolution of exercises

MD5. Learning based on problems/projects

## LEARNING OBJECTIVES OF THE SUBJECT

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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 anchorage¼ anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
- .10 dragging anchor¼ 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 distress¼ towing operations¼ 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

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Type	Hours	Percentage
Hours large group	45,0	100.00

**Total learning time:** 45 h



## CONTENTS

### Theme 1: Revision of principles of maneuver

**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 anchorage¼ anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used

**Full-or-part-time:** 33h 20m

Self study : 33h 20m

### Theme 2: Main maneuvers in conventional vessels

**Description:**

Main manoeuvres for berthing and unberthing in conventional ships (practices in simulator).

Main manoeuvres for anchoring, picking up and ship to ship in conventional ships, in different circumstances, and berthing to a buoy.

**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 anchorage¼ anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used

**Related activities:**

Exercises

**Full-or-part-time:** 19h 27m

Laboratory classes: 4h

Self study : 15h 27m



### 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 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)

**Full-or-part-time:** 8h 20m

Self study : 8h 20m

### Theme 4: Ships equipped with: two propellers, two rudders, azimuthal thrusters or waterjets

**Description:**

Azimuthal thruster: mechanical (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.

**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

**Related activities:**

Exercises

**Full-or-part-time:** 38h 53m

Laboratory classes: 8h

Self study : 30h 53m



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

**Description:**

Planning a manoeuvre, 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:

- .1 manoeuvres when approaching pilot, stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances
- .7 ship and tug interaction
- .9 choice of anchorage and 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 and 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

**Full-or-part-time:** 8h 20m

Self study : 8h 20m

### 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 and towing operations and 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

**Full-or-part-time:** 16h 40m

Self study : 16h 40m

## GRADING SYSTEM

The final qualification is the sum of the following partial qualifications:

$$Q_{\text{final}} = 0,52 \cdot Q_{\text{fe}} + 0,48 \cdot Q_{\text{ce}}$$

Q<sub>final</sub>: Final qualification

Q<sub>fe</sub>: Qualification of the final exam

Q<sub>ce</sub>: Qualification of the exercises (continuous evaluation)

## BIBLIOGRAPHY

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### Basic:

- Ship simulator and bridge teamwork : Imo model course 1.22. rev. ed. London: International Maritime Organization, 2002. ISBN 9280141627.
- Marí Sagarra, Ricard. Maniobra de los buques [on line]. Tercera edición. Barcelona: Edicions UPC, junio de 1999 [Consultation: 17/12/2019]. Available on: <http://hdl.handle.net/2117/103443>. ISBN 8483013266.
- Master and chief mate : IMO Model Course 7.01. London: International Maritime Organization, 1999. ISBN 9280161032.

### Complementary:

- Clark, I. C; Vervloesem, Walter. Mooring and anchoring ships. London: Nautical Institute, 2009. ISBN 9781870077934.
- Admiralty manual of seamanship : BR 67 : a practical guide to the essential seamanship and sea survival skills from the world's leading practitioner. London: The Nautical Institute, 2009. ISBN 9781906915018.
- Gaston, M.J. The tug book. 2nd ed. Somerset: Haynes, 2009. ISBN 9781844255276.
- Ritchie, Gary. Offshore support vessels : a practical guide. London: The Nautical Institute, 2008. ISBN 9781870077880.
- Rowe, R. W. The shiphandler's guide for masters and navigating officers, pilots and tug masters. London: The Nautical Institute, cop. 1996. ISBN 9781870077354.
- Swift, A. J. Bridge team management : a practical guide. 2nd ed. London: Nautical Institute, 2004. ISBN 1870077660.
- Mooring equipment guidelines. 3th ed. London: Witherby, 2008. ISBN 9781905331321.