

Course guide

280714 - 280714 - Navigation Safety Management and Planning

Last modified: 19/06/2025

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: 2025 **ECTS Credits:** 5.0 **Languages:** Spanish, English

LECTURER

Coordinating lecturer: ÀFRICA UYÀ JUNCADELLA

Primer quadrimestre:
ÀFRICA UYÀ JUNCADELLA - Grup: ERAS, Grup: MNGTM

Others: Primer quadrimestre:
ÀFRICA UYÀ JUNCADELLA - Grup: ERAS, Grup: MNGTM

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CE4-MNGTM. Gestió i control de seguretat, la Navegació i el Tràfic Marítim.

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

CE11-MNGTM. Conocimiento de oceanografía para el análisis del comportamiento de los buques, que deben ser tenidos en cuenta en la seguridad marítima y la lucha contra la contaminación.

Generical:

CG1-MNGTM. Capacitat per a gestionar, dirigir i coordinar l'anàlisi de les situacions, càlcul de variables i paràmetres específics de la navegació, la maniobra i del transport marítim.

CG4-MNGTM. Capacitat per gestionar, planificar i coordinar la seguretat del vaixell i la protecció de les persones a bord

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.

CT2. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.

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.

CT1. ENTREPRENEURSHIP AND INNOVATION: Knowing and understanding the organization of a company and the sciences that govern the activity; be able to understand the business rules and relationships between planning, industrial and commercial strategies, quality and profit.

Basic:

CB6. Possess knowledge and understanding that provide a basis or opportunity be original in the development and / or application of ideas, often in a research context.

CB8. Students should be able to integrate knowledge and handle the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the responsibilities social and ethical linked to the application of their knowledge and judgments.

CB9. That students can communicate their conclusions and the knowledge and Latest rationale underpinning to specialists and non Specialty clearly and unambiguously.

CB10. Students must possess the learning skills that enable them continue studying in a way that will be largely self-directed or autonomous.

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

Further than the concrete knowledge/skills (use of the equipments, correction of charts, etc.), ensure that the student has a global view about how to carry out a voyage plan and the watchkeeping.

On the other hand, one of the objectives of this subject is provide the knowledge, understanding and proficiency of the competences PLAN A VOYAGE AND CONDUCT NAVIGATION (complete competence: Table A-II/2-1), MAINTAIN THE SAFETY OF NAVIGATION THROUGH THE USE OF ECDIS AND ASSOCIATED NAVIGATION SYSTEMS TO ASSIST COMMAND DECISION MAKING (complete competence: Table A-II/2-7), DETERMINE POSITION AND THE ACCURACY OF RESULTANT POSITION FIX BY ANY MEANS (complete competence: Table A-II/2-2), FORECAST WEATHER AND OCEANOGRAPHIC CONDITIONS (part of the competence: table A-II/2-8), competences required and defined in Section A-II/2 (Mandatory minimum requirements for certification of masters and chief mates on ships of 500 GT or more) of the Seafarers' Training, Certification and Watchkeeping (STCW) International Code.

This competence will be evaluated through the simulator NAVIGATION/MANOEUVERING, in accordance of STCW Code.

STUDY LOAD

Type	Hours	Percentage
Self study	80,0	64.00
Hours large group	45,0	36.00

Total learning time: 125 h

CONTENTS

LESSON 1: ORGANIZATION OF THE CHARTROOM

Description:

Organization of: charts, publications controlled on board (sailing directions, lists of lights, lists of radiosignals, tide tables) and publications not controlled on board (conventions, ISM and ISPS manuals, other manuals of the company, and other publications). Content and use of the notices to mariners for updating nautical charts and publications controlled on board. Inventories and corrections of nautical charts and publications controlled on board. How to fill the Log Book y and the Navigation Diary, in relation to the voyage record data (noon position, run distances and times, facts).

Specific objectives:

Ensure that the student has the necessary knowledge/skills to elaborate a voyage plan.
Competence of the STCW Code, Table A-II/2-1.2, 1.3: PLAN A VOYAGE AND CONDUCT NAVIGATION; Table A-II/2-2.1.1, 2.1.2: DETERMINE POSITION AND THE ACCURACY OF RESULTANT POSITION FIX BY ANY MEANS; Table A-II/2-8.3: FORECAST WEATHER AND OCEANOGRAPHIC CONDITIONS.

Related activities:

Plotting and selecting of routes on paper or electronic charts

Related competencies :

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.

Full-or-part-time: 27h 47m

Laboratory classes: 4h

Self study : 23h 47m

LESSON 2: TYPES OF ROUTES

Description:

Overview of types of routes: rhumb line, great circle, mix between rhumb line and great circle, other variants of optimization of distances, and notions about the optimum track ship's routing (OTSR).
Manual calculation and by Excel of: distances, courses and longitudes/latitudes of change of chart for the track drawing on charts. Weather routing, based mainly on information from the pilot charts, Ocean passages for the world, tides tables, tidal currents atlas and general information from sailing directions. (Necessary knowledge/skills in accordance with STCW Code: Forecast weather and oceanographic conditions: Use all appropriate nautical publications on tides and currents)

Specific objectives:

Ensure that the student has the necessary knowledge/skills to elaborate a voyage plan.
Competences of the STCW Code, Table A-II/2-1.1, 1.2: PLAN A VOYAGE AND CONDUCT NAVIGATION; Table A-II/2-8.3: FORECAST WEATHER AND OCEANOGRAPHIC CONDITIONS.

Related activities:

Drawing and selection of routes on paper charts

Related competencies :

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.

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

Self study : 33h 20m

LESSON 3: PASSAGE PLANNING

Description:

Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks, taking into account, e.g.:

- restricted waters
- meteorological conditions
- ice
- restricted visibility
- traffic separation schemes
- vessel traffic service (VTS) areas
- areas of extensive tidal effects
- high risk areas

Routeing in accordance with the General Provisions on Ships? Routeing.

Reporting in accordance with the General principles for Ship Reporting Systems and with VTS procedures.

(The above knowledge/skills are necessary in accordance with STCW Code: Plan a voyage and conduct navigation)

Track drawing on charts, taking into account the above points, and the themes 1 and 2, moreover of:

- Selection of the charts in the catalogue, according to their scale (this knowledge is necessary in accordance with STCW Code: Determine position and the accuracy of resultant position fix by any means: Position determination in all conditions: (?) including the ability to use appropriate charts, notices to mariners and other publications (??))
- notes from previous voyages.
- monitoring of a route by GPS.

Elaboration of the voyage plan: list of WP, courses, run distances, distances to destination, and other interesting information.

Specific objectives:

Ensure that the student has a global view about how to carry out a voyage plan, and therefore, his capacity to manage and command of a ship.

Competences of the STCW Code, Table A-II/2-1.1, 1.2: PLAN A VOYAGE AND CONDUCT NAVIGATION; Table A-II/2-2.1.2: DETERMINE POSITION AND THE ACCURACY OF RESULTANT POSITION FIX BY ANY MEANS; Table A-II/2-8.2, 8.3: FORECAST WEATHER AND OCEANOGRAPHIC CONDITIONS.

Related activities:

Drawing and selection of routes on paper charts

Related competencies :

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.

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

Laboratory classes: 2h

Self study : 36h 53m

LESSON 4: ROUTE MONITORING WITH ECDIS

Description:

Management of operational procedures, system files and data, including:

- manage procurement, licensing and updating of chart data and system software to conform to established procedures
- system and information updating, including the ability to update ECDIS system version in accordance with vendor's product development
- create and maintain system configuration and backup files
- create and maintain log files in accordance with established procedures
- create and maintain route plan files in accordance with established procedures
- use ECDIS log-book and track history functions for inspection of system functions, alarm settings and user responses
- Operate radar/ARPA and AIS to maintain navigation safety
- Practice ECDIS playback mode to review the voyage plan and system functions

(The above knowledge/skills are necessary in accordance with STCW Code: Maintain the safety of navigation through the use of ECDIS and associated navigation systems to assist command decision making)

Specific objectives:

Competence of the STCW Code, Table A-II/2-7.1, 7.2: MAINTAIN THE SAFETY OF NAVIGATION THROUGH THE USE OF ECDIS AND ASSOCIATED NAVIGATION SYSTEMS TO ASSIST COMMAND DECISION MAKING: 7.1, 7.2; Table A-II/2-2.1.3: DETERMINE POSITION AND THE ACCURACY OF RESULTANT POSITION FIX BY ANY MEANS.

Application to ECDIS of the knowledge developed in the previous themes.

Related activities:

Planning and monitoring of routes by ECDIS

Related competencies :

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.

Full-or-part-time: 25h

Laboratory classes: 6h

Self study : 19h

GRADING SYSTEM

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

$$Q_{\text{final}} = 0,40 \cdot Q_{\text{fe}} + 0,60 \cdot Q_{\text{ce}}$$

Q_{final} : Final qualification

Q_{fe} : Qualification of the final exam

Q_{ce} : Qualification of the exercises, practices and works (continuous evaluation)

BIBLIOGRAPHY

Basic:

- IMO. Ships' routing. London: International Maritime Organization, 2019. ISBN 9789280100495.
- Organització Internacional Marítima. Asamblea. Resoluciones y otras decisiones : (resoluciones 874-901) : asamblea, vigésimo primer periodo de sesiones 15-26 noviembre 1999 [on line]. Londres: Organización Maritima Internacional, 2000 Available on: <https://digitallibrary.un.org/record/455816?ln=en>. ISBN 9280135375.
- Master and chief mate : IMO model course, 7.01. London: International Maritime Organization, 2014. ISBN 9789280115819.
- The Operational use of electronic chart display and information systems (ECDIS) : IMO Model Course, 1.27. London: International Maritime Organization, 2012. ISBN 9789280115550.
- Ship simulator and bridge teamwork : IMO model course, 1.22. London: International Maritime Organization, 2002. ISBN 9280141627.
- Victor, Alain. Parallel index techniques in restricted waters : incl. radar errors and limitations : use of ARPA and chart overlays. Second edition. Scotland, UK: Witherby Publishing Group, 2020. ISBN 9781856099165.
- ECDIS : guidance for good practice. MSC.1/Circ.1503/Rev.2. 28 November 2022 [on line]. London: International Maritime Organization, 2022 [Consultation: 04/07/2024]. Available on: <https://wwwcdn.imo.org/localresources/en/OurWork/Safety/Documents/IMO%20Documents%20related%20to/MS.C.1-Circ.1503-Rev.2.pdf>.
- Gran Bretanya. Royal Navy. The Admiralty manual of navigation. Vol. 1, The Principles of navigation. 11th edition. London: The Nautical Institute, 2018-2019. ISBN 9781906915643.

Complementary:

- International Maritime Organization. Resolution MSC.232(82): adoption of the THE REVISED PERFORMANCE STANDARDS FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEMS (ECDIS) [on line]. 12/2006. London: International Maritime Organization, 2006 [Consultation: 26/10/2015]. Available on: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/282385/min445.pdf.
- Operating anomalies identified within ECDIS. MSC.1/Circ.1391. 7 December 2010 [on line]. London: International maritime organization, 2010 [Consultation: 04/07/2024]. Available on: https://legacy.iho.int/mtg_docs/industry/ECDIS_workshop_12/MS.C.1-Circ.1391.pdf.
- Hetch, Horst [et al]. The Electronic chart, fundamentals, functions, data and other essentials : a textbook for ECDIS use and training. 3rd rev. ed. Lemmer: Geomares Publishing, 2011. ISBN 9789080620582.
- International Chamber of Shipping. Bridge procedures guide. 6th ed. London: Marisec, 2022. ISBN 9781913997076.
- Moreu Curbera, José María; Martínez Jiménez, Enrique. Astronomía y navegación. Vol. 1 i Vol. 2. 3a ed. Vigo: [s.n.], DL 1987-. ISBN 8485645014.
- Moréu Curbera, José María ; Martínez Jiménez, Enrique. Astronomia y navegación. Vol. 3. 3a ed. Vigo: [s.n.], 1972.
- UK Hydrographic Office. The Mariner's handbook. 12th ed. Somerset: UK Hydrographic office, 2020. ISBN 9780707746142.

RESOURCES

Other resources:

Catalogue of British Admiralty Charts and Publications (NP 131)

- URL: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991004047719706711 />

British Admiralty Navigational Charts

British Admiralty Notices to Mariners

- URL: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991004047689706711 />

Symbols and Abbriations used on Admiralty Paper Charts (NP 5011)

- URL: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991004047699706711 />

British Sailing Directions (ASD - Pilots)

British Admiralty List of Lights and Fog Signals (ALL)

- URL: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991004047659706711 />

British Admiralty List of Radio Signals (ALRS)

- URL: https://discovery.upc.edu/permalink/34CSUC_UPC/11q3oqt/alma991005130371506711 />

British Admiralty Tide Tables (ATT)

- URL: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991004047649706711 />

Ocean Passages for the World (NP 136)

- URL: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991001465299706711