UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Course guide
280649 - 280649 - Marine Pollution Prevention and Sustainability

Last modified: 09/05/2023

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

Degree: BACHELOR'S DEGREE IN MARINE TECHNOLOGIES (Syllabus 2010). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: SANTIAGO ORDAS JIMENEZ

Others: Primer quadrimestre:
SANTIAGO ORDAS JIMENEZ - DT, ERAS, GTM

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE10. Knowledge of environmental technologies and sustainability in the marine environment.

Transversal:
SCS N1. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world¿s situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.
CT6. GENDER PERSPECTIVE: An awareness and understanding of sexual and gender inequalities in society in relation to the field of the degree, and the incorporation of different needs and preferences due to sex and gender when designing solutions and solving problems.

STCW:
ME.1. A-III/1-4. Function: Controlling the operation of the ship and care for persons on board at the operational level
ME.2. A-III/1-4.1 Ensure compliance with pollutionprevention requirements
ME.3. A-III/1-KUP 4.1.1 Prevention of pollution of the marine environament: Knowledge of the precautions to be taken to prevent pollution of the marine environment
ME.4. A-III/1-KUP 4.1.2 Prevention of pollution of the marine environament: Anti-pollution Procedures and all associated equipment
ME.5. A-III/11-KUP 4.1.3 Prevention of pollution of the marine environament: Importance of proactive measures to protect the marine environment
ME.6. A-III/1-4.6 Monitor compliance with legislative requirements
ME.7. A-III/1-KUP 4.6.1 Basic working knowledge of the relevant IMO conventions concernint safety of life at sea, security and protection of the marine environment
ETO.1. A-III/6-CCS 2.5.3 Practical knowledge: Detection of machinery malfunction, location of faults and action to prevent damage
ETO.2. A-III/6-3. Function: Controlling the operation of the ship and care for persons on board at operational level
ETO.3. A-III/6-3.1 Ensure compliance with pollution prevention requirements
ETO.4. A-III/6-CCS 3.1.1 Prevention of pollution of the marine environment: Knowledge of the precautions to be taken to prevent pollution of the marine environment
ETO.5. A-III/6-CCS 3.1.2 Prevention of pollution of the marine environament: Antipollution procedures and all associated equipment

TEACHING METHODOLOGY

· Receive, understand and synthesize knowledge.
· Set up and solve problems.
· Develop critical thinking and reasoning and defend it orally or in writing, and defend it and share it in the classroom with respect. Being able to transform one's own thinking in new directions from the incorporation of the experiences of colleagues.
· Perform work and activities individually or in groups.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course the student can demonstrate that:

· Learn about environmental technologies applicable to the ship.
· Meet sustainability principles applicable to the ship.
· Has extensive knowledge of marine environmental legislation.
· Master all aspects of the prevention of marine pollution.
· Apply sustainability criteria and ethical codes of the profession in the solution design and technology solutions.
· Identifies the need for legislation, regulations and standards.
· Know, understand and respect, from the field of the degree itself, gender, social, cultural and economic diversity.

On the other hand, one of the objectives of this subject is provide the knowledge, understanding and proficiency of the competencies:

Ensure compliance with the requirements for pollution prevention:
Prevention of pollution of the marine environment.
Knowledge of precautions will be taken to avoid pollution of the marine environment.
Procedures and antipollution equipment.

Monitoring compliance with legal requirements:
Basic working knowledge of the relevant IMO conventions concerning safety of life at sea and protection of the marine environment, identifying and critically analyzing possible gender, social, cultural and economic inequalities that may arise from these agreements.

Competences required and defined in Section A-III/1 Mandatory minimum requirements for certification of officers in charge of an engineering watch in a manned engine-room or designated duty engineer in a periodically unmanned engine-room (propulsion power of 750 kW or more) of the Seafarers Training, Certification and Watchkeeping (STCW) International Code

STUDY LOAD

Type	Hours	Percentage
Guided activities	15,0	10.00
Self study	90,0	60.00
Hours large group	30,0	20.00
Hours medium group	15,0	10.00

Total learning time: 150 h

CONTENTS

1. Legal aspects of marine pollution

Description:
MARPOL 73/78. Prevention of pollution by oil. Prevention of pollution by noxius liquid substances. Prevention of pollution by harmful substances in packaged form. Prevention of pollution by sewage from ships. Prevention of pollution by garbage from ships. Prevention of air pollution from ships. Prevention of pollution by ballast waters.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

15.1 Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment

Full-or-part-time: 11h
Theory classes: 3h
Laboratory classes: 1h
Guided activities: 1h
Self study : 6h

2. Pollution from land-locked activity and navigation

Description:
Type of pollutants. Ways of entry. Impact of marine pollution.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 9h
Theory classes: 2h
Laboratory classes: 1h
Guided activities: 1h
Self study : 5h

3. Prevention of pollution by oil

Description:
Permitted discharges. Certificates. Sludge and slop tanks. Oil Record Book. Bilge Separator.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 17h
Theory classes: 3h
Laboratory classes: 2h
Guided activities: 2h
Self study : 10h

4. Prevention of pollution by noxius liquid substances

Description:
Classification of chemichal substances. Permitted discharges. Certificates. HNS Record Book. IMDG Code.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 13h
Theory classes: 3h
Laboratory classes: 1h
Guided activities: 1h
Self study : 8h

5. Prevention of pollution by sewage from ships.

Description:
Black and grey waters. Permitted discharges. Seawage plants and treatments.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 12h
Theory classes: 2h
Laboratory classes: 1h
Guided activities: 1h
Self study : 8h

6. Prevention of pollution by garbage

Description:
Permitted discharges. Garbage Management on board. Garbage Management Plan.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 12h
Theory classes: 2h
Laboratory classes: 1h
Guided activities: 1h
Self study : 8h

7. Prevention of air pollution from ships

Description:
Typology of pollutants. Certificates. Permitted Emissions

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 15h
Theory classes: 3h
Laboratory classes: 2h
Guided activities: 2h
Self study : 8h

8. Prevention of pollution by ballast waters

Description:
Environment impact of ballast waters. Ballast water management. Treatment technologies.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 9h
Theory classes: 1h
Laboratory classes: 1h
Guided activities: 1h
Self study : 6h

9. Port reception facilities

Description:
Legal aspects in the UE. Spanish regulations. Facilities.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 7h
Theory classes: 1h
Laboratory classes: 1h
Guided activities: 1h
Self study : 4h

10. Spill response

Description:
Fate of oil spills. Response techniques. Environmental Effects. Economic Effects.

Specific objectives:
This knowledge is necessary in accordance with STCW Code A-III/1 and it's developed according to OFFICER IN CHARGE OF AN ENGINEERING WATCH (Model course 7.04) (2014 Edition)

10.1 Prevention of pollution of the marine environment
10.2 Knowledge of the precautions to be taken to prevent pollution of the marine environment
10.3 Anti-pollution procedures and all associated equipment
10.4 Importance of proactive measures to protect the marine environment

Full-or-part-time: 13h
Theory classes: 3h
Laboratory classes: 1h
Guided activities: 1h
Self study : 8h

11. Environment Management Systems

Description:
ISO 14000. The European Eco-Management and Audit Scheme (EMAS). Verification and Certification. Environment Management Systems.

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 1h
Guided activities: 1h
Self study : 6h

12. Environment Technologies and Sustainability

Description:
Concept of sustainable development. Measuring sustainability. Cooperation and social commitment. Natural energy resources and sustainability. Renewable energy.

Full-or-part-time: 23h
Theory classes: 5h
Laboratory classes: 2h
Guided activities: 2h
Self study : 14h

ACTIVITIES

Design, development and drafting of the equality plan for a company in the maritime sector (shipping company, port, shipyard, etc.)

Description:
One of the continuous assessment activities with a percentage of 5% of the final grade will consist of the design, drafting and development of an equality plan in a company in the field of the degree.

Specific objectives:
Know, understand and respect, from the field of the degree itself, gender, social, cultural and economic diversity.

Related competencies :
CT6. GENDER PERSPECTIVE: An awareness and understanding of sexual and gender inequalities in society in relation to the field of the degree, and the incorporation of different needs and preferences due to sex and gender when designing solutions and solving problems.

Full-or-part-time: 5h
Guided activities: 4h
Self study: 1h

GRADING SYSTEM

The final score is the sum of the following partial grades:
Npf Nfinal = 0.5 Npf + 0.3 Nact + 0.2 Naca

Nfinal: final grade.
Npf: final test score.
Nact: continuous assessment work.
Naca: continuous assessment activities rating.

The assesment will be done in accordance with the provisions of the STCW Convention and Code.

The final test consists of a part with issues related to the learning objectives of the course in terms of knowledge or understanding concepts, and a set of application exercises. Continuous assessment consists of different activities, both individual and group, summative and formative, made ??during the course (in the classroom and outside of it).

The reassessment of the course will consist of a final exam that will include all the contents of the subject.

EXAMINATION RULES.

· If not any of the ongoing evaluation activities performed, shall be deemed not scored.
· Be deemed not submitted the student / a not present at the final test or have not submitted at least 50% of the work and activities.

BIBLIOGRAPHY

Basic:
- Anwar, Nadeem; Churcher, Linda. Ballast water management. 14th edition. Scotland, UK: Witherbys, 2023. ISBN 9781914993640.
- International Chamber of Shipping. Reducing greenhouse gas emissions : a guide to IMO regulatory compliance. London: Marisec Publications, [2022]. ISBN 9781913997311.
- Piniella, Francisco. La seguridad del transporte marítimo : retos del siglo XXI. Cadiz: Universidad de Cádiz. Servicio de Publicaciones, 2009. ISBN 9788498282511.
- Kuhre, W. Lee. ISO 14001 certification : environmental management systems : a practical guide for preparing effective environmental management systems . Upper Saddle River, NJ: Prentice Hall, 1995. ISBN 0131994077.
- Miller, G. T. Introducción a la ciencia ambiental: desarrollo sostenible de la tierra. Madrid: International Thomson, cop, 2002. ISBN 8497320530.
- Torres, A. L.; Capdevila, I. Medi ambient i tecnologia: guia ambiental de la UPC [on line]. Barcelona: Edicions UPC, 1998 [Consultation: 12/07/2021]. Available on: http://hdl.handle.net/2099.3/36198. ISBN 8483012782.
- Masters, Gilbert M.; Ela, Wendell P. Introducción a la ingeniería medioambiental [on line]. 3a ed. Madrid: Pearson, Prentice Hall, 2008 [Consultation: 01/09/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=3884. ISBN 9788483224441.
- Xercavins, J. [et al.]. Desarrollo sostenible [on line]. Barcelona: Edicions UPC, 2005 [Consultation: 12/07/2021]. Available on: http://hdl.handle.net/2099.3/36752. ISBN 9788498800715.

Complementary:
- Guidelines for the control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens. Londres: Organización Marítima Internacional, 1998. ISBN 9280114549.
- Manual sobre contaminación química, vol. 1. Londres: Organización Marítima Internacional, 1997-2000. ISBN 9280135295.
- Organització Internacional Marítima. Directrices para la implantación del Anexo V del Marpol. 3a ed. Londres: Organización Marítima Internacional, 2012. ISBN 9789280130942.
- Ayres, Robert U. ; Ayres, Leslie W.; Frankl, Paolo. Industrial ecology: towards closing the materials cycle. Cheltenham (UK): Edward Elgar, 1996. ISBN 1858983975.
- Sadgrove, K.. La Ecología aplicada a la empresa. Madrid: Deusto, 1993. ISBN 8423412164.
- Abecassis, David William. Oil pollution from ships : : International, United Kingdom and United States law and practice. 2th ed. London: Steven & Sons, 1985. ISBN 042047000X.
- Organització Internacional Marítima. Manual on oil pollution : section IV, combating oil spils. Londres: Organización Marítima Internacional, 2005. ISBN 9280141775.
- Organització Internacional Marítima. Manual on oil pollution : Section II: Contingency Planning. eth ed.. Londres: Organización Marítima Internacional, 1995. ISBN 9789280113303.
- Handbook of industrial ecology, A. Northampton, MA: Edwards Elgar, 2001. ISBN 1840645067.
- Análisis del ciclo de vida : aspectos metodológicos y casos prácticos. Valencia: Universidad Politécnica de Valencia, 2005. ISBN 8497058526.
- Organització Internacional Marítima. Manual on oil pollution : section VI: IMO guidelines for sampling and identification of oil spills. London: International Maritime Organization, 1998. ISBN 9789280114515.
- Manual sobre la contaminación ocasionada por hidrocarburos. Parte IV: Lucha contra los derrames de hidrocarburos. 2a ed. Londres: Organización Marítima Internacional, 2005. ISBN 9280100823.
- International Maritime Organization. Electro-technical officer. IMO model course 7.08. London: IMO, 2014. ISBN 97892801158022.

RESOURCES

Other resources:
https://vp.imo.org/Login.aspx />

Access to the IMO VEGA database, where you can consult all the updated IMO regulations.

To access, you have to ask for the access codes at the library of the Barcelona School of Nautical Studies.