# 280628 - Transport of Dangerous, Hazardous and Harmful Goods

**Coordinating unit:** 280 - FNB - Barcelona School of Nautical Studies  
**Teaching unit:** 742 - CEN - Department of Nautical Sciences and Engineering  
**Academic year:** 2020  
**Degree:** BACHELOR'S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Teaching unit Compulsory)  
**ECTS credits:** 4,5  
**Teaching languages:** Spanish

## Teaching staff

**Coordinator:** Vallellano García, Jose Manuel  
**Others:** Vallellano García, Jose Manuel

## Prior skills

Having Passed the course 280618 "STOWAGE"

## Degree competences to which the subject contributes

### Specific:

4. Knowledge of maintenance equipment load measurement and control systems of the atmospheres of cargo space and equipment of tankers for transportation of liquefied petroleum natural gas oil, transportation of crude oil derivatives and chemicals.

3. Knowledge of the organization and management capacity for repair projects, installation, modification and maintenance of loading equipment, storage and security systems and means of loading and auxiliary vessel.


### Transversal:

1. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and sustainability.

## Learning objectives of the subject

The student should know how to operate the loading and discharging systems of the special cargoes ships.

**Competencies**  
The especifics CE.24, 25, 26 i 27  
Additionally the ones of chart A-II/1 in the STCW convention: "Monitor de loading, stowage, securing, care during the
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voyage and the unloading of cargoes" partially and the chart A-II/2 of the STCW convention: "Carriage of dangerous goods" partially and of chart A-V/1 parts 1,2,3,4,5,6,7. Also of chart B-V/1 parts 13,14,15.

### Study load

<table>
<thead>
<tr>
<th><strong>Total learning time:</strong> 112h 30m</th>
<th>Hours large group:</th>
<th>15h</th>
<th>13.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>15h</td>
<td>13.33%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>6h</td>
<td>5.33%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>9h</td>
<td>8.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>67h 30m</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th><strong>Chapter 1: Basic training for oil and chemical tanker cargo operations</strong></th>
<th><strong>Learning time:</strong> 22h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td><strong>Theory classes:</strong> 9h 30m</td>
</tr>
<tr>
<td>Provide training to students to be duly qualified under sections A-V/1-1 and B-V/1 of the STCW Code with specific duties and responsibilities related to cargo or cargo equipment on oil or chemical tankers.</td>
<td><strong>Practical classes:</strong> 3h</td>
</tr>
<tr>
<td>- Introduction (Development of tankers, types, piping system, cargo pumps, Types of cargoes, Tanker terminology, Rules and regulations)</td>
<td><strong>Self study:</strong> 9h 30m</td>
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<tr>
<td>- Toxicity and Other Hazards</td>
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<td>- Hazard control</td>
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<td>- Safety Equipment and Protection of personnel</td>
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<td>- Pollution Prevention</td>
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<tr>
<td>- Cargo equipment</td>
<td></td>
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<tr>
<td>- Cargo operations</td>
<td></td>
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<tr>
<td><strong>Related activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Resolution of a real maritime accident</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>* Familiarization with the equipment, instrumentation and controls used for cargo handling on a tanker</td>
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<tr>
<td>* Greater awareness of the need of proper planning, the use of checklists and the time scales involved in the various cargo handling Operations</td>
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<tr>
<td>* Enhanced awareness to apply proper and safe procedures at all times when carrying out the various Operations on board and oil or chemical tanker</td>
<td></td>
</tr>
<tr>
<td>* Acquisition of experience in identify operational problems and assist in solving them</td>
<td></td>
</tr>
<tr>
<td>* Improvement in the ability to promote safety and protect the marine environment</td>
<td></td>
</tr>
<tr>
<td>* Increased ability to assist and coordinate actions during emergencies.</td>
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</tbody>
</table>
Chapter 2: Advanced training for oil tanker cargo operations

Description:
Provide training to students to meet the requirements of section A-V/1-1-2 and B-V/1.1 of the STCW Code with specific duties for loading, unloading and care in transit or handling of oil cargoes.

- Knowledge of oil tanker design, systems and equipment
- Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation
- Proficiency in tanker safety culture and implementation of safety management system
- Knowledge and understanding of monitoring and safety systems, including the emergency shutdown
- Loading, unloading, care and handling of cargo
- Knowledge of the effect of bulk liquid cargoes on trim, stability and structural integrity
- Knowledge and understanding of oil cargo related operations
- Development and application of cargo-related operation plans, procedures and checklists
- Ability to calibrate and use monitoring and gas detection systems, instruments and equipment
- Ability to manage and supervise personnel with cargo-related responsibilities
- Knowledge and understanding of the hazards and control measures associated with oil tanker cargo operations
- Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to oil tankers
- Knowledge and understanding of oil tanker emergency procedures
- Actions to be taken following collision, grounding, or spillage
- Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), as amended, and other relevant IMO instruments, industry guidelines and port regulations as commonly applied

Related activities:
Maritime accident resolution

Specific objectives:
* Familiarization with the equipment, instrumentation and controls used for cargo handling on an oil tanker
* A greater awareness of the need of proper planning, the use of checklists and the time scales involved in the various cargo handling Operations.
* An enhanced awareness to apply proper and safe procedures at all times when carrying out the various Operations on board an oil tanker
* An acquisition of experience in identifying operational problems and assist in solving them
* An improvement in the ability to promote safety and protect the marine environment
* An increased ability to assist and coordinate actions during emergencies
### Chapter 3: Advanced training for chemical tanker cargo operations

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 31h</th>
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</table>
| Provide training to students to be duly qualified, in accordance with section A-V/1-1-3 and B-V/1-1 of the STCW Code, with specific duties for loading, unloading and care in transit of chemical tanker cargoes. | Theory classes: 14h  
Practical classes: 3h  
Self study: 14h |

- Knowledge of chemical tanker designs, systems and equipments  
- Knowledge of pump theory and characteristics, including types of cargo, pumps and their safe operations  
- Proficiency in tanker safety culture and implementation of safety management system  
- Knowledge and understanding of monitoring and safety systems, including the emergency shutdown system  
- Ability to perform cargo measurement and calculations  
- Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity  
- Knowledge and understanding of chemical cargo-related operations  
- Development and application of cargo-related operation plans, procedures and checklists  
- Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment  
- Ability to manage and supervise personnel with cargo-related responsibilities  
- Knowledge and understanding of the chemical and the physical properties of noxious liquid substances  
- Understanding the information contained in a Safety Data Sheet (SDS)  
- Knowledge and understanding of the hazards and control measures associated with chemical tanker cargo operations  
- Knowledge and understanding of dangers of non-compliance with relevant rules/regulations  
- Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to chemical tankers  
- Knowledge and understanding of chemical tanker emergency procedures  
- Actions to be taken following collision, grounding or spillage  
- Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied  
- Proficiency in the use of the IBC Code and related documents

### Related activities:
- Maritime accident resolution

### Specific objectives:
- Familiarization with the equipment, instrumentation and controls used for cargo handling on an oil tanker  
- A greater awareness of the need of proper planning, the use of checklists and the time scales involved in the various cargo handling Operations.  
- An enhanced awareness to apply proper and safe procedures at all times when carrying out the various Operations on board an oil tanker  
- An acquisition of experience in identifying operational problems and assist in solving them  
- An improvement in the ability to promote safety and protect the marine environment  
- An increased ability to assist and coordinate actions during emergencies
## Chapter 4: Basic training for liquefied gas tanker cargo operations

### Learning time:
- **18h 30m**
  - Theory classes: 7h 45m
  - Practical classes: 3h
  - Self study: 7h 45m

### Description:
Provide training to candidates to be duly qualified under section A-V/1-2 and B-V/1.2 of the STCW Code with specific duties and responsibilities related to cargo or cargo equipment on liquefied gas tankers.

- Liquefied gas tankers
- Cargo operations
- Physical properties of liquefied gases
- Hazards associated with tanker operations
- Hazard controls
- Information on a Material Safety Data Sheet (MSDS)
- Safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to liquefied gas tankers
- Effects of pollution on human and marine life
- Shipboard procedures to prevent pollution
- Measure to be taken in the event of spillage

### Related activities:
- Maritime accident resolution

### Specific objectives:
* Familiarization with the equipment, instrumentation and controls used for cargo handling on a liquefied gas tanker
* A greater awareness of the need of proper planning, the use of checklists and the time scales involved in the various cargo handling operations.
* An enhanced awareness to apply proper and safe procedures at all times when carrying out the various operations on board liquefied gas tanker
* An acquisition of experience in identifying operational problems and assist in solving them
* An improvement in the ability to promote safety and protect the marine environment
* An increased ability to assist and coordinate actions during emergencies
### Chapter 5: Advanced training for liquefied gas tanker cargo operations

<table>
<thead>
<tr>
<th>Learning time: 32h 45m</th>
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</thead>
<tbody>
<tr>
<td>Theory classes: 14h 52m</td>
</tr>
<tr>
<td>Practical classes: 3h</td>
</tr>
<tr>
<td>Self study: 14h 53m</td>
</tr>
</tbody>
</table>

**Description:**
Provide training to candidates to be duly qualified under section A-V/1-2 and B-V/1.1of the STCW Code with specific duties and responsibilities related to cargo or cargo equipment on liquefied gas tankers.

- Knowledge of liquefied gas tanker design, systems, and equipment
- Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation
- Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity
- Proficiency to apply tanker safety culture and implementation of safety management requirements
- Proficiency to apply safe preparations, procedures and checklist for all cargo operations
- Proficiency to perform cargo measurement and calculation
- Proficiency to manage and supervise personnel with cargo-related responsibilities
- Knowledge and understanding of basic chemistry and physics and the relevant definitions related to the safe carriage of liquefied gases in bulk in ships
- Understanding the information contained in an Material Safety Data Sheet (MSDS)
- Knowledge and understanding of the hazards and control measures associated with liquefied gas tanker cargo operations
- Proficiency to calibrate and use monitoring and gas detection systems, instruments and equipment
- Knowledge and understanding of dangers of non-compliance with relevant rules/regulation
- Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to liquefied gas tankers
- Knowledge and understanding of liquefied gas tanker emergency procedures
- Actions to be taken following collision, grounding or spillage and envelopment of the ship in toxic or flammable vapour
- Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied
- Proficiency in the use of the IBC and IGC Codes and related documents
- Knowledge of liquefied gas tanker design, systems, and equipment
- Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation
- Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity
- Proficiency to apply tanker safety culture and implementation of safety management requirements
- Proficiency to apply safe preparations, procedures and checklist for all cargo operations
- Proficiency to perform cargo measurement and calculation
- Proficiency to manage and supervise personnel with cargo-related responsibilities
- Knowledge and understanding of basic chemistry and physics and the relevant definitions related to the safe carriage of liquefied gases in bulk in ships
- Understanding the information contained in an Material Safety Data Sheet (MSDS)
- Knowledge and understanding of the hazards and control measures associated with liquefied gas tanker cargo operations
- Proficiency to calibrate and use monitoring and gas detection systems, instruments and equipment
- Knowledge and understanding of dangers of non-compliance with relevant rules/regulation
- Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to liquefied gas tankers
- Knowledge and understanding of liquefied gas tanker emergency procedures
- Actions to be taken following collision, grounding or spillage and envelopment of the ship in toxic or flammable vapour
- Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied
**Specific objectives:**

Course involves:

1. Knowledge of liquefied gas tanker design, systems, and equipment
2. Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation
3. Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity
4. Proficiency in tanker safety culture and implementation of safety management requirements
5. Proficiency to apply safe preparations, procedures and checklists for all cargo operations
6. Proficiency to perform cargo measurements and calculations
7. Proficiency to manage and supervise personnel with cargo-related responsibilities
8. Knowledge and understanding of basic chemistry and physics and the relevant definitions related to the safe carriage of liquefied gases in bulk in ships
9. Understanding the information contained in a Material Safety Data Sheet (MSDS)
10. Knowledge and understanding of the hazards and control measures associated with liquefied gas tanker cargo operations
11. Proficiency to calibrate and use monitoring and gas detection systems, instruments and equipment
12. Knowledge and understanding of dangers on non-compliance with relevant rules/regulations
13. Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to liquefied gas tankers
14. Knowledge and understanding of liquefied gas tanker emergency procedures
15. Actions to be taken following collision, grounding or spillage and envelopment of the ship in toxic or flammable vapour
17. Understanding of procedures to prevent pollution of the environment
18. Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied
19. Proficiency in the use of the IBC and IGC Codes and related documents

**Planning of activities**

<table>
<thead>
<tr>
<th><strong>Simulator teaching</strong></th>
<th><strong>Hours:</strong> 10h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Laboratory classes: 10h</td>
</tr>
<tr>
<td>Simulator teaching:</td>
<td></td>
</tr>
<tr>
<td>- Basic knowledge of ship arrangements of an oil tanker an chemical tanker</td>
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<tr>
<td>- Knowledge of the effect of bulk liquid cargoes on trim, stability and structural integrity</td>
<td></td>
</tr>
<tr>
<td>- Proficiency to apply safe preparations, procedures and checklists for all cargo operations</td>
<td></td>
</tr>
</tbody>
</table>

**Support materials:**

Simulator

**Specific objectives:**

- Knowledge of ship arrangements of an oil tanker an chemical tanker, knowledge of the effect of bulk liquid cargoes on trim, stability and structural integrity and proficiency to apply safe preparations, procedures and checklists for all cargo operations
Bibliography

Basic:


