



1nd Day

09.00 - 10.00

Topic Number: 1
Title: **Introduction: Shipping and the Environment**
Lecturer: HELMEPA

10.00 - 10.15 Break

10.15 - 11.45

Topic Number: 2
Title: **The Marine Environment**
Lecturer: HELMEPA

11.45 - 12.00 Break

12.00 - 12.30

Topic Number: 3
Title: **Mediterranean Sea, Main Features and Environmental Protection**
Lecturer: HELMEPA

12.30 - 13.00 Break

13.00 - 14.00

Topic Number: 4
Title: **Discharges to the Sea - Oil, Chemicals, Sewage and Garbage**
Lecturer: HELMEPA

14.00 - 14.15 Break

14.15 - 15.15

Topic Number: 4 (continued)
Title: **Discharges to the Sea - Oil, Chemicals, Sewage and Garbage**
Lecturer: HELMEPA

15.15 - 16.15 **Workshop: Personal Opinions – Reputation of Shipping**

2nd Day

09.00 - 10.00

Topic Number: 5
Title: **Greenhouse Gas Emissions**
Lecturer: HELMEPA

10.00 - 10.15 Break

10.15 - 11.15

Topic Number: 6
Title: **Air Pollution**
Lecturer: HELMEPA

11.15 - 11.30 Break

11.30 - 12.30

Topic Number: 7
Title: **Invasions of Non-Indigenous Species**
Lecturer: HELMEPA

12.30 - 13.00 Break

13.00 - 14.00

Topic Number: 8
Title: **Other Environmental Impacts of Ship Operations**
Lecturer: HELMEPA

14.00 - 14.15 Break

14.15 - 15.45 **Workshop/Practical Exercise:
Pollution Prevention Measures – Personal Involvement**

15.45 - 16.15 **Written Assessment**

1. Introduction: Shipping and the Environment

- Development of the relationship of humans and sea
- Modern shipping and its importance for global economy
- Environmental impact of shipping and international regulations
- Major contemporary environmental issues
- What is sustainable development and sustainable shipping?
- The role of the human element and the importance of environmental awareness
- Structure and contents of the seminar

2. The Marine Environment

- Ocean's importance to the planet and humanity
- From the surface to the great depths and from the coast to the open sea: the main features of the marine environment
- Understanding the basics of how the marine ecosystem works
- Apply your knowledge: comparing the open ocean with coastal and upwelling zones
- Special protection schemes for the marine environment: Marine Protected Areas (MPA) – Special Areas (SA) – Particularly Sensitive Sea Areas (PSSA)
- Case study: The Australian Great Barrier Reef – the first PSSA

3. Mediterranean Sea, Main Features and Environmental Protection

- Main characteristics of the Mediterranean region
- Environmental threats for the Mediterranean marine environment
- Marine litter in the Mediterranean Sea
- Shipping industry at the Mediterranean region
- International collaboration for the protection of the Mediterranean Sea
- Increased awareness as key to success

4. Discharges to the Sea - Oil, Chemicals, Sewage and Garbage

Oil

- Oil pollution into the sea: sources and current figures
- Nature and properties of oil, behavior of oil spills in the marine environment and main impact
- Prevention of oil pollution from ships: an overview of MARPOL Annex I

Chemicals

- Properties, classifications and carriage of chemicals by ships: the notion of Harmful and Noxious Substances (HNS) and applicable IMO Codes for the maritime transportation of the various forms of chemical cargoes

- Prevention of pollution from liquid cargoes (other than oil) carried in bulk: MARPOL Annex II and the IBC Code
- Prevention of pollution from chemicals carried in packaged form: MARPOL Annex III and the definition of Marine Pollutants according to the IMDG Code

Sewage

- Ship-generated sewage: quantitative and qualitative aspects
- Impact of untreated sewage discharge in the marine environment
- Prevention of pollution from sewage produced on board: MARPOL Annex IV

Garbage

- Marine litter - A global problem
- Environmental and socioeconomic impact of marine litter
- Prevention of pollution from garbage generated on board: the revised MARPOL Annex V

5. Greenhouse Gas Emissions

- Introduction to the Earth's climate system and its regulation: the greenhouse effect and the role of oceanic circulation
- The human factor in climate: emissions of greenhouse gases
- Our planet in transition: major climatic changes and their impact
- Climate change impact on the marine ecosystem
- Reduction of greenhouse gas emissions from shipping: requirements of MARPOL Annex VI on the energy efficiency of ships

6. Air Pollution

- Introduction to exhaust gas emissions from ships' engines
- Prevention of air pollution from ships: MARPOL Annex VI
- Emission Control Areas (ECAs)
- Sulphur Oxides (SO_x)
 - *Impacts to human health and environment*
 - *Pollution prevention measures*
- Nitrogen Oxides (NO_x)
 - *Impacts to human health and environment*
 - *Pollution prevention measures*
- Particulate matter (PM)
- Ozone depleting substances (ODS)
- Volatile Organic Compounds (VOCs)
- Incineration on board

7. Invasions of Non-Indigenous Species

- The environmental issue of the invasion of non-indigenous species:
 - *The ship as a vector of non-indigenous species*
 - *Impacts on the marine ecosystems*
 - *Cases of catastrophic invasions*
- Measures for the prevention of the transport of non-indigenous species by means of ballast water: the International Ballast Water Management Convention

8. Other Environmental Impacts from Ship Operations

- Antifouling paints of ships: the phenomenon of biofouling, environmental impacts of organotins, the AFS International Convention for pollution prevention and the new generation of antifouling paints
- Recycling of ships: the current situation and the main requirements of the International Hong Kong Convention and the EU Regulation
- Ships' strikes with marine mammals: the extent of the problem and prevention measures
- Underwater noise from ships: the vital importance of the sound for marine animals, the impact of anthropogenic noise and the IMO guidelines for less noisy ships

9. Workshops and Practical Exercise

The aim of the workshops is to provide participants with the opportunity to express their opinions and share their experience on issues such as the environmental challenges faced by modern shipping and the public image of the shipping industry, to propose solutions and to increase their environmental awareness by considering and realizing their own part.

During the practical exercise, participants are asked to apply the knowledge they acquired on pollution impacts and prevention measures on a specific operational scenario.