COURSE DESCRIPTION

<table>
<tr><td>Course Title</td><td colspan="5">SHIPPING AND THE ENVIRONMENT</td></tr>
<tr><td>Course Code</td><td colspan="5">ATSE401</td></tr>
<tr><td>Course Type</td><td colspan="5">Required</td></tr>
<tr><td>Level</td><td colspan="5">BSc (Level 1)</td></tr>
<tr><td>Year / Semester</td><td colspan="5">2 / Fall</td></tr>
<tr><td>Teacher’s Name</td><td colspan="5">Demetris Kletou</td></tr>
<tr><td>ECTS</td><td>6</td><td>Lectures / week</td><td>3</td><td>Laboratories/week</td><td></td></tr>
<tr><td>Course Purpose</td><td colspan="5">This course aims to raise the environmental awareness of students and to help them appreciate the services offered by marine ecosystems. Students will learn about the main impacts of shipping on the environment, international regulations to protect the environment, and understand how the shipping sector complies with technical modifications to achieve sustainable shipping practices. This course is particularly useful to students that consider the position of an Environmental Officer.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="5">By the end of the course, the students should be able to:
Describe the concept of sustainability and the benefits/services that marine ecosystems provide to humans.
Explain and assess how the marine environment is adversely affected by major pressures induced by shipping.
Distinguish the maritime international regulatory framework related to marine environmental protection (focus on IMO regulations).
Discuss mitigation practices for each pressure, compliance with regulations, and technical implications/modifications of the shipping sector.
Assess the environmental problems associated with port construction and operation and discuss ways to green a port.</td></tr>
<tr><td>Prerequisites</td><td colspan="2">None</td><td>Corequisites</td><td colspan="2">None</td></tr>
<tr><td>Course Content</td><td colspan="5">Build Marine Environmental Awareness
Marine ecosystem services and sustainability
Shipping environmental impacts and International legal framework for environmental protection in the maritime sector, emphasis given on International Maritime Organization (IMO) regulations
Assess Environmental Impacts, Regulations and ways of Compliance
Discharges to water
Oil and oily mixtures
Regulation: MARPOL 73/78 Annex I
Compliance/Mitigation: Double hull, precaution, monitoring, enforcement, remedial, etc.
Wastewater
Regulation: MARPOL 73/78 Annex IV
Compliance/Mitigation: Sewage Treatment, port reception facilities, etc.
Marine litter
Regulation: MARPOL 73/78 Annex V</td></tr>
</table>

	▪ *Compliance/Mitigation*: Reduce-reuse-recycle, treatment on board, etc. ○ Antifouling paints ▪ *Regulation*: Antifouling Systems Convention ▪ *Compliance/Mitigation*: Antifouling, Biocide research ○ Transport of non-indigenous species ▪ *Regulation*: Ballast Water Management Convention ▪ *Compliance/Mitigation*: Ballast water treatment, disinfection, release in open waters etc. • Air Emissions ○ Greenhouse gases ○ Nitrogen oxides ○ Sulphur oxides ○ Particulate Matter ○ Ozone-depleting substances ○ Volatile organic compounds ▪ *Regulations*: MARPOL 73/78 Annex VI, EU regulation and more, ECAs, 2020 Global Sulphur Cap, Ship Energy Efficiency Management Plan, Energy Efficiency Design Index ▪ *Compliance/Mitigation*: Alternative fuels, scrubbers, energy efficiency and sustainable shipping, slow steaming, renewable energy sources, etc. • Physical Impacts ○ Noise and light pollution ○ Wildlife collisions ▪ *Regulation*: International Regulations for Preventing Collisions at Sea ○ Grounding ▪ *Regulation*: Safe and Environmentally sound recycling of ships • Ports ○ Environmental impacts from port construction and operation ○ Ecoports
Teaching Methodology	Lectures include PowerPoint presentations and discussions.
Bibliography	Andersson, K., Brynolf, S., Lindgren, J. F., Wilewska-Bien, M. eds. *Shipping and the Environment. Improving environmental performance in maritime transportation.* Springer, Berlin, Heidelberg, 2016. Pages 1-434, ISBN: 978-3-662-49043-3, doi: 0.1007/978-3-662-49045-7
Assessment	Mid-term Exam 20% Attendance and Participation 10% Presentation on a related topic 10% Final Exam 60%
Language	English