COURSE OUTLINE

(1) GENERAL

SCHOOL	Maritime and Industrial Studies		
ACADEMIC UNIT	Maritime Studies		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΝΑΑΓΓ43	SEMESTER	Spring semester elective
COURSE TITLE	Shipping Pollution		
INSTRUCTOR'S NAME	Professor Fani Sakellariadou		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
Lectures	4	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background
PREREQUISITE COURSES:	no
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	yes
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, the students will

- ✓ Be able to identify the types of marine pollutants.
- ✓ Understand the need to improve the environmental performance of shipping
- ✓ Have the skills to evaluate the various options for a smart shipping industry
- ✓ Know how to apply an environmental port management

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology

Project planning and management

Respect for difference and multiculturalism

Adapting to new situations *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
Individual work Teamwork Decision-making Respect for the natural environment Adaptation to new situations Promotion of free, creative, and inductive thinking Work in an interdisciplinary environment Project planning and management	

(3) SYLLABUS

- ✓ Pollution in general and its sources. Pollution categories. Climate change.
- ✓ Atmospheric pollution and its effects. The transport sector and air pollution. Carbon footprint of transport means.
- ✓ Shipping and air pollution. Reduction of CO_2 emitted by ships. SEEMP and EEDI. Lower S fuels. Scrubbers. Techniques for preventing the NOx formation during combustion. Alternative fuels. Cold ironing. Alternative energy sources. Polar shipping roads.
- ✓ Oil pollution: major causes and impacts. Major marine oil spills. Fate of marine oil spills. Cleaning up oil spills. Bioremediation. Natural recovery.
- ✓ Port reception facilities: MARPOL Annex I-VI. The collection of ship wastes. Oily wastes. Sewage. Garbage. Residues of cargo. Hydrocarbons cargo in bulk waste. Chemical cargo in bulk waste. Garbage disposal. Management and treatment of wastes.
- ✓ Marine biofouling: Effects on unprotected ships. Anti-fouling technologies. Anti-fouling coatings. Biocidal antifouling paints and Biocide-free foul release coatings. Total biofouling removal. Environmental impacts.
- ✓ Marine pollution from ballast water. IMO ballast water convention. Precautionary practices in BWM.
- ✓ Hazardous materials within a ship's structure. The Basel Convention. The Hong Kong Convention. EU ship recycling regulation. Green Ship recycling.
- ✓ The Green Passport. The Green Award. Clean shipping. The future of shipping. Green coastal shipping program.
- ✓ Seaport environmental priorities. The Sustainable-Green port. Case study of a port using biomonitoring for EMS. Smart port. 1st-5th generation port. Smart port-cities.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of computers and the Internet.
Support of the learning process through the e-class and ms-teams online platforms.</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Project</td><td>40</td></tr>
<tr><td>Study</td><td>58</td></tr>
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<tr><td>Course total</td><td>150</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Written final exam (60%) in English.
Project preparation, with submission of written report, oral presentation, and examination (40%).</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- ✓ Andersson, Karin & Brynolf, Selma & Lindgren, John & Wilewska-Bien, Magda. (2016). Shipping and the Environment - Improving Environmental Performance in Marine Transportation. 10.1007/978-3-662-49045-7.
- ✓ Europe Economics study "Impact assessment for the review of the 2000/59/EC Directive on port reception facilities for ship-generated waste and cargo residues"
- ✓ Reducing CO2 Emissions to Zero: The 'Paris Agreement for Shipping' Implementing the Initial Strategy on Reduction of GHG Emissions from Ships (adopted by the UN International Maritime Organization), Marisec Publications 2018
- ✓ Wang, C., Zhang, D., Yang, X. and Yang, Z. (2018), "A novel model for the quantitative evaluation of green port development a case study of major ports in China", Transportation Research Part D. Transport and Environment, Vol. 61, pp. 431-443.
- ✓ Professor's power point presentations

- Related academic journals:

Maritime Journal
Marine Pollution Bulletin
Marine Policy