**3.2. Course description**

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| **Generic information** |
| Head of Course | **Radoslav Radonja, Ph. D., associate professor** |
| Course | **Sea and Marine Environment Protection** |
| Study Programme | **Marine Engineering** |
| Level | **Undergraduate** |
| Type of Course | **STCW - obligatory** |
| Year of Study | **2** |  |
| Estimated Student Workload and Methods of Instruction | ECTS coefficient of Student Workload | **3** |
| Number of Hours (L+E+S) | **2 + 0 + 0** |

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| **1. GENERAL COURSE DESCRIPTION** |
| *1.1. Course Objectives*  |
| The main goal of the course is to acquire knowledge about the principles and laws of environmental protection, and understanding of theoretical, technical and legislative considerations of the relationship between organisms, biotopes and sources of pollution in traffic, and especially the part related to marine environment. |
| *1.2. Prerequisites for Course Registration*  |
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| *1.3. Expected Learning Outcomes*  |
| After passing the exam, it is expected that students will be able to do the following:1. Properly interpret the basic concepts of ecology and sustainable development2. Explain and interpret the harmful impact of pollutants in maritime transport on the biocenosis and biotope3. List and explain the protocols and annexes of the MARPOL 73/78 Convention4. Explain the categories of pollutants according to the annexes and their harmful impact5. State and explain the legislative requirements and documentation on board related to pollution prevention6. Argue the requirements of the Ballast Water Convention (BWC) and assess their impact on the environment7. State and explain the harmful effects of underwater anti-fouling paints (AFC)8. Analyze and compare sources of marine noise pollution9. List the requirements of the Convention on the Recycling of the Ships and explain prudent disposal procedures10. Discuss possible scenarios related to sustainable development and climate change. |

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| *1.4. Course Outline*  |
| Basic concepts of ecology, sustainable development and sustainable maritime affairs. Pollutants and their harmful effects. Marine ecosystem factors and protection of the marine environment. Ship as a source of pollution. Marpol 73/78 (protocols and annexes). Ballast Water Convention. Convention against anti-fouling paints. Ship Recycling Convention. Sound pollution. Assumed possible scenarios related to sustainable development and climate change. |
| *1.5. Modes of* *Instruction*  | [x]  Lectures[ ]  Seminars and workshops [ ]  Exercises [ ]  E-learning[ ]  Field work | [ ]  Practical work [ ]  Multimedia and Network [ ]  Laboratory[ ]  Mentorship[ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| *1.6. Comments*  |  |
| *1.7. Student Obligations*  |
| Active class attendance, 1st colloquium, 2nd colloquium and final oral exam.  |
| *1.8. Assessment1 of Learning Outcomes*  |
| Course attendance | 1,0 | Class participation | 0,5 | Seminar paper |     | Experiment |     |
| Written exam |     | Oral exam | 0,5 | Essay |     | Research |     |
| Project |     | Continuous Assessment | 1,0 | Presentation |     | Practical work |     |
| Portfolio |     |  |     |  |     |  |     |

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| *1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam*  |
| The procedure for evaluating the acquired learning outcomes takes place in accordance with University’s and Faculty’s normative acts as follows:• through continuous testing of knowledge during classes, 70% of the acquired learning outcomes are evaluated through the 1st colloquium - learning outcomes 1-2 (20%), 2nd colloquium - learning outcomes 3-6 (50%), and the student must realize each colloquium minimum 50% points;• At the final part of the exam, 30% of the acquired learning outcomes are evaluated (1-10), whereby the student must realize a minimum of 50% of points in order to pass the final exam.*Examples of evaluating learning outcomes in relation to set learning outcomes are:*1. Explain what studies ecology as a science? What is the difference between abiotic and biotic factors? Why is water said to be the most important abiotic factor? Explain the concept of sustainable development and sustainable maritime affairs?2. What is meant by the term "oil on board" and what does the spread and movement of the oil spill on the water depend on? List and explain the basic processes of oil decomposition? What are the harmful effects of pollutants from the exhaust gases of marine energy systems on the environment, and what on human health and why? ...3. What does the Marpol 73/78 Convention consist of and what does Annex 1 (or 2 or 3 or… 6) deal with? To which ships does it apply / does it not apply? What are the exceptions? What are special and what are particularly sensitive marine areas? ...4. According to Annex 2 of Marpol 73/78 of the Convention, where are unhealthy substances in bulk listed and how are they classified? According to Annex 3 of the Marpol 73/78 Convention, where are dangerous substances listed and how are they classified? ...5. According to Annex 5 of the Marpol Convention, what documentation must a ship have? According to Annex 3 of Marpol 73/78 of the Convention, what are the conditions of packing and marking of cargo, requirements for accompanying documentation, packing and labeling, and how to handle empty packing? ...6. What is the potential danger from ballast water to the environment coming from a tanker unloading / loading cargo at the tanker terminal and why? What is the difference between clean and separate ballast on an oil tanker? ...7. What impact on the ship comes from the accumulation of fouling on the hull? What environmental hazards come from TBT underwater anti-fouling paints? ...8. How does marine noise pollution affect the environment and people? What are the possible sources of noise and what is the difference between land and sea noise pollution? ...9. Explain the term so-called. "Green passports" on board? Explain the difference in costs and the impact on people and the environment between ship recycling by stranding and recycling in a recycling shipyard? ...10. What are the causes that can lead to the opening of the so-called northern sailing routes and what are the possible consequences? How can a further increase in atmospheric temperature affect ‘permafrost’ and what are the possible consequences? Why is a ship considered the most environmentally friendly means of transport despite being heavily polluted? ... |
| *1.10. Main Reading*  |  |  |
| 1. Teacher lectures - available in electronic form
2. Klepac, R.: Osnove ekologije, JUMENA, Zagreb 1990.
3. IMO, MARPOL 73/78., Consolidated Edition, London 2013.
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| *1.11. Recommended Reading*  |  |  |
| 1. <https://www.pfri.hr/web/dokumenti/uploads_nastava/20180227_184357_zec_ZMMO_v.1.5_web.pdf>
2. Golubić, J. Promet i okoliš, Fakultet prometnih znanosti u Zagrebu, Zagreb, 1999.
3. Dorčić, I.: Osnove čišćenja uljnih zagađenja, SKTH, Zagreb
4. Botkin, D., Keller, E., Environmental science, J. Wiley & sons, Inc., New York, 1995.
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| *1.12. Number of Main Reading Examples*  |  |  |
| *Title*  | *Number of examples*  | *Number of students*  |
| Teacher lectures - available in electronic form  | - | 60 |
| IMO, MARPOL 73/78., Consolidated Edition, London 2013. | 1 | 60 |
| Klepac, R.: Osnove ekologije, JUMENA, Zagreb 1990. | 1 | 60 |
| *1.13. Quality Assurance*  |
| Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly. |

1 **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.