## 3.2. Course description

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| Generic information |
| Head of Course | Predrag Kralj, Associate Professor, Ph.D., MS.ME., BS.ME. |
| Course | Marine Auxiliary Systems |
| Study Programme  | Marine Engineering |
| Type of Course | STCW - obligatory |
| Year of Study | 3 |  |
| Estimated Student Workload and Methods of Instruction | ECTS coefficient of Student Workload | 6 |
| Number of Hours (L+E+S) | 60+15+0 (4+1+0) |

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| 1. **GENERAL COURSE DESCRIPTION**
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| * 1. *Course Objectives*
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| The objective of the course is to introduce the students in the field of ship auxiliary systems, their most common types, the characteristics of their important elements and the exploitation of the systems in a safe and efficient mode, what is necessary for responsible marine engineer officer. |
| * 1. *Prerequisites for Course Registration*
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| Passed exams of Technical mechanics I and II and Thermodynamics and heat transfer courses |
| * 1. *Expected Learning Outcomes*
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| It is expected that the students will be able:1. To recognize, define and give examples of new trends in technology and recent developments in marine engineering, e.g. changes in propulsion systems regarding recent development of marine diesel engines, development of diesel engines’ cooling systems through history etc.
2. To know marine engineering terminology, both Croatian and English
3. To demonstrate the skills of simple calculation – how to calculate and dimension system element (segments / parts)
4. To analyse the type of ship piping element and to draw most common elements
5. To explain graphic interpretation of the system and its function
6. To plan maintenance works in the engine room and perform engineer officer duties in a safe manner on both operation and management level
7. To establish the relations among measured parameters, the measuring points in the system and the alarms and their characteristics, the importance of alarms and, to give fault diagnosis, i. e. the cause of the alarms or faults
8. To create functional piping scheme in accordance with the classification society’s rules or manufacturer’s recommendations
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| * 1. *Course Outline*
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| The piping systems on board ships, the system elements, the materials and the protection methods, the international regulations, namely propulsion systems (fuel oil, lubrication oil, compressed air (**7.02:**1.2.1.8.), cooling water (**7.02:**1.2.1.6., 1.2.2.11.-13.), steam and condensate, combustion air, exhaust gas system); general purpose and safety systems (ballast –**7.02:** 1.3.1.1., bilge – **7.02:**1.3.1.2., firefighting –**7.02:**1.3.1.3., ventilation, drinking and sanitary water, sewage systems, operation and automation air (**7.02:**1.2.3.5.), air conditioning (**7.02:**1.1.3.2.) and ventilation, automation, hydraulics, sounding pipes, draining and overflow systems, filling systems, vent systems, exploitation).Marine refrigerating systems: design and optimization, application on board ships, system elements, automated operation and protection, exploitation, safety operation with refrigerants, maintenance. The systems related to liquid cargoes (inert gas, gas sampling systems, cargo loading/unloading systems, washing and crude oil washing systems, stripping and draining systems, heating and cooling of cargo). The exploitation of systems, local and remote operation and surveillance, the sea environment protection (**7.02:** 1.3.1.4.-5). |
| * 1. *Modes of Instruction*
 | [x]  Lectures[ ]  Seminars and workshops [x] Exercises [ ]  E-learning[ ]  Field work | [x]  Practical work [ ]  Multimedia and Network [x]  Laboratory[ ]  Mentorship[ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| * 1. *Comments*
 | Upon completion of laboratory exercises students need to create final laboratory reports consisting of tables with measured values, heat diagrams and explanations. |
| * 1. *Student Obligations*
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| Beside lectures and exercises students have four home works and a set of laboratory exercise reports to deliver. |
| * 1. *Assessment[[1]](#footnote-1) of Learning Outcomes*
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| Course attendance | 2,5 | Class participation |     | Seminar paper |     | Experiment |     |
| Written exam | 1 | Oral exam |     | Essay |     | Research |     |
| Project |     | Continuous Assessment | 2 | Presentation |     | Practical work | 0,5 |
| Portfolio |     |  |     |  |     |  |     |
| * 1. *Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam*
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| 70% during classes and 30% on final exam (learning outcomes 1 – 8) in accordance with the University’s and Faculty’s normative acts. Continuous assessment:* Two theoretical partial exams – first on marine piping systems and second on refrigerating systems (60%) – outcomes 1 – 8
* 4 % students gain for correct solving of four numerical home works (outcomes 3, 4, 6) and another one (1 %) for practical work on fresh water generator simulator (outcomes 5, 6), while another 5% students gain for correct performance on laboratory exercises (outcomes 1 – 7).

On written final exam complete field of marine auxiliary systems is assessed.Examples of assessment for outcome:1. On the marine auxiliary system’s schematic representation recognize its function and the function of each element (outcomes 1, 2, 3, 5, 7)
2. Read out measured values and diagnose the fault in the system, make basic calculation of the element to be replaced, plan and execute replacement (outcomes 2, 4, 5, 6,7)
3. Evaluate local and remote indication of measured parameters, dependence between manometric and absolute pressure, analog and digital indication (outcomes 1, 2, 7, 8)
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| * 1. *Main Reading*
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| 1. Kralj Predrag, Šegulja Ivica, Brodski cjevovodi, Pomorski fakultet, Rijeka, 2018.2. Martinović Dragan, Brodski strojni sustavi, Pomorski fakultet, 2005.3. Matković Milan, Protupožarna zaštita na brodovima, Pomorski fakultet, Rijeka, 1995.4. Martinović Dragan, Brodski rashladni uređaji, Školska knjiga, Zagreb, 1994.5. Learning materials published on the lecturer’s web page and on the e-learning system Merlin |
| * 1. *Recommended Reading*
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| *1.* Martinović Dragan, Stanković Predrag*, Sustav inertnog plina, Pomorski fakultet, Rijeka, 1995.**2.* Martinović Dragan*, Strojarski priručnik za časnike palube, Graftrade, Rijeka**3.* Martinović Dragan, Stanković Predrag*, Sigurnost na tankerima, Pomorski fakultet, Rijeka, 1995.**4.* Martinović Dragan, Stanković Predrag*, Pranje tankova sirovom naftom, Pomorski fakultet, Rijeka, 1992.**5.* Ozretić Velimir*, Brodski pomoćni strojevi i uređaji, Ship management, Split, 1996.**6.* Marsh, R. W., Olivo, C. T.*, Refrigeration, Delmar Publishers, Inc., Bombay, 1966.**7.* Golber, P. F.*, Refrigeration Servicing, Delmar Publishers, Inc., Bombay, 1971.**8.* Knak Christen*, Diesel Motor Ships – Engines and Machinery, G-E-C GAD Publishers, Copenhagen, 1979.*  |
| * 1. *Number of Main Reading Examples*
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| *Title*  | *Number of examples* | *Number of students* |
| Brodski cjevovodi | Bibliothek7Faculty Book Store150 | 80 |
| Brodski strojni sustavi | Bibliothek7Faculty Book Store0 |
| Protupožarna zaštita na brodovima | Bibliothek14Faculty Book Store500 |
| Brodski rashladni uređaji | Bibliothek5Faculty Book Store0 |
| * 1. *Quality Assurance*
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| 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. [↑](#footnote-ref-1)