**3.2. Course description**

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| **Generic information** |
| Head of Course | dr.sc. Nikola Tomac |
| Course | Material Technology and Processing |
| Study Programme | Marine Engineering |
| Type of Course | compulsory |
| Year of Study | 1 |  |
| Estimated Student Workload and Methods of Instruction | ECTS coefficient of Student Workload | 5 |
| Number of Hours (L+E+S) | 2+2+0 |

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| **1. GENERAL COURSE DESCRIPTION** |
| *1.1. Course Objectives*  |
|  *The objective of this course is to provide the student with appropriate knowledge of materials and processing technologies and systems prescribed by STCW and IMO Model Courses for the service of Naval Navigation Officer.* |
| *1.2. Prerequisites for Course Registration*  |
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| *1.3. Expected Learning Outcomes*  |
| After passing the exam, students will be able to do the following:1. Describe technical materials, strength tests and technological properties of materials.2. Explain the basic methods of iron and steel production.3. Explain the structure of atoms, arrangement of atoms and irregularities in the atomic structure.4. Explain the motion of atoms in materials and solidification and solidification.5. Explain the iron carbon alloys.7. Describe the basic properties and methods of production of iron, steel and non-ferrous metals.8. Describe the basics of heat treatment.9. Explain the basics of plastic, ceramic, composite and natural materials.10. Explain basic welding procedures12. Know basic practical measurements with manual measuring tools.13. Have the knowledge necessary to perform basic manual processing; logging, sawing, drilling, etc.14. Have the knowledge required to perform basic machine operations on a universal lathe, milling machine, drill, grinder and sharpener.15. Have the knowledge necessary to perform basic welding with a coated electrode and a TIG process.16. Have the knowledge necessary to perform the measurement of the hardness, toughness of the material and identify the metal structure with a microscope. |
| *1.4. Course Outline*  |
| Introduction to technical materials and strength tests and technological properties of materials, basics of metallography, basic methods of production of iron and steel, basics of heat treatment, fundamentals of plastic, ceramic, composite and natural materials. Fundamentals of particle separation, unconventional processing methods and technological welding processes.Laboratory program: manual measurements; machining on a lathe, milling machine, drill grinder, sharpener; manual processing; manual welding with electrode coated and TIG process; measurement of static and dynamic strength of material with a trowel and trowel; measurement of hardness; measurement of material toughness; identifying the metal structure with a microscope |
| *1.5. Modes of* *Instruction*  | [x]  Lectures[ ]  Seminars and workshops [x]  Exercises [ ]  E-learning[ ]  Field work | [ ]  Practical work [ ]  Multimedia and Network [x]  Laboratory[ ]  Mentorship[ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| *1.6. Comments*  |       |
| *1.7. Student Obligations*  |
| Regular attendance at classes, regular midterm exams, final exam. |
| *1.8. Assessment1 of Learning Outcomes*  |
| Course attendance | 1,5 | Class participation |     | Seminar paper |     | Experiment |     |
| Written exam |     | Oral exam | 0,9 | Essay |     | Research |     |
| Project |     | Continuous Assessment | 1,6 | Presentation |     | Practical work |  |
| Portfolio |     |  |     |  |     |  |     |

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.

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| *1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam*  |
|  *Learning outcomes are evaluated through regular class attendance and activity (10%), continuous exams (60%) and final examination (30%). During the class, the student can collect a maximum of 70% of the grade points as follows:**A) Successfully pass 2 oral midterms within the prescribed deadlines. Each passed midterm carries a minimum of 15% and a maximum of 30% of marks and can be taken 3 times. A student who has not achieved all the required learning outcomes cannot take the midterm exam. The next colloquium cannot be accessed unless the previous colloquium is passed. The colloquiums include the following:**1st Colloquium (Learning Outcomes 1-5)**2nd Colloquium (Learning Outcomes 1-5)**B) Active attendance (lectures and exercises). Each class absence accounts for 1% of the grade point.**Students who have passed both exams can apply for the oral final exam (learning outcomes 1-5) and earn a minimum of 15% and a maximum of 30% of the marks.**Examples of evaluating learning outcomes in relation to set learning outcomes are:**1. Describe technical materials, strength tests and technological properties of materials.**2. Explain the basic methods of iron and steel production.**3. Explain the structure of atoms, arrangement of atoms and irregularities in the atomic structure.**4. Explain the motion of atoms in materials and solidification and solidification.**5. Explain the iron carbon alloys.**7. Describe the basic properties and methods of production of iron, steel and non-ferrous metals.**8. Describe the basics of heat treatment.**9. Explain the basics of plastic, ceramic, composite and natural materials.**10. Explain basic welding procedures* |
| *1.10. Main Reading*  |  |  |
| Tomac, N. Tehnički materijali, 2012.**Tomac, N.: Tehnologija materijala i obrade, 2008.,** <http://www.pfri.hr/~tomac/TMO/SADRZAJ.htm> |
| *1.11. Recommended Reading*  |  |  |
| Šestan, A.: Tehnologija materijala i obrade. Pomorski fakultet, Rijeka, 1997. |
| *1.12. Number of Main Reading Examples*  |  |  |
| *Title*  | *Number of examples*  | *Number of students*  |
| Tomac, N. Tehnički materijali, 2012. |  |  |
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| *1.13. Quality Assurance*  |
| In accordance with ISO 9001 at the Faculty level. |