

COURSE OUTLINE

(1) GENERAL

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| SCHOOL | School of Engineering | | |
| ACADEMIC UNIT | Department of Naval Architecture | | |
| LEVEL OF STUDIES | Undergraduate | | |
| COURSE CODE | NAOME1344 | SEMESTER | 7 th |
| COURSE TITLE | SPECIAL TOPICS IN SHIPBUILDING MATERIALS | | |
| INDEPENDENT TEACHING ACTIVITIES | | WEEKLY TEACHING HOURS | CREDITS (ECTS) |
| Lectures | | 3 | 4 |
| COURSE TYPE <i>general background, specialbackground, specialised general knowledge, skills development</i> | | Specialized | |
| PREREQUISITE COURSES: | NAOME1213 - NAVAL MATERIALS TECHNOLOGY | | |
| LANGUAGE OF INSTRUCTION and EXAMINATIONS: | Greek | | |
| IS THE COURSE OFFERED TO ERASMUS STUDENTS | Yes (English) | | |
| COURSE WEBSITE (URL) | https://eclass.uniwa.gr/courses/NA225/ | | |

(2) COURSE GOALS / LEARNING OUTCOMES

The aim of the course is to familiarize the students with:

- The factors that determine the properties and the mechanical behavior of metallic and non-metallic materials.
- The various processes of producing and manufacturing materials with specific properties, as well as the methods that improve the properties of these materials.
- The metals and alloys of interest in marine and shipbuilding technology, as well as their specifications.
- The methods of production, the manufacturing processes, the chemical composition and properties of materials used in shipbuilding.
- The evaluation and selection of materials for ship and off-shore structures.
- The use of technical information and data for the selection and application of the appropriate materials in ship and off-shore structures.
- The current trends and developments in the area of the materials used in shipbuilding and marine technology.

(3) COURSE CONTENT / SYLLABUS

Lectures:

- Dislocations and other defects in the structure of materials.
- Phase diagrams and phase transformations.
- Strengthening mechanisms.

- Thermal processing of metal alloys.
- Surface treatment of metals and alloys.
- Fracture and failure of materials.
- Steel and cast iron in shipbuilding.
- Marine and naval copper alloys.
- Marine and naval aluminum alloys.
- Structure and properties of polymers.
- Processing of polymers.
- Composite materials.
- Wood in shipbuilding.

(4) TEACHING and LEARNING METHODS - EVALUATION

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| DELIVERY Face-to-face, Distance learning, etc. | Face-to-face | |
| USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students | <ul style="list-style-type: none"> • Communication with students and support of learning procedure through the electronic e-class platform. | |
| TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <i>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</i> | Activity | Workload (hours) |
| | Lectures | 39 |
| | Study of Lectures and Homework assignments | 78 |
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| | Course total | 117 |
| STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>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</i> | Written examination (100%). | |

(5) ATTACHED BIBLIOGRAPHY

Suggested readings:

1. W.D. Callister and D.G. Rethwisch, "Materials Science and Engineering", 9th ed. Wiley Interscience, 2014.
2. B.S. Mitchell, "An Introduction to Materials Engineering and Science", Wiley Interscience, New Jersey, 2004.
3. J.F. Shackelford, Y. Han, S. Kim, S. Kwon, "CRC Materials Science and Engineering Handbook",

CRC Press, New York, 2016.

Journals and other material:

1. Materials. www.mdpi.com/journal/materials
2. Journal of Materials Science. <https://link.springer.com/journal/10853>
3. TJPRC: Journal of Naval Architecture and Marine Engineering.
<http://www.tjprc.org/journals/tjprc-journal-of-naval-architecture-and-marine-engineering1112>