

COURSE OF STUDY: *Science and Management of Maritime Activities*
ACADEMIC YEAR: II
ACADEMIC SUBJECT

General information	
Year of the course	<i>II</i>
Academic calendar (starting and ending date)	<i>I semester</i>
Credits (CFU/ETCS):	6
SSD	<i>ING-IND/22</i>
Language	<i>Italian</i>
Mode of attendance	<i>Optional</i>

Professor/ Lecturer	
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Department and address	
Virtual room	<i>Cod: 5n8u7f4</i>
Office Hours (and modalities: e.g., by appointment, on line, etc.)	On-line by appointment

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
<i>150</i>	<i>48</i>	<i>0</i>	<i>102</i>
CFU/ETCS			
<i>6</i>	<i>4</i>	<i>2</i>	

Learning Objectives
<p><i>The course enables students to acquire the skills to interpret the correlations between atomic/molecular structure, microstructure, macro-structure and behaviour of materials. Integrating the knowledge gained in the basic sciences courses, it allows to acquire the theoretical and practical basis for understanding the major physical-chemical, morphological and mechanical characterization techniques for building materials, and for diagnosis of their degradation. The course enables students to learn the methods of production, the properties and durability of different classes of materials used in civil and environmental engineering. In order to address advanced design themes and treat the innovation and development of new products and new technological processes through the application of knowledge, the student should be able to correctly interpret the correlations between structure and properties of building materials. This will be reflected in a range of professional skills, such as: 1. the ability to choose the most suitable material for the realization of a particular structure in a given exposure environment; 2. the ability to analytically describe and appropriately interpret the results of laboratory tests on construction materials; 3. the ability to identify the causes of failure of a construction material working in a team with other elements involved in the study of the problem.</i></p>

Course prerequisites	-
Teaching strategie	<p><i>The course is developed through frontal lessons related to the aspects of the discipline that are relevant and indispensable for the achievement of the specific educational objectives of the course of study. The frontal teaching is supported by seminars, exercises and practical experiences.</i></p> <p><i>During the lessons, various tools are used to improve teaching, such as, for example, power point presentations projected in the classroom, diagrams, bibliographic indications and anything else deemed useful to improve the effectiveness of teaching.</i></p>
Expected learning outcomes in terms of	
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ Knowledge of the characteristics of different materials and their use; ○ Knowledge of the chemical-physical processes at the basis of production; ○ Regulatory aspects of design; ○ Mechanical properties.
Applying knowledge and understanding on:	<ul style="list-style-type: none"> ○ Application of knowledge to design.
Soft skills	<ul style="list-style-type: none"> ● <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ Selection of a material based on stress conditions and its physical and mechanical characteristics; ○ Designing according to strength, consistency and durability classes. ○ Optimizing the layout of a material based on stress conditions. ● <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Communication skills. ● <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Skills in consulting technical and scientific texts.
Syllabus	
Content knowledge	<ul style="list-style-type: none"> ● <i>Correlation between the structure of materials and their properties.</i> ● <i>Comparison of classes of materials.</i> ● <i>Durability and sustainability of materials.</i> ● <i>Chemical, physical, morphological, and mechanical characterization of materials.</i> ● <i>Binders: Portland cement and mixed cements.</i> ● <i>Steels: production, quality, structure (Fe-C diagram) and properties.</i> ● <i>Polymeric materials: thermoplastics, thermosets, and elastomers.</i> ● <i>Composite materials.</i>
Texts and readings	<ul style="list-style-type: none"> - <i>M. Santocchi, F. Giusti: Tecnologia Meccanica e Studi di Fabbricazione, Casa Editrice Ambrosiana, Milano.</i> - <i>A. Bugini, C. Giardini, R. Pacagnella, G. Restelli: Tecnologia Meccanica – Vol. I e II ed esercizi, Utet Libreria.</i> - <i>S. Kalpakjian: Manufacturing Engineering and Technology, Addison-Wesley Publishing Company.</i> - <i>W. F. Smith - Scienza e Tecnologia dei Materiali -II ED., McGraw-Hill</i> - <i>Metallurgia, Walter Nicodemi, Seconda edizione, Zanichelli.</i>
Notes, additional materials	-
Repository	<i>Teams classroom</i>
Assessment	
Assessment methods	<i>At the end of the course there will be an oral exam.</i>
Assessment criteria	<i>At the end of the course, the student should have acquired the following following knowledge:</i>

	<ul style="list-style-type: none"> • <i>metallurgical technology;</i> • <i>measuring instruments;</i> • <i>technological workings on materials;</i> • <i>machine tools.</i> <p><i>Moreover, the student should have acquired the following skills:</i></p> <ul style="list-style-type: none"> • <i>describe the physical, chemical, and mechanical properties of metals and their use;</i> • <i>to know how to use some measuring correctly measuring instruments;</i> • <i>illustrate steel production methods;</i> • <i>distinguish non-destructive testing on metallic materials metal materials.</i>
Final exam and grading criteria	<p><i>The final grade is awarded in thirtieths. The examination is deemed passed when the mark is greater than or equal to 18.</i></p>
Further information	-
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