Stampare su carta intestata del CdS

General information	
Academic subject	***Materials Technology***
Degree course	*Science and Management of Maritime Activities*
Academic Year	*II*
European Credit Transfer and Accumulation System (ECTS)	6
Language	*Italian*
Academic calendar (starting and ending date)	*March-June*
Attendance	*No*

Professor/ Lecturer	
Name and Surname	Francesco Todaro
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Telephone	3397787542
Department and address	-
Virtual headquarters	*Canale Teams: Ricevimento Studenti - Corso di Tecnologia dei Materiali (Codice: 5n8u7f4)*
Tutoring (time and day)	Mercoledì dalle 9:00 alle 13:00

Syllabus	
Learning Objectives	*The course enables students to acquire the skills to interpret the correlations between atomic/molecular structure, microstructure, macro-structure and behavior of materials. Integrating the knowledge gained in the basic sciences courses, it allows to aquire 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 he 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.*
Course prerequisites	-
Contents	1. *Correlation between the structure of materials and their properties.* 2. *Comparison of classes of materials.* 3. *Durability and sustainability of materials.* 4. *Chemical, physical, morphological, and mechanical characterization of materials.* 5. *Binders: Portland cement and mixed cements.* 6. *Steels: production, quality, structure (Fe-C diagram) and properties.* 7. *Polymeric materials: thermoplastics, thermosets, and elastomers.* 8. *Composite materials.*
Books and bibliography	1. *M. Santocchi, F. Giusti: Tecnologia Meccanica e Studi di Fabbricazione, Casa Editrice Ambrosiana, Milano.*

	2. A. Bugini, C. Giardini, R. Pacagnella, G. Restelli: Tecnologia Meccanica – Vol. I e II ed esercizi, Utet Libreria. *3. S. Kalpakjian: Manufacturing Engineering and Technology, Addison-Wesley Publishing Company.* *4. - W. F. Smith - Scienza e Tecnologia dei Materiali -II ED., McGraw-Hill.*
Additional materials	*-*

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	*48*	*0*	*102*
ECTS			
6	*6*	*0*	

Teaching strategy	
	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. *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.*
Expected learning outcomes	
Knowledge and understanding on:	○ 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:	○ Application of knowledge to design.
Soft skills	• *Making informed judgments and choices* ○ 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. • *Communicating knowledge and understanding* ○ Communication skills. • *Capacities to continue learning* ○ Skills in consulting technical and scientific texts.

Assessment and feedback	
Methods of assessment	*The final profit test related to the teaching is carried out in written and/or oral form and the evaluation is expressed by a grade in thirtieths, with possible praise. Further profit tests are carried out during the course. They are related to the topics covered in class and are organized in the form of questionnaires characterized by open-ended and/or multiple-choice questions and exercises.*
Evaluation criteria	• *Knowledge and understanding:* ○ *knowledge of the mechanical properties of materials, chemical reactions underlying the processes for their manufacture;*

	○ *mechanical characteristics in strength and stiffness design;* ○ *use of characteristics for material selection in strength and stiffness design.* • *Applying kowledge and understanding:* ○ *calculating the modulus and strength of a material from its stress-strain curve;* ○ *determining the mass of a component from its stress conditions and its mechanical and physical properties;* ○ *selection of a material based on its mechanical properties and its density for reducing the mass of a component.* • *Autonomy of judgment:* ○ *evaluate the most appropriate type of material for a particular type of mechanical stress;* ○ *Choose the type of material to meet particular performance requirements.* • *Communication Skills:* ○ *demonstrate knowledge of correct technical and scientific terminology;* ○ *expound on topics covered in class with ownership of language.* • *Capacities to continue learning:* ○ *the questions proposed in the examination sessions will have an increasing degree of depth in order to establish the student's level of learning.*
Criteria for assessment and attribution of the final mark	*The criteria for the evaluation of the tests take into account the correctness of the content, the clarity of the argumentation and the capacity for critical analysis and re-elaboration.*
Additional information	-