Syllabus

Course Description

Course Title	Material Sciences
Course Code	42619
Course Title Additional	
Scientific-Disciplinary Sector	IMAT-01/A
Language	English
Degree Course	Professional Bachelor in Wood Technology
Other Degree Courses (Loaned)	
Lecturers	Dott. Chiara Tardini, Chiara.Tardini@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/42844
Teaching Assistant	
Semester	First semester
Course Year/s	2
CP	3
Teaching Hours	30
Lab Hours	0
Individual Study Hours	45
Planned Office Hours	9
Contents Summary	List of topics Mechanical behaviour and thermal properties of: • Metals and metals alloy • Reinforced concrete • Ceramics • Glass • Polymers and natural insulation materials The decay and durability of wood elements will be also investigated along with the decay of reinforced concrete structures.
Course Topics	Mechanical behaviour and thermal properties of: • Metals and metal alloys

	• Reinforced concrete • Ceramics • Glass • Polymers and natural insulation materials The decay and durability of wood elements will be also investigated along with the decay of reinforced concrete structures. A brief overview of atomic and molecular structures, chemical bondings, and phase diagrams will precede the main topics.
Keywords	Mechanical properties, Metals, Reinforced concrete, Glass, Durability of Timber, Wood painting and coatings
Recommended Prerequisites	None.
Propaedeutic Courses	
Teaching Format	Frontal lectures, exercises, seminars.
Mandatory Attendance	Attendance is not compulsory but highly recommended.
Specific Educational Objectives and Learning Outcomes	The course gives a general overview of scientific contents related to science of materials with a focus on the energy efficiency. The aim of the course is to acquire the knowledge of the properties and characteristics of materials. The building materials will be dealt with, are: metals and metal alloys, ceramics, polymers and glass. The mechanical and thermal behavior of these materials will be analyzed, and the different properties of similar materials will be compared. This is the basic knowledge that will consent in the Lab of Material Sciences for energy efficiency to choose the proper material according to the specific need. Students will develop a strong foundation in material science principles, including atomic and molecular structure, bonding, and phase diagrams. Intended Learning Outcomes (ILO) Knowledge and understanding: 1. Knowledge of the key concepts and technologies of building materials 2. Knowledge of the thermal properties of materials and understanding of the best solution for an energy effective use of building materials 3. Knowledge of the mechanical properties of selected materials and metals 4. Knowledge of the methods to increase the durability of

	materials and avoid the decay process 5. Understand the relationship between material structure and properties Applying knowledge and understanding: 6. to mechanical calculations 7. to the laboratory of Materials science for energy efficiency 8. to Materials Science relevant to engineering Making judgments on: 9. Mechanical and thermal aspects of material science 10. Selection of the most proper material according to the specific energy saving need. Communication skills: 11. Express mechanical problems in writing Learning skills 12. Ability to deal with problems in a systematic way and find appropriate problem-solving solutions.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Examination of the course is conducted via a written and oral exam. The written exam is related to ascertain the content of the course through exercises and an oral exam on the topics analyzed. Formative Assessment: Form: in-class exercises Lenght/Duration: 6 x 20 minutes ILOs assessed: 3,6,11,12 Summative assessment: Written exam: 40%; Lenght/duration: 150 minutes; ILOs assessed: 1,2,3,4,5,6,7,8,9,10,11,12 Oral exam: 60%; Lenght/duration: 30 minutes; ILOs assessed: 1,2,3,4,5,6,7,8,9,10,11,12
Evaluation Criteria	Grading with a single final grade. Criteria for grading: comprehension, problem-solving skills, technical competence and correct calculation of results will be evaluated.
Required Readings	Callister W., Rethwisch D.G., *Materials Science and Engineering*, Wiley & Son

Supplementary Readings	Taylor G.D. *Materials in construction*, Longman Scientific &Technical, 1994 Bulian F., Graystone J.A. *Wood coatings: Theory and Practice*, Elsevier, 2009
Further Information	
Sustainable Development Goals (SDGs)	Quality education