Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2025/2026

Course title	**Material Sciences**
Course code	42619
Scientific sector	ING-IND/22
Degree	Bachelor in Wood Technology (L- P03)
Semester	1
Year	2
Credits	3
Modular	No

Total lecturing hours	30
Total lab hours	-
Attendance	Attendance is not compulsory but highly recommended
Prerequisites	none
Course page	Microsoft Teams (and https://ole.unibz.it/)

Specific educational objectives	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.

Lecturer	Chiara Tardini
Contact	chiara.tardini@unibz.it
Scientific sector of lecturer	
Teaching language	English
Office hours	During the semester, see calendar
Lecturing Assistant (if any)	-
Contact LA	
Office hours LA	
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.

Teaching format	Frontal lectures, exercises, seminars.

Learning outcomes	**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

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	**Length/duration**	**ILOs assessed**
In class exercises	6 x 20 minutes	3,6,11,12

<table>
<tr><td></td><td>Summative assessment
<table>
<tr><th>Form</th><th>%</th><th>Length/duration</th><th>ILOs assessed</th></tr>
<tr><td>Written exam</td><td>60%</td><td>150 minutes</td><td>1,2,3,4,5,6,7,8,9,10,11,12</td></tr>
<tr><td>Oral exam</td><td>40%</td><td>30 minutes</td><td>1,2,3,4,5,6,7,8,9,10,11,12</td></tr>
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<tr><td>Assessment language</td><td>English</td></tr>
<tr><td>Assessment Typology</td><td>Monocratic</td></tr>
<tr><td>Evaluation criteria and criteria for awarding marks</td><td>Grading with a single final grade.
Criteria for grading: comprehension, problem-solving skills, technical competence and correct calculation of results will be evaluated.</td></tr>
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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
Software used	-

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