Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2025/2026

Course title	**Laboratory of Material Sciences for energy efficiency**
Course code	42620
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 lab is related to the analysis of a case-study (a small building) with the structural element made of timber, reinforced concrete, masonry, (at student's choice) located in different cities (different climate zones) in which any thermal bridge should be avoided. The purpose of the course is to choose the best material with the proper thermal properties to avoid all the eventual thermal bridges. Students will be aware of the ethical implications of their work in materials science, including environmental and sustainability concerns. Analyzing the performance of materials in various environments and conditions.

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	Thermal bridges: how to avoid them, given a tiny house with different structural materials, located in different places across Italy. Choice of the materials/elements (windows, insulation with the proper thermal properties. Calculation of winter and summer heat balance (thermal transmittance of the wall, Thermal loss, Ventilation loss, Solar gains, Internal gains).

Teaching format	Project-based learning.

Learning outcomes	**Intended Learning Outcomes (ILO)** Knowledge and understanding: 1. Knowledge of the thermal properties of materials and understanding of the best solution for an energy effective use of building materials and components 2. Knowledge of the environmental impact of insulation materials Applying knowledge and understanding: 3. Applying knowledge of thermal properties of building materials to select appropriate materials to avoid thermal bridges in the case-study building Making judgments on: 4. the sustainability and environmental impact of materials 5. Selection of the most proper material according to the specific energy saving need. Communication skills: 6. Students will learn to communicate their findings and collaborate with others in interdisciplinary teams 7. Writing technical reports on the work carried out during the Lab Learning skills 8. Ability to deal with problems in a systematic way and find appropriate problem-solving solutions

Assessment	Examination of the course is conducted via an oral presentation (possibly jointly with the course of Structural mechanics) of the project carried out during the semester. An A1 poster with the drawings and the materials adopted and a written technical report will be also considered for the final evaluation (passed/not passed).

Formative assessment Form	Length/duration	ILOs assessed
A1 Poster with drawings and list of materials	-	1,2,3,8

<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 Technical report</td><td>60%</td><td>To delivery one week before the exam</td><td>1,2,3,4,5,7,8</td></tr>
<tr><td>Oral presentation</td><td>40%</td><td>30 minutes</td><td>1,2,3,4,5,6,8</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>Passed/Not passed grading.
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	KlimaHaus *Catalogue of Thermal Bridges,* 2023
Supplementary readings	
Software used	Autocad 2D, Canva

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