Syllabus

Descrizione corso

Titolo insegnamento	Laboratorio di Scienza dei materiali per l'efficienza energetica
Codice insegnamento	42620
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	NN
Lingua	Inglese
Corso di Studio	Corso di laurea professionalizzante in Tecnologie del Legno
Altri Corsi di Studio (mutuati)	
Docenti	dott. Chiara Tardini, Chiara.Tardini@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/42844
Assistente	
Semestre	Primo semestre
Anno/i di corso	2
CFU	3
Ore didattica frontale	0
Ore di laboratorio	30
Ore di studio individuale	45
Ore di ricevimento previste	9
Sintesi contenuti	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).
Argomenti	Lab on a tiny house with different structural materials, located in

dell'insegnamento	various places across Italy. Choice of the materials/elements (windows, doors, insulation with the proper thermal properties) to fulfill the requirements according to the Minimum Requirements Decree (Ministerial Decree of October 28, 2025) . Calculation of winter and summer heat balance (thermal transmittance of the wall, Thermal loss, Ventilation loss, Solar gains, Internal gains).
Parole chiave	Thermal bridges, Thermal loss, Ventilation loss, Solar gains, internal gains, Winter and summer heat balance
Prerequisiti	None.
Insegnamenti propedeutici	
Modalità di insegnamento	Project-based learning. Each class is introduced by a brief presentation of the topic to be analysed.
Obbligo di frequenza	Attendance is not compulsory but highly recommended.
Obiettivi formativi specifici e risultati di apprendimento attesi	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. 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.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	
Modalità di esame	The exam 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 must be prepared and delivered one week before the final presentation (or the exam). The exam will be graded on a pass/fail basis. Formative Assessment Form: A1 Poster with drawings and list of materials; ILOs assessed: 1,2,3,8. Technical report; ILOs assessed: 1,2,3,4,5,6,7,8
Criteri di valutazione	Pass/Fail grading. Criteria for grading: comprehension, problem-solving skills, technical competence, and correct calculation will be evaluated.
Bibliografia obbligatoria	KlimaHaus *Catalogue of Thermal Bridges*, 2023 Minimum Requirements Decree (Ministerial Decree of October 28, 2025)
Bibliografia facoltativa	
Altre informazioni	Software used: Autocad 2D, Canva.
Obiettivi di Sviluppo	Utilizzo responsabile delle risorse

Sostenibile (SDGs)	