Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2025/2026

Course title	**Laboratory of Energy Efficiency in Wood Production and Final use**
Course code	42627
Scientific sector	ND
Degree	Bachelor in Wood Engineering (L-P03)
Semester	1
Year	3
Credits	6
Modular	No

Total lecturing hours	20
Total exercise hours	-
Attendance	Strongly recommended
Prerequisites	none
Course page	• https://www.unibz.it/en/faculties/engineering/bachelor-wood-technology/ • Microsoft Teams Community (the professor will provide the link during the first lectures).

Specific educational objectives	The present laboratory deals with the practical aspects of energy efficiency with a special focus on the wood engineering sector. The course consists of 20 hours of practical activities carried out mainly through laboratory activities consisting in the: • Analysis the energy efficiency of processes involved thermo-chemical conversion of wood. • Characterization of wood-based biomass through laboratory analysis of properties such as moisture content, calorific value, and elemental composition. • Investigation of the thermo-chemical conversion processes (combustion, pyrolysis, gasification) through laboratory experiments. • Understanding the performance and efficiency of real biomass energy systems through visits to full-scale facilities/plants. • Development of technical skills in operating laboratory instruments and interpreting results for biomass energy applications.

Lecturer	Maja DANOVSKA
Contact	maja.danovska@unitn.it
Scientific sector of lecturer	ING-IND/10
Teaching language	English

Office hours	Arranged beforehand by email
Lecturing Assistant (if any)	-
Contact LA	-
Office hours LA	-
List of topics	The laboratory course will cover the following topics: • Energy Efficiency in Thermo-Chemical Conversion of Wood. • Characterization of Wood-Based Biomass. • Thermo-Chemical Conversion Processes. • Performance and Efficiency of Real Biomass Energy Systems. • Laboratory Instrumentation and Data Interpretation.
Teaching format	Practical lecture mainly inside the laboratory. Teaching material and additional materials will be provided during the semester.

Learning outcomes	The learning outcomes need to refer to the Dublin Descriptors: **1. Knowledge and Understanding** • Demonstrate comprehensive knowledge of the principles of energy efficiency, thermo-chemical conversion processes, and sustainability within the wood industry and biomass energy systems. **2. Applying Knowledge and Understanding** • Apply theoretical and practical knowledge to analyze and solve problems related to energy efficiency in wood biomass conversion and to design or propose improvement projects for energy systems. **3. Making Judgements** • Exercise autonomous judgement in evaluating energy scenarios and performance of biomass conversion systems; critically assess data from laboratory experiments and real facilities to recommend effective energy efficiency strategies in the wood sector. **4. Communication Skills** • Effectively communicate technical concepts, experimental results, and improvement proposals both verbally and in writing, including the clear presentation of numerical analyses related to energy systems in wood production and biomass conversion. **5. Ability to Learn**

	• Develop lifelong learning skills to acquire advanced knowledge and practical tools in energy efficiency, sustainability, and circular economy principles applicable not only to the wood industry but also to broader industrial and environmental contexts.

Assessment	No exam is required. Students are either marked Passed or Failed. Attendance is strongly recommended, even if it is not mandatory.
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	-

Required readings	Çengel, Y. A., & Boles, M. A. (2021). Thermodynamics: An engineering approach (9th ed.). McGraw-Hill Education. Çengel, Y. A., & Ghajar, A. J. (2020). Heat and mass transfer: Fundamentals and applications (6th ed.). McGraw-Hill Education.
Supplementary readings	Learning material will be provided by the professor during the course.
Software used	In case, information will be provided at the beginning of the course.