Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2024/2025

Course title	**Laboratory for Heat and Mass Transfer (42618)**
Course code	42618
Scientific sector	ING-IND
Degree	Bachelor in Wood Technology
Semester	1
Year	2
Credits	3
Modular	No

Total lecturing hours	0
Total lab hours	30
Attendance	Not compulsory but recommended. 15% of the grading of the course Heat and Mass Transfer will be based on course work and short student presentations (including pdf hand-outs generated) during the lectures and/or laboratory hours. The students will get "extra points" which count to the grand total points in the written exam of the course. This makes it easier for them to achieve a good mark. However, even without presentations, students can still reach full points in the written exam.
Prerequisites	Availability of standards (e.g. pdfs on your smart phone) under "compulsory readings" during the lectures.
Course page	Microsoft Teams and https://ole.unibz.it/

Specific educational objectives	The laboratory hours are used to see the building physics lab of the university, to demonstrate and understand measurements of physical properties relevant for heat and mass transport in materials and building components, and (if possible - tbd) to set up und conduct easy laboratory experiments regarding these material and construction behaviours. Also, part of the lab hours are dedicated to working through calculation examples accompanying the lectures n order to deepen the understanding of the equations shown in the lectures.

Lecturer	Prof. Dr.-Ing. Martin H. Spitzner
Contact	Spitzner@hochschule-bc.de (E-mail and MSTeams), Skype (mhspitzner)
Scientific sector of lecturer	building physics, heat and mass transport, energy in buildings, energy rating, material science, civil engineering
Teaching language	English (or German if requested)
Office hours	tbd - arrange beforehand by email.
Lecturing Assistant (if any)	
Contact LA	
List of topics	• Demonstrations, measurements and test procedures in the field of heat and mass transport, moisture, thermal conductiviy and heat transport, thermal insulation materials, temperature. • heat gain, heat loss, surface temperature, water vapour diffusion, air humidity, air exchange, mould prevention, room temperature, thermal comfort.

	• Example calculations, indivudual or group coursework, student presentations
Office hours LA	
Teaching format	exercises, labs, student coursework and presentations.

Learning outcomes	DD1: Knowledge and understanding The students have developed and have demonstrated knowledge and understanding of physical processes in materials and building components with respect to heat and mass transfer. This includes the relevant rules and calculations for heat transport, energy efficiency in buildings, moisture transport, moisture protection in building materials, building components and buildings. DD2: Applying knowledge and understanding The students can apply their knowledge and understanding professionally, and can solve problems and questions regarding heat and mass transport and energy efficiency. DD3: Making judgements The students have the ability to gather and interpret relevant data (thermal and hygric parameters of materials, building components and building materials; climatic data) and rate the performance of the material or the component or buuilding accordingly and against current benchmarks. DD4: Communication skills The students can communicate the principles of heat and mass trasnsfer, and their application in buildings, to both specialist and non-specialist audiences DD5: Ability to learn The students have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy.

Assessment	Course work & oral presentations throughout the course & Hand-out (slides; pdf files to be handed in for distribution to all participants. Written test (ca. 1 hour) an the end or after the course 15% of the grading of the course will be based on course work and short student presentations (including pdf hand-outs generated) during the lectures and/or laboratory hours. The students will get "extra points" for the presentations which count to the grand total points in the written exam of the course. This makes it easier for them to achieve a good mark. However, even without presentations, students can still reach full points by the written exam.
Assessment language	English
Assessment Typology	Written test

	Benefit for oral student presentations + hand-outs during the semester.
Evaluation criteria and criteria for awarding marks	Written test (ca. 1 hour) an the end or after the course. The written test can give up to 100% of the points for awarding marks. However, students can "earn" up to 15% extra points by oral student presentations during the course hours and the lab hours, which count into the 100% of the written test. The contents of the oral presentations is to be handed out to allparticipants as pdf files with the slides. Admission to the written test open for all participants (attending and non-attending). Extra points for presentations only available for attending students. Relevant for assessment: • written test: correct calculations, clarity of answers, ability to summarize, evaluate, and establish relationships between topics, general understanding of the topics which had been teached. Knowledge and understanding of physical processes and relevant calculations. Judgement of performance of materials and components. Identification and discussion of problem-solving and improvement techniques. Knowledge of relevant standards. • student presentations: ability to work out a given topic, quality and correctness of presentation, ability to summarize in own words, hand-out (pdf). Judgement of performance of materials and components. Identification and discussion of problem-solving and improvement techniques.

Required readings	• (UNI) EN ISO 6946 • (UNI) EN ISO 10456 • (UNI) EN ISO 13788
Supplementary readings	• books by Prof. Cristina Benedetti (UniBz) on building physics, thermal bridges etc. • Spitzner M. H., Sprengard C: Winterlicher Wärmschutz. Kapitel in: Kalksandstein-Planungshandbuch, 2018. Downloadbar unter www.kalksandstein.de/bv_ksi/downloads (in German) In Deutsch, Englisch and Italiano, see University library: • Pfundstein M., Gellert R., Spitzner M. H., Rudolphi A.: Materiali isolanti. Edizione italiana a cura di Enrico de Angelis. ISBN: 978-88-598-0391-1. Milanofiori Assago (MI): UTET Scienze Tecniche, Wolters Kluwer Italia S.r.l., 2009, Seiten 77 – 92. • Pfundstein M., Gellert R., Spitzner M. H., Rudolphi A.: Insulating Materials – Principles, Materials, Applications. ISBN: 978-3-7643-8654-2. Basel: Birkhäuser, 2008, Seiten 77 – 92. • Pfundstein M., Gellert R., Spitzner M. H., Rudolphi A.: Dämmstoffe – Grundlagen, Materialien, Anwendungen. ISBN: 978-3-920034-18-8. München: Institut für internationale Architektur-Dokumentation GmbH & Co. KG, 2007. Ca. Seiten 77 – 92.

Software used	Excel spreadsheets. (probably:) Numerical simulation software for thermal bridges and/or for summer-time room temperature (Windows, free student licence, in English), to be distributed during the course