Syllabus

Descrizione corso

Titolo insegnamento	Laboratorio di Scambio Termico e di Massa
Codice insegnamento	42618
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	dr. ing. Martin Heinrich Spitzner, MartinH.Spitzner@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/14260
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	• Demonstrations, measurements and test procedures in the field of heat and mass transport, moisture, thermal conductivity 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 and numerical simulations, individual or group coursework, student presentations.
Argomenti	

dell'insegnamento	
Parole chiave	
Prerequisiti	Availability of standards (e.g. pdfs on your smart phone) under "compulsory readings" during the lectures.
Insegnamenti propedeutici	
Modalità di insegnamento	Exercises, labs, student coursework and presentations.
Obbligo di frequenza	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.
Obiettivi formativi specifici e risultati di apprendimento attesi	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 (mainly numerical simulations) accompanying the lectures in order to deepen the understanding of the equations shown in the lectures. 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 transfer, 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.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	
Modalità di esame	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) at the end or after the course (integrated in the written exam in course 42617).
Criteri di valutazione	Relevant for assessment: • student presentations and hand-outs: 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 • 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.
Bibliografia obbligatoria	• (UNI) EN ISO 6946 • (UNI) EN ISO 10456 • (UNI) EN ISO 13788

Bibliografia facoltativa	• 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.
Altre informazioni	Software used: Excel spreadsheets. THERM, Therakles, WuFi (probably, tbd): Numerical simu-lation software for thermal bridges, summer-time room temperature and moisture transport (run on Windows, free student licence, in English), to be distributed during the course.
Obiettivi di Sviluppo Sostenibile (SDGs)	