Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Heat and mass transfer
Course code	42309
Scientific sector	ING-IND/10
Degree	Bachelor in Wood Engineering
Semester	I
Year	II
Academic Year	2019-20
Credits	6
Modular	no

Total lecturing hours	32
Total lab hours	
Total exercise hours	24
Attendance	Not compulsory but recommended
Prerequisites	availability of standards under “compulsory readings” during the lectures
Course page	https://www.unibz.it/de/faculties/sciencetechnology/bachelor-wood-engineering/courses-offered/?academicYear=2019

Specific educational objectives	Die Grundsätze und Prozesse des Wärme- und Stofftransports kennenlernen, verstehen, berechnen und bewerten können, vor allem für die Anwendung in Baustoffen, Bauteilen und Gebäuden. Es werden die praktisch erforderlichen Zusammenhänge für die thermisch-hygrisch-energetische Bewertung von Baustoffen, Bauteilenaufbauten und Gebäuden vermittelt, sowie die physikalischen Prozesse dahinter. Die gelehrten physikalischen Prinzipien sind auch grundlegend für das Verständnis entsprechender Produktionsprozesse (physical processes in processing, manufacturing and automation).

Lecturer	Prof. Dr.-Ing. Martin H. Spitzner
Scientific sector of the lecturer	building physics, heat and mass transport, civil engineering
Teaching language	Deutsch oder Englisch
Office hours	Email (Spitzner@hochschule-bc.de) / Skype (mhspitzner) / or by appointment
Teaching assistant (if any)	---
Office hours	---
List of topics covered	opake und transparente Gebäudehülle Wärmebrücken Technische Standards und Normen Messungen und Testverfahren thermische und hygrische Bauphysik Berechnungs- und Nachweisverfahren

	sowie die dafür relevanten Parameter (u.a. Bauteilaufbau, Wärmetransport, Wärmeverlust, Oberflächentemperatur, Luftfeuchte, Luftwechsel, Schimmelvermeidung, Diffusion, Energie und Energieeffizienz).
Teaching format	lecture; examples and exercised; presentation of models.

Learning outcomes (ILOs)	The learning outcomes need to refer to the Dublin Descriptors: Knowledge and understanding 1. 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. Applying knowledge and understanding **2.** the students can apply their knowledge and understanding professionally, and can solve problems and questions regarding heat and mass transport and energy efficiency. Making judgements 3. 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. Communication skills 4. the students can communicate the principles of heat and mass trasnsfer, and their application in buildings, to both specialist and non-specialist audiences Ability to learn 5. 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	**Formative assessment** **Form** | **Length / duration** | **ILOs assessed** Oral or written test | ca. 1 hour | 1, 2, 3, (4)

	Summative assessment **Form** | **%** | **Length /duration** | **ILOs assessed** | | | | | | | |
Assessment language	Deutsch or english (same as in the lectures)
Evaluation criteria and criteria for awarding marks	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.

Required readings	• (UNI) EN ISO 6946 • (UNI) EN ISO 10456 • (UNI) EN ISO 13788 • Spitzner M. H., Sprengard C: Winterlicher Wärmschutz. Kapitel in: Kalksandstein-Planungshandbuch, 2018. Downloadbar unter www.kalksandstein.de/bv_ksi/downloads
Supplementary readings	• (Italienisch): 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. • (Englisch): 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. • (Deutsch): 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.