

## Syllabus

### Course description

<b>Course title</b>	Heat and mass transfer
<b>Course code</b>	42309
<b>Scientific sector</b>	ING-IND/10
<b>Degree</b>	Bachelor in Wood Engineering
<b>Semester</b>	I
<b>Year</b>	II
<b>Academic Year</b>	2020-21
<b>Credits</b>	6
<b>Modular</b>	no

<b>Total lecturing hours</b>	32
<b>Total lab hours</b>	
<b>Total exercise hours</b>	24
<b>Attendance</b>	Not compulsory but recommended
<b>Prerequisites</b>	availability of standards under "compulsory readings" during the lectures
<b>Course page</b>	<a href="https://www.unibz.it/de/faculties/sciencetechnology/bachelor-wood-engineering/courses-offered/?academicYear=2020">https://www.unibz.it/de/faculties/sciencetechnology/bachelor-wood-engineering/courses-offered/?academicYear=2020</a>

<b>Specific educational objectives</b>	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 gelehrtten physikalischen Prinzipien sind auch grundlegend für das Verständnis entsprechender Produktionsprozesse (physical processes in processing, manufacturing and automation).
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<b>Lecturer</b>	Prof. Dr.-Ing. Martin H. Spitzner
<b>Scientific sector of the lecturer</b>	building physics, heat and mass transport, civil engineering
<b>Teaching language</b>	Deutsch oder Englisch
<b>Office hours</b>	Email ( <a href="mailto:Spitzner@hochschule-bc.de">Spitzner@hochschule-bc.de</a> ) / Skype (mhspitzner) / or by appointment
<b>Teaching assistant (if any )</b>	---
<b>Office hours</b>	---
<b>List of topics covered</b>	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).
<b>Teaching format</b>	lecture; examples and exercised; presentation of models.

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

	<p><b>Summative assessment</b></p> <table border="1"> <thead> <tr> <th>Form</th> <th>%</th> <th>Length /duration</th> <th>ILOs assessed</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Form	%	Length /duration	ILOs assessed								
Form	%	Length /duration	ILOs assessed										
<b>Assessment language</b>	Deutsch or english (same as in the lectures)												
<b>Evaluation criteria and criteria for awarding marks</b>	<p>Knowledge and understanding of physical processes and relevant calculations.</p> <p>Judgement of performance of materials and components.</p> <p>Identification and discussion of problem-solving and improvement techniques.</p> <p>Knowledge of relevant standards.</p>												
<b>Required readings</b>	<ul style="list-style-type: none"> <li>• (UNI) EN ISO 6946</li> <li>• (UNI) EN ISO 10456</li> <li>• (UNI) EN ISO 13788</li> <li>• Spitzner M. H., Sprengard C: Winterlicher Wärmeschutz. Kapitel in: Kalksandstein-Planungshandbuch, 2018. Downloadbar unter <a href="http://www.kalksandstein.de/bv_ksi/downloads">www.kalksandstein.de/bv_ksi/downloads</a></li> </ul>												
<b>Supplementary readings</b>	<ul style="list-style-type: none"> <li>• (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.</li> <li>• (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.</li> <li>• (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 &amp; Co. KG, 2007. Ca. Seiten 77 – 92.</li> </ul>												