

<b>Module description: Materials Engineering 1</b>			
<b>Module Code</b>	t.BA.MT.WT1.19HS		
<b>ECTS Credits</b>	4		
<b>Language of Instruction/Examination</b>	German		
<b>Organizational Unit</b>	IMPE		
<b>Module Coordinator</b>	Oliver Döbrich		
<b>Legal Framework</b>	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.		
<b>Module Characteristic</b>	Type 3b  2 lecture lessons per semester week and class+ 4 lab bi-weekly lessons per semester and half-class		
<b>Module Description</b>	Materials science for mechanical engineers. Fundamentals of materials science from structural composition to mechanical properties. Fundamentals of metals, polymers and fibre reinforced composites. Fundamentals of destructive and non-destructive material and component testing accompanied by practical training.		
<b>Module Content</b>	<p><b>Lecture:</b></p> <ul style="list-style-type: none"> <li>• - Definition of mechanical properties, comparison of materials</li> <li>• - Real and crystalline structures of metals and relation to strength properties</li> <li>• - Alloys and phase diagrams</li> <li>• - Steel, aluminium</li> <li>• - Polymers and fibre reinforced composites</li> <li>• - Destructive and non destructive testing of materials and components</li> </ul> <p><b>Practical course:</b></p> <p><b>7 trainings of 4 lessons each in groups on the following topics:</b></p> <ul style="list-style-type: none"> <li>• - Introduction into universal testing machine equipment and microscopy</li> <li>• - Mechanical properties of typical metallic construction materials, measured in tensile and notched bar impact tests</li> <li>• - Non destructive testing and its application</li> <li>• - Ultrasonic examination as a non-destructive testing method</li> <li>• - Mechanical properties of polymers</li> <li>• - Mechanical properties of composite materials</li> </ul>		
<b>Prerequisite Knowledge</b>	<a href="https://gpmpublic.zhaw.ch/GPMDocProdDPublic/2_Studium/2_02_Grundlagen_Studium/T_C_L_Modulauspraegungen_SM2025.pdf">https://gpmpublic.zhaw.ch/GPMDocProdDPublic/2_Studium/2_02_Grundlagen_Studium/T_C_L_Modulauspraegungen_SM2025.pdf</a>		
<b>Learning Objectives (Competences)</b>	<b>Students...</b>	<b>Competencies</b>	<b>Taxonomies</b>
	Students are able to evaluate materials properties required for the dimensioning of mechanical parts	F, M	K4
	Students are able to connect materials substructures properties with material types	F, M	K3
	Students understand materials testing and link it to materials properties	M, F	K3

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<b>Performance Assessment</b>	<b>End-of-module exam</b>	<b>Assessment</b>	<b>Length (min.)</b>	<b>Weighting</b>	<b>Form</b>	
	written exam	Grade	90	80	acc. to module agreement	
	<b>Performance assessment during the semester</b>		<b>Assessment</b>	<b>Length (min.)</b>	<b>Weighting</b>	<b>Form</b>
	written exam		Grade	90	20	acc. to module agreement
<b>Classroom Attendance Requirement</b>	None					
<b>Learning material</b>	<ul style="list-style-type: none"> <li>• Weißbach, W. (2007). Werkstoffkunde. 15 Edition. Wiesbaden: Vieweg. ISBN 978-3-8348-0295-8.</li> <li>• Roos &amp; Maile (2015). Werkstoffkunde für Ingenieure. 5 Edition. Berlin: Springer. ISBN 978-3-662-64731-8.</li> </ul>					
<b>Comments</b>						