


Studiengang: <b>Bachelor of Science Maschinenbau</b> Program: <i>Bachelor of Science in Mechanical Engineering</i>														
1	Modul: <b>Instrumentation and Measurement</b> Module: <i>Instrumentierung und Messtechnik</i>	<b>English</b> <i>Englisch</i>												
	<b>Fach-Nr.</b> <i>Course number</i>	<b>Semester</b> <i>Semester</i>	<b>Dauer</b> <i>Duration</i>	<b>Status</b> <i>Status</i>										
		5. Semester	1 Semester	compulsory										
	<b>Turnus</b> <i>Regular cycle</i>	annually												
<b>Kreditpunkte</b> <i>Credits</i>	<b>Aufwand</b> <i>Workload</i>	<b>Kontaktzeit</b> <i>Contact-hours</i>	<b>Selbststudium</b> <i>Student's efforts</i>											
4 ECTS	150 h	3 hrs/week = 45 hrs Lecture with integrated Exercises 1 hr/week = 15 hrs Lab Exercise	45 hrs Preparation and post processing of the lecture and exercises 15 hrs Preparation and post processing of the lab exercises 30 hrs exam preparation											
2	<b>Beschreibung</b> <i>Description</i> This is a course in the modelling and selection of measurement devices and techniques in mechanical engineering design. Steady-state and transient sensor performance characteristics, signal processing, and data acquisition techniques will be introduced.													
3	<b>Lernziele</b> <i>Learning Outcomes</i> <ul style="list-style-type: none"> <li>Describe the physical operating principles of common sensor technologies</li> <li>Know the characteristics and performance parameters of sensors</li> <li>Measure physical phenomenon with proper sensors</li> <li>Address sampling and quantization challenges</li> </ul>													
4	<b>Schlüsselqualifikationen</b> <i>Key qualifications</i> <table border="1" data-bbox="207 1160 1513 1240"> <thead> <tr> <th>Sozialkompetenz</th> <th>Methodenkompetenz</th> <th>Selbstkompetenz / Personenkompetenz</th> <th>Interkulturelle Kompetenz</th> <th>Medienkompetenz</th> </tr> </thead> <tbody> <tr> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>				Sozialkompetenz	Methodenkompetenz	Selbstkompetenz / Personenkompetenz	Interkulturelle Kompetenz	Medienkompetenz		X	X		
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	X	X												
5	<b>Lehrveranstaltung/ -methoden</b> <i>Course type and methods</i> <ul style="list-style-type: none"> <li>Lectures with exercises</li> <li>Lab</li> </ul>													
6	<b>Vorbedingungen / Vorkenntnisse</b> <i>Prerequisites</i> <b>Strongly recommended:</b> <ul style="list-style-type: none"> <li>Basic circuits</li> <li>System dynamics</li> <li>Blockdiagram-based Modelling and Simulation</li> </ul>													
7	<b>Arbeitsmittel / Literatur</b> <i>Required material / Literature</i> <ul style="list-style-type: none"> <li>Projector/Laptop/Electronic Panel</li> <li>Presentations</li> <li>Exercises within the lecture</li> <li>Further reading according to the current list published in the lecture</li> </ul>													

Detailinformationen																				
8	<b>Inhalte</b> <i>Course topics</i> <ul style="list-style-type: none"> <li>• <b>Sensor Technologies</b></li> <li>• <b>Sensor Dynamics</b></li> <li>• <b>Sensor Characteristics and Calibration</b></li> <li>• <b>Analog vs Digital</b></li> <li>• <b>Sampling and Data Acquisition</b></li> <li>• <b>Numerical Methods</b></li>   <li>• <b>Laboratory</b>  The lab will be carried out with a changing selection related to the following topics: <ul style="list-style-type: none"> <li>• Incremental Encoders</li> <li>• Graphical User Interfaces and Instrumentation</li> <li>• Adapters</li> <li>• CAN-bus devices</li> <li>• 1<sup>st</sup> and 2<sup>nd</sup> order sensor response</li> <li>• Sensor calibration</li> <li>• Aliasing and Quantization</li> </ul> </li> </ul>																			
9	<b>Prüfungsform</b> <i>Assessment</i> Prüfungsvorleistung / Prerequisite: none Fachprüfung / Examination: written exam																			
10	<b>Voraussetzung für die Vergabe von Kreditpunkten</b> <i>Requirements for granting of credits</i> Successfully passing all individual parts of the examination according to row 9 „Assessment“																			
11	<b>Weiterführende Veranstaltungen</b> <i>Related courses</i> None																			
12	<b>Zuordnung</b> <i>Classification</i> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 14%;">Mathematik &amp; Naturwissenschaft</th> <th style="width: 14%;">Ingenieurwissenschaften</th> <th style="width: 14%;">Ingenieur-anwendungen</th> <th style="width: 14%;">Entwicklung &amp; Konstruktion</th> <th style="width: 14%;">Werkstoffe</th> <th style="width: 14%;">Wirtschaft, Management, Sprachen</th> <th style="width: 14%;">Anderes</th> </tr> </thead> <tbody> <tr> <td></td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						Mathematik & Naturwissenschaft	Ingenieurwissenschaften	Ingenieur-anwendungen	Entwicklung & Konstruktion	Werkstoffe	Wirtschaft, Management, Sprachen	Anderes		X	X	X			
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13	<b>Modulbeauftragter / Lehrpersonen</b> <i>Responsible person / Lecturers</i> Prof. Dr.-Ing. M. Hahn / Prof. Dr.-Ing. M. Hahn																			