

<b>Einführung in die Medizintechnik</b>						
<b>Module Code</b>	<b>Workload</b>	<b>Credits</b>	<b>Semester</b>	<b>Frequency of Module</b>	<b>Duration</b>	
	180 hrs.	6	1	Only winter semester	1 Semester	
<b>1</b>	<b>Module Components</b>		<b>Teaching Language</b>	<b>Contact Hours</b>	<b>Self Study</b>	<b>Class Size</b>
	a) Grundlagen der Medizintechnik		a) English	a) 22,5 hrs.	a) 67,5 hrs.	a) 15
	b) Praktikum Medizintechnik		b) English	b) 22,5 hrs.	b) 67,5 hrs.	b) 15
<b>2</b>	<p><b>Learning Outcomes</b></p> <p>After successful participation in the module the students ...</p> <p><b>Knowledge (1)</b> ... describe the range of applications and approaches in the field of Biomedical Engineering</p> <p><b>Comprehension (2)</b> ... understand main principles in Biomedical Engineering especially in the field of modeling &amp; simulation, measurement techniques and artificial organs</p> <p><b>Application (3)</b> ... use standard software to analyze sound signals and design simple user interfaces ... apply methods from electronics to tailor application specific solutions ... apply methods of Biomedical Engineering to the specific application of blood pressure monitoring</p> <p><b>Analysis (4)</b> ... understand mathematical problems in Biomedical Engineering and describe possible solutions to ... demonstrate and explain results in a scientific presentation ... determine parameters and settings required in electronic measurement systems ... determine robustness and noise sensitivity of a biomedical measurement system ... outline the ideas of relevant scientific publications, reproduce results and inspect for reproducibility</p>					
<b>3</b>	<p><b>Individual Component Content</b></p> <p>a) Overview of different fields of Biomedical Engineering:</p> <ul style="list-style-type: none"> <li>- Physiological basis of organ systems</li> <li>- Available measurements and their accuracy and robustness</li> <li>- artificial organs e.g. artificial heart, kidney replacement, artificial limbs, cochlea implants, artificial retina</li> </ul> <p>b) From physiology to signal interpretation:</p> <ul style="list-style-type: none"> <li>- Physiology of blood pressure</li> <li>- Korotkoff method of blood pressure measurement</li> <li>- Design of amplifiers</li> <li>- Signal acquisition and analysis</li> </ul>					

	<ul style="list-style-type: none"> <li>- Simple interface programming</li> <li>- modeling of organ systems</li> <li>- optimization of therapeutic measures</li> </ul>
<b>4</b>	<p><b>Teaching Methods</b></p> <p>a) Lecture / Seminar</p> <p>b) Practical / Lab</p>
<b>5</b>	<p><b>Prerequisites</b></p> <p>Undergraduate programming, electronic circuits, signal analysis, :</p> <ul style="list-style-type: none"> <li>- Physiology of organ system</li> <li>- Signal acquisition, amplifier design, signal analysis</li> </ul> <p>Basics of engineering and presentation skills:</p> <ul style="list-style-type: none"> <li>- measurement devices</li> <li>- engineering math</li> <li>- scientific presentation</li> </ul>
<b>6</b>	<p><b>Methods of Assessment</b></p> <p>a) Graded Assessment 1K (Written Exam) (3 LP)</p> <p>b) Non Graded Assessment 1sbA (Practical Work) (3 LP)</p>
<b>7</b>	<p><b>Applicability of Module</b></p> <p>Mikromedizintechnik M.Sc. (MZT)</p>
<b>8</b>	<p><b>Person Responsible for Module</b></p> <p>Prof. Dr. Bernhard Vondenbusch (Module Responsible)</p> <p>Heiko Bähr (Lecturer)</p>
<b>9</b>	<p><b>Reading List (Core Texts and Recommended Texts)</b></p> <p>a) Carr/Brown, (2000) "Introduction to Biomedical Equipment Technology", Prentice Hall, 2000</p> <p>b) Kramme, Rüdiger: Medizintechnik : Verfahren - Systeme - Informationsverarbeitung; mit 161 Tab., 4., vollst. überarb. u. erw. Aufl., Springer 2011</p> <p>The biomedical engineering handbook., 4. ed., CRC Taylor Francis 2014 (E-Book)</p>