

<b>Module Name:</b> Medical Technology					
<b>Module Responsibility / Lecturer</b>	Prof. Dr.-Ing. Stefan Müller				
<b>Department, Facility</b>	THL, Applied Natural Sciences, Med. Sensors and Devices Lab				
<b>Module Number</b>		<b>Level</b>	Master	<b>Short Name</b>	
<b>Course of Studies</b>	Medical Microtechnology, Master				
<b>Compulsory/elective</b>	Compulsory	<b>ECTS Credit Points</b>		8	
<b>Semester of Studies</b>	1	<b>Semester Hours per Week</b>		6	
<b>Length (semesters)</b>	1	<b>Workload (hours)</b>		240	
<b>Frequency</b>	WiSe	<b>Presence Hours</b>		72	
<b>Teaching Language</b>	English	<b>Self-Study Hours</b>		168	
<b>Consideration of Gender and Diversity Issues</b>	<input checked="" type="checkbox"/> Use of gender-neutral language (THL standard)				
	<input type="checkbox"/> Target group specific adjustment of didactic methods				
	<input type="checkbox"/> Making subject diversity visible (female researchers, cultures etc.)				
<b>Applicability</b>	Biomedical Engineering, Medical Microtechnology				
<b>Remarks</b>	None				
<b>Course 1: Medical Technology Lecture</b>					
<b>Course Number</b>		<b>Short Name</b>			
<b>Course Type</b>	Lecture	<b>Form of Learning</b>		Presence	
<b>Mandatory Attendance</b>	<input type="checkbox"/>	<b>ECTS Credit Points</b>		6	
<b>Participation Limit</b>	None	<b>Semester Hours per Week</b>		4	
<b>Group Size (practical training, exercises, ...)</b>	None	<b>Workload (hours)</b>		180	
<b>Teaching Language</b>	English	<b>Presence Hours</b>		48	

<b>Study Achievements („Studienleistung“, SL)</b>	None	<b>Self-Study Hours</b>	132
<b>SL Length (minutes)</b>	n. a.	<b>SL Grading System</b>	n. a.
<b>Exam Type</b>	Written Exam	<b>Exam Language</b>	English
<b>Exam Length (minutes)</b>	90	<b>Exam Grading System</b>	One-third Grades
<b>Learning Outcomes</b>	The students shall acquire basic knowledge in medicine, learn to communicate with physicians adequately and learn about the application of modern medical products. They shall get consolidated knowledge of current medical products used for diagnosis and therapy.		
<b>Participation Prerequisites</b>	Basic knowledge in physics, mathematics and engineering sciences		
<b>Contents</b>	<ul style="list-style-type: none"> <li>• Medical Terminology, major organ systems, generation of bioelectrical potentials, a generalized medical instrument, system-transfer function</li> <li>• Measurement of flow, flow sensors, examples</li> <li>• Measurements of the respiratory system, physiology, instruments</li> <li>• Body temperature and temperature sensors</li> <li>• Bioelectrodes and biopotential</li> <li>• ECG (Eindhoven, Goldberger, Wilson), 3D Projection</li> <li>• Bioinstrumentation amplifiers, noise, electrical field, shielding, driven right leg concept</li> <li>• Pumps: Infusion, perfusion, insulin pumps, safety concepts</li> <li>• Cardiac pacemakers and defibrillators</li> <li>• Use of models and equivalent circuits</li> <li>• Exercises for the examination</li> </ul>		
<b>Literature</b>	John G. Webster, „ <i>Medical Instrumentation</i> “, 3rd edition, Wiley and Sons, ISBN 978-0471153689, 1997.		
<b>Remarks</b>	None		
<b>Course 2: Medical Technology Lab</b>			
<b>Course Number</b>		<b>Short Name</b>	
<b>Course Type</b>	Lab	<b>Form of Learning</b>	Presence
<b>Mandatory Attendance</b>	<input checked="" type="checkbox"/>	<b>ECTS Credit Points</b>	2
<b>Participation Limit</b>	25	<b>Semester Hours per Week</b>	2

<b>Group Size (practical training, exercises, ...)</b>	2	<b>Workload (hours)</b>	60
<b>Teaching Language</b>	English	<b>Presence Hours</b>	30
<b>Study Achievements („Studienleistung“, SL)</b>	Lab report	<b>Self-Study Hours</b>	30
<b>SL Length (minutes)</b>	n. a.	<b>SL Grading System</b>	One-third Grades
<b>Exam Type</b>	n. a.	<b>Exam Language</b>	n. a.
<b>Exam Length (minutes)</b>	n. a.	<b>Exam Grading System</b>	n. a.
<b>Learning Outcomes</b>	Knowing of the function and practice of the main medical devices.		
<b>Participation Prerequisites</b>	None		
<b>Contents</b>	Compulsory experiments <ul style="list-style-type: none"> <li>• Lung function</li> <li>• ECG</li> <li>• Infusion and Perfusion</li> </ul>		
<b>Literature</b>	Hand-out, lab descriptions		
<b>Remarks</b>	None		