

# Module Catalog Master Program Medical Engineering

## Study Field "Medical Image and Data Processing"

Please note the Module Descriptions in UnivIS!

Modul Group	Modul Number	Modules		SWS L+E+S+P	Total Sum ECTS	1st Year		2nd Year		Credit Modalities	Department	Lecturer / Responsible Person	WT/ST
		Modul Name (Name of Lecture)	Abbr.			WT	ST	WT	ST				
						ECTS	ECTS	ECTS	ECTS				
<b>M 1</b>	<b>Medical Specialisation</b>			<b>L+E+S+P</b>	<b>10</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>gCA</b>			
	M 1.1	Clinical Applications of Optical Technologies and Associated Fundamentals of Anatomy <sup>1</sup>	OMED/CA	4+0+0+0	5		5			45 o	MED	Prof. Dr. med. Michael Eichhorn	ST
	M 1.2	Applications of nanotechnology in cardiovascular diseases	HNO 24	0+0+2+0	2,5		2,5			gCA	MED	Prof. Dr. med. Christoph Alexiou, PD Dr. habil. med. Iwona Cicha	WT/ST
	M 1.3	Medizinische Biotechnologie / Medical Biotechnology	MBT	3+1+0+0	5		5			120 w	CBI	Prof. Dr. med. habil. Dr. rer. nat. Oliver Friedrich	ST
	M 1.4	Medical physics in radiation therapy Praktikum	MSP	4+0+0+2	10	2,5				PfE	MED	Prof. Dr. Christoph Bert	WT+ST
	M 1.5	Medical physics in radiation therapy - lab only Praktikum	MSPL	2+0+0+2	7,5	2,5				PfE	MED	Prof. Dr. Christoph Bert	WT+ST
	M 1.6	Medical physics in radiation therapy - special topic only	MSPS	4+0+0+0	5	2,5	2,5			PfE	MED	Prof. Dr. Christoph Bert	WT+ST
	M 1.7	Jüngste Entwicklungen der medizinischen Systembiologie / Advances in Medical Systems Biology	AdvMedSys	0+0+3+0	2,5		2,5			PfE	MED	Prof. Dr. Julio Vera-Gonzalez	ST

<sup>1</sup> Obligatory, if appropriate skills not acquired in the Bachelor.

M 2 Engineering Core Modules			L+E+S+P	20	10	10	0	0	gCA			
M 2.8	Computergraphik / Computer Graphics <sup>3</sup> Exercise	CG	3+1+0+0	5	5				90 w	INF	Dr. Roberto Grosso	WT
M 2.9	Digitale Signalverarbeitung / Digital Signal Processing Exercise	DSV	3+1+0+0	5	5				90 w	EEL	Prof. Dr.-Ing. Walter Kellermann	WT
M 2.10	Pattern Recognition <sup>1</sup>	PR	3+0+0+0	5	5				30 o	INF	Prof. Dr.-Ing. Joachim Hornegger	WT
M 2.11	Pattern Analysis <sup>1</sup>	PA	3+0+0+0	5		5			30 o	INF	Prof. Dr.-Ing. Elmar Nöth	ST
M 2.12	Statistische Signalverarbeitung / Statistical Signal Processing Exercise	STASIP	3+1+0+0	5		5			90 w	EEL	Prof. Dr.-Ing. Walter Kellermann	ST
M 2.20	Informationstheorie / Information Theory Übung	IT IT-EN	3+1+0+0	5		5			90 s	EEL	Prof. Dr.-Ing. Ralf Müller	WT: en. ST: ger.
M 2.21	Kanalcodierung / Channel Coding Exercise	KaCo ChCo	3+1+0+0	5		5			90 w	EEL	Dr.-Ing. Clemens Stierstorfer	WT: ger. ST: en.
M 2.23	Geometrische Modellierung / Geometric Modeling <sup>3</sup> Exercise	GM	3+1+0+0	5	5				30 o	INF	Prof. Dr. Günther Greiner, Prof. Dr.-Ing. Marc Stamminger	WT
M 2.24	Angewandte Visualisierung / Applied Visualization Exercise	AppVis	2+2+0+0	5		5			30 o	INF	PD Dr.-Ing. Peter Hastreiter	ST
M 2.25	Transformationen in der Signalverarbeitung / Transformations in Signal Processing	TSV	2+0+0+0	2,5		2,5			30 o	EEL	Dr.-Ing. Jürgen Seiler	ST
M 2.27	Dependable Embedded Systems <b>(currently not offered!)</b> Exercise	DES	2+2+0+0	5	5				30 o	INF	Prof. Dr.-Ing. Michael Glaß	WT
M 2.28	Algorithms of Numerical Linear Algebra Exercise	ANLA	4+2+0+0	7,5	7,5				90 w	INF	Prof. Dr. Christoph Pflaum	WT
M 2.29	Functional Analysis for Engineers <sup>2</sup> Exercise	FuncAnEng	2+2+0+0	5	5				60 w	INF	Prof. Dr. Christoph Pflaum	WT
M 2.30	Optimierung für Ingenieure / Optimization for Engineers Exercise	OptIngV	3+1+0+0	5		5			90 w	NAT	apl. Prof. Martin Gugat, Dr. Johannes Hild	ST

<sup>1</sup> Obligatory, if appropriate skills not acquired in the Bachelor.

<sup>2</sup> Very profound knowledge of mathematics required.

<sup>3</sup> Yearly change between German and English.

M 3 Medical Engineering Core Modules				L+E+S+P	20	10	10	0	0	gCA			
M 3.1	Visual Computing in Medicine	VCMed	4+0+0+0	5	2,5	2,5	0	0	0	30 o	INF	PD Dr.-Ing. Peter Hastreiter, PD Dr. Thomas Wittenberg	WT+ST
M 3.2	Diagnostic Medical Image Processing	DMIP	3+0+0+0	5	5	0	0	0	0	30 o	INF	Prof. Dr.-Ing. habil. Andreas Maier	WT
M 3.3	Interventional Medical Image Processing	IMIP	3+0+0+0	5	5	0	0	0	0	30 o	INF	Prof. Dr.-Ing. habil. Andreas Maier	ST
M 3.4	Biomedizinische Signalanalyse / Biomedical Signal Analysis Exercise	BioSig	2+2+0+0	5	5	0	0	0	0	90 w	INF	Prof. Dr. Björn Eskofier	WT
M 3.5	Computer Architectures for Medical Applications Exercise	CAMA	2+2+0+0	5	5	0	0	0	0	30 o	INF	Prof. Dr.-Ing. Dietmar Fey, Prof. Dr. Gerhard Wellein	ST
M 3.7	Image and Video Compression Exercise	IVC	3+1+0+0	5	5	0	0	0	0	90 w	EEL	Prof. Dr.-Ing. André Kaup	ST
M 3.9	Wavelet-Transformationen in der Bildverarbeitung / Wavelet Transformations in Image Processing Exercise (Theoretical or Practical)	WTBV	3+1+0+0	7,5	0	0	7,5	0	0	30 o	INF	apl. Prof. i. R. Volker Strehl	WT
M 3.10	Geometry Processing Exercise	GP	2+2+0+0	5	5	0	0	0	0	30 o	INF	Prof. Dr. Günther Greiner, Dr. Roberto Grosso	ST

M 4 Medical Engineering Core Skills				L+E+S+P	10	5	0	5	0	gCA			
M 4.1	<b>Medical Device Law</b> Innovation Technology		2+2+0+0	5	5	0	0	0	0	gCA	WISO	Prof. Dr. Kathrin M. Möslein	WT
M 4.2	<b>Economics and Innovation</b> Interdisciplinary Innovations in Medical Engineering	ININMEN	0+0+2+0	2,5	2,5	0	0	0	0	gCA	ZiMT	Sultan Haider, Dipl.-Ing. Tobias Zobel	WT/ST
	Leadership and communication in a global world		2+0+0+0	2,5	2,5	0	0	0	0	online, offline,	VHB	Klaus Helmerich, Kathrin Horn	WT/ST
	Management of Change Processes in a Global World		2+0+0+0	2,5	2,5	0	0	0	0	online, offline,	VHB	Markus-Alexander Kötzle	WT/ST
	Product Management	OSS-PROD	4+0+0+0	5	5	0	0	0	0	gCA	INF	Prof. Dr. Dirk Riehle, MBA	ST
	Innovation & Leadership		2+2+0+0	5	5	0	0	0	0	gCA	WISO	Prof. Dr. Kathrin M. Möslein	WT
	Internationales Projektmanagement / International Project Management	IntPM	4+0+0+0	5	5	0	0	0	0	30 o	WISO	Yörk Rössler	WT
	Innovation Management in Emerging Markets		4+0+0+0	5	5	0	0	0	0	20 o	VHB	Prof. Dr. Björn Ivens	ST
M 4.3 <sup>5</sup>	<b>Seminar Medical Engineering and Ethics</b> , consisting of:			5			5						
M 4.3 a	Seminar Medizinethik / Seminar Medical Ethics	MEDET	0+0+2+0	2,5	0	0	2,5	0	0	gCA	ZiMT	Dr. Jens Ried, Dr.-Ing. Kurt Höller, MBA	WT/ST
M 4.3 b <sup>4</sup>	Seminar Medical Engineering		0+0+2+0	2,5	0	0	2,5	0	0	gCA	ZiMT	see Seminar Catalogue	WT/ST

<sup>4</sup> Selection of 1 out of Catalogue

<sup>5</sup> Obligatory

M 5 Medical Engineering Specialisation Modules			L+E+S+P	10	0	5	5	0	gCA			
M 5.6	Software Test and Analysis (Software Verification and Validation) Exercise	SWE-VV	2+2+0+0	5	0	0	5	0	60 w	INF	Prof. Dr. Francesca Saglietti	WT
M 5.9	Human Computer Interaction Exercise	HCI	3+1+0+0	5	0	5	0	0	90 w	INF	Prof. Dr. Björn Eskofier	ST
M 5.10	Convex Optimization in Communications and Signal Processing Exercise	ConvOpt	3+1+0+0	5	0	0	5	0	90 w	EEL	apl. Prof. Dr.-Ing. Wolfgang Gerstacker	WT
M 5.11	Image Processing in Optical Nanoscopy Exercise	IPNano	1+1+0+0	5	0	5	0	0	30 o	INF	PD Dr.-Ing. habil. Harald Köstler, Dr. Gerald Donnert	ST
M 5.12	Security in Embedded Hardware Exercise	SEH	2+2+0+0	5	0	5	0	0	30 o	INF	Dr.-Ing. Daniel Ziener	ST
M 5.1	Optical Technologies in Life Science GPP <sup>6</sup>	OIC/OTLS	4+0+0+0	5	0	0	5	0	90 w	CBI	Prof. Dr. med. habil. Dr. rer. nat. Oliver Friedrich	WT
M 5.2	Lasers in Healthcare Engineering GPP <sup>6</sup>	LASHE	2+0+0+0	2,5	0	0	2,5	0	60 w	WW	Ilya Alexeev, Ph.D.	WT
M 5.12	Integrated Production Systems (Lean Management) GPP <sup>6</sup> Exercise	IPS	2+2+0+0	5	0	0	5	0	90 w	MB	Prof. Dr.-Ing. Jörg Franke	WT/ST online
M 5.19	Knowledge Discovery in Databases <b>not offered in ST 16!</b>	KDD	2+0+0+0	2,5	0	2,5	0	0	30 o	INF	Prof. Dr. Klaus Meyer-Wegener	ST

<sup>6</sup> Modules from the branch of study "Medical Devices, Manufacturing Engineering and Prosthetics" (GPP), selection 1 out of 3: only a maximum of 5 ECTS from the module groups M2, M3 or M5 of all branches of study

M 6 Medical Engineering Practical Skills		L+E+S+P	10	0	0	10	0	uCA			
M 6.1	Academic Laboratory	0+0+0+4	5	0	0	5	0	uCA		Dipl.-Ing. Tobias Zobel	WT/ST
M 6.2	Research Laboratory	0+0+0+4	5	0	0	5	0	uCA		Dr.-Ing. Kurt Höller, MBA	WT/ST
M 6.1 + M 6.2	Alternative for M 6.1 and M 6.2: Flat-Panel CT Reconstruction	ProjFCR	0+0+0+8	10		10		uCA		Prof. Dr.-Ing. habil. Andreas Maier	WT/ST

M 7 Softskills / Flexible Budget			10	0	0	10	0	gCA		
M 7.1	Softskills any <b>graded</b> lecture / course at the university		10	0	0	10	0			

M 8 Master's Thesis			30	0	0	0	30	PfE		
M 8	Master's Thesis		30	0	0	0	30			

For M3 you can use max. 5 ECTS points from the module groups M2 to M3 of all branches of study.

For M5 you can use max. 5 ECTS points from the module groups M2, M3 or M5 of all branches of study.

All lectures can be complemented by additional exercises and practical courses.

It is possible that in rare cases the exam type is changed. This information must be communicated to the students no later than two weeks after the semester start and must be documented in the module description.

**L** Lecture

**E** Exercise

**S** Seminar

**P** Practical Exercise

**WT** Winter Term

**ST** Summer Term

**PfE** Portfolio Examination

**gCA** graded Course Achievement

**uCA** ungraded Course Achievement

**w** written

**o** oral

**online** online (Virtual University Bavaria, www.vhb.org)

VORLAGE Stuko 2016-01-12