



## M.Sc. Medical Photonics

The M.Sc. Medical Photonics programme comprises five blocks:

- **Adjustment:** Modules of this block provide students with the necessary background knowledge in natural sciences (with focus on optics and physical chemistry) and basic knowledge in biology and medicine (with focus on anatomy and physiology).
- **Fundamentals:** This block provides students with basic skills needed in all other courses.
- **Specialization:** This block comprises elective courses the student can select to focus in more depth on a special topic.
- **Practical training:** In all semesters theoretical courses and exercises are complemented by practical training in student and research laboratories.
- **Master thesis:** The master thesis can be completed in university or industry research laboratories.

The programme is complemented by language and soft skills courses.

1 <sup>st</sup> semester Adjustment & Fundamentals	30 CP	2 <sup>nd</sup> semester Adjustment & Fundamentals	30 CP	3 <sup>rd</sup> semester Specialization & Research	30 CP	4 <sup>th</sup> semester Research	30 CP
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Adjustment		18 CP			9 CP
Mathematical Methods Precourse	A0.1				
Introduction to Chemistry Precourse	A0.2				
Mathematical Methods 2L + 1E	A1.1				
Physical Optics 2L + 1E	A1.2		Optical Engineering 2L + 1E	A2.1	3 CP
Physical Chemistry 4L + 2E	A1.3		Light Matter Interaction 2L + 1E	A2.2	3 CP
Human Biology I 4L + 2E	A1.4		Human Biology II 2L + 1E	A2.3	3 CP

Fundamentals		8 CP			8 CP
Image Processing I 2L + 2E	F1.1		Image Processing II 2L + 2E	F2.1	4 CP
Biomedical Imaging I 2L + 1E	F1.2		Biomedical Statistics 2L + 2E	F2.2	4 CP

Specialization		8 CP			12 CP
Basic techniques			Specialization towards microscopy		
Advanced mathematics 2L + 2E	S2.1	4 CP	Biological microscopy 2L + 1E	S3.1	4 CP
Biomedical Imaging II 2L + 1E	S2.2	4 CP	Single-molecule microscopy 2L + 1E	S3.2	4 CP
Microscopy 2L + 1E	S2.3	4 CP	Electron microscopy 2L + 1E	S3.3	4 CP
Labels (Dyes, Nanoparticles, etc.) 2L	S2.4	4 CP	Nanooptics 2L + 1E	S3.4	4 CP
Lasers in medicine 2L + 1E	S2.5	4 CP	Specialization towards clinical applications		
Fiber optics 2L + 1E	S2.6	4 CP	Ophthalmoscopy 2L + 1E	S3.5	4 CP
Image understanding 2L + 1E	S2.7	4 CP	Medical diagnosis and therapy 2L + 1E	S3.6	4 CP
Visual recognition and analysis 1L + 2E	S2.8	4 CP	Theranostics 2L + 1E	S3.7	4 CP
Management of scientific data 2L + 2E	S2.9	4 CP	Biomaterials 2L + 1E	S3.8	4 CP
			Specialization towards spectroscopy / diagnostics		
			Chemometrics 2L + 1E	S3.9	4 CP
			Microspectroscopy 3L	S3.10	4 CP
			Mass Spectrometry Imaging 2L + 1E	S3.11	4 CP
			Optical Sensors, Microfluidics 2L + 1E	S3.12	4 CP

Practical Training			
Practical Course	P1	9 CP	
Research Labworks	P2	18 CP	
Master's Thesis	M	30 CP	

L = Lecture, E = Exercise/Seminar

For more details see the website of the M.Sc. Medical Photonics programme: [www.uniklinikum-jena.de/medpho/en/](http://www.uniklinikum-jena.de/medpho/en/)