

Career prospects:

By completing the Master's programme "Medical Photonics" you will be well prepared to use and develop optical methods in biomedical research and in clinical applications. This will provide the basis to enrol for a Ph.D. programme in biomedical photonics and start a scientific career.

As a graduate of the M.Sc. Medical Photonics you will also have excellent prospects in finding a job at technology-related companies in optics, medical technology or life sciences.



M.Sc. Medical Photonics

www.medpho.uniklinikum-jena.de

Regular period of studies:	4 semesters (full time)
Start:	every winter term
Language:	English
Numbers:	up to 30 students per year
Admission requirements:	first degree in chemistry, physics, biology, biochemistry/molecular biology, medicine or equivalent
Application:	Online at www.master.uni-jena.de
Contact for general questions	Master Service Centre
Registration:	April 1 st to July 15 th
Contact and further information:	Dr. Holger Babovsky Coordinator of the Master's degree programme Tel: 03641-9-33623 holger.babovsky@uni-jena.de Prof. Dr. Christoph Biskup AG Biomolekulare Photonik Tel: 03641-9-397800 Fax: 03641-9-397802 christoph.biskup@uni-jena.de

Participating faculties:

Faculty of Chemistry and Earth-Sciences
Faculty of Medicine
Faculty of Physics and Astronomy



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Aims and contents of the M.Sc. programme:

Understanding the cause of diseases, early diagnosis of diseases and establishing a specific and effective treatment, these are the goals modern medicine tries to achieve. Light plays a key role in turning this ambitious vision into reality. In biomedical research, modern optical and photonic techniques allow for monitoring and manipulating life processes in cells and tissues even at the molecular level. Optical and photonic techniques have also become an essential part in many fields of clinical medicine. Ophthalmologic products, research and surgical microscopes, endoscopes, laser systems are nowadays indispensable tools in diagnosis and therapy.

For applying and developing new optical methods in the field of medical photonics fundamental knowledge in biomedicine as well as in natural sciences and mathematics is indispensable. Additionally, expert knowledge in selected branches of microscopy, spectroscopy and clinical applications of photonic technologies is required. The Master's programme "Medical Photonics" at Friedrich-Schiller-Universität Jena prepares students to meet exactly these needs.

As a student of the Master's degree programme you will gain deeper theoretical, methodical and systematic insights into branches of biology, medicine, mathematics, chemistry and physics. At the same time you will gather the necessary experimental skills for doing research in the field of Medical Photonics. During your studies you will have the possibility to get specialized training in various subfields of Medical Photonics, such as microscopy, spectroscopy and diagnostics as well as clinical applications of these techniques.

Course of studies:

The studies are structured in blocks. Adjustment modules offered at the beginning of the Master's programme aim at complementing the students' knowledge in the neighbouring disciplines. Additional modules within the block "Fundamentals" give the students training in basic skills needed for the elective courses of the block "Specialization".

Lectures and seminars are accompanied by practical courses. A research oriented lab-work during the 3rd semester provides the possibility to participate in a current research project of one of the research groups participating in the Master's degree programme and introduces the student to the topic of his/her master thesis.

1 st semester 30 CP Adjustment & Fundamentals	2 nd semester 30 CP Adjustment & Fundamentals	3 rd semester 30 CP Specialization & Research	4 th semester 30 CP Research
Module Adjustment 16 CP Mathematical methods..... (precourse) Mathematical methods (M/C) 4 CP Optics (M/C) 4 CP Physical Chemistry (M/P) 8 CP Human Biology I (C/P)..... 8 CP 8 CP Physical Optics (M/C) 4 CP Light Matter Interaction (M/P)..... 4 CP Human Biology II (C/P)..... 4 CP		
Module Fundamentals 8 CP Image Processing I (M/C/P) 4 CP Biomedical Imaging I (M/C/P) 4 CP 8 CP Image Processing II (M/C/P) 4 CP Biomedical Statistics (M/C/P) 4 CP		
	Module Specialization 8 CP Basic techniques Advanced Mathematics 4 CP Biomedical Imaging II 4 CP Microscopy 4 CP Lables (Dyes, Nanoparticles, ...) 4 CP Lasers in medicine 4 CP Fiber optics 4 CP Image understanding 4 CP Visual recognition and analysis 4 CP Management of scientific data 4 CP12 CP Specialization Microscopy Biological Microscopy 4 CP Single-molecule Microscopy 4 CP Electron Microscopy 4 CP Nanooptics 4 CP Specialization Clinical Applications Ophthalmoscopy 4 CP Medical Diagnosis and Therapy 4 CP Theranostics 4 CP Biomaterials 4 CP Specialization Spectroscopy/ Diagnostics Chemometrics 4 CP Microspectroscopy 4 CP Mass Spectrometry Imaging 4 CP Optical Sensors, Microfluidics 4 CP	
Module Practical Training Practical Course 12 CP		Research Labworks 8 CP	Master Thesis 30 CP

Legend:
 course is compulsory for students having a bachelor degree in
 M = biological sciences or for students having completed the basic studies in medicine
 C = chemical sciences
 P = physical sciences
 elective courses