Module description

Module title					Abbreviation
Principles of Two- and Three-Dimensional Röntgen Imaging					11-ZDR-152-m01
Module coordinator				Module offered by	
Managing Director of the Institute of A			pplied Physics Faculty of Physics and Astronomy		
ECTS Method of grading		Only after succ. compl. of module(s)			
6 numerical grade					
Duration		Module level	Other prerequisites		
1 semester		graduate			
Contents					
Physics of X-ray generation (X-ray tubes, synchrotron). Physics of the interaction between X-rays and matter (pho- ton absorption, scattering), physics of X-ray detection. Mathematics of reconstruction algorithms (filtered rear projection, Fourier reconstruction, iterative methods). Image processing (image data pre-processing, feature ex- traction, visualisation,). Applications of X-ray imaging in the industrial sector (component testing, material characterisation, metrology, biology,). Radiation protection and biological radiation effect (dose,).					
Intended learning outcomes					
The students know the principles of generating X-rays and of their interactions with matter. They know imaging techniques using X-rays and methods of image processing as well as application areas of these methods.					
Courses (type, number of weekly contact hours, language — if other than German)					
V (3) + R (1) Module taught in: German or English					
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)					
 a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English Assessment offered: Once a year, summer semester 					
Allocation of places					
Additional information					
Workload					
180 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor's degree (1 major) Physics (2015) Bachelor's degree (1 major) Nanostructure Technology (2015) Master's degree (1 major) Functional Materials (2016)					

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Bachelor's degree (1 major) Physics (2020) Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Functional Materials (2022) exchange program Physics (2023) Master's degree (1 major) Functional Materials (2025)

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