

Module title		Abbreviation
Computer Vision		10-I-CV-222-m01
Module coordinator		Module offered by
holder of the Chair of Computer Science IV		Institute of Computer Science
ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
Contents		
<p>This course aims at offering a self-contained account of computer vision and its underlying concepts, including the recent use of deep learning. It starts with an overview of existing and emerging computer vision applications. It shows how image processing is entering multiple fields from our daily life. First, the light-matter interaction is considered and the image acquisition cameras and illumination sources are also discussed. The course then turns to image representation and discretization, and describes pre-processing steps (such as linear and non-linear filters) used to enhance image quality and/or detect specific features. The course will continue by analyzing procedures to extract information from multiple images, with motion and 3D shape as major examples. Finally, the recognition of objects (specific and/or class level) will be discussed and different approaches will be analyzed. A large part of the course concerns deep learning and AI-based approaches to vision tasks.</p>		
Intended learning outcomes		
<ul style="list-style-type: none"> • Understanding of important computer vision concepts: light, matter, acquisition of images, color, texture, sampling, quantization, enhancement, feature extraction, segmentation, 3D acquisition, motion, tracking, object recognition. • Understanding of deep learning (MLP, ConvNets, architectures) and the application to visual data. • Deployment of vision and learning algorithms from standard libraries. • Understanding of vision problems, and the ability to propose, debug, validate and explain solutions based on particular algorithms. 		
Courses (type, number of weekly contact hours, language – if other than German)		
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Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)		
<p>written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus</p>		
Allocation of places		
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Additional information		
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Workload		
150 h		
Teaching cycle		
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Referred to in LPO I (examination regulations for teaching-degree programmes)		
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Module appears in		

Bachelor' degree (1 major) Mathematical Data Science (2022)
Bachelor' degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor' degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor' degree (1 major) Artificial Intelligence and Data Science (2024)