Department	04 Electrical Engineering and Information Technology
Course title	**Computer Vision**
Hours per week (SWS)	3
Number of ECTS credits	5
Course objective	• Projective Geometry (2D, 3D) • Camera model and camera calibration • Feature extraction and matching • Image segmentation • Classification and detection • 3d reconstruction • Motion estimation and tracking • Algorithms on point clouds After participating at this course, the students will know and understand established methods of computer-based vision (computer vision). They will learn methods for extracting and registering meaningful image features as well as methods for segmenting homogeneous or semantically similar image areas. The students will know various classification and detection methods and use them in combination with the extracted image features for object classification and detection. The students will know methods for 3D reconstruction based on several camera images. They will learn methods for estimating motion and tracking interesting image structures and objects in video sequences. The students will have the ability to analyze and synthesize complex image processing systems and to design, build and commission camera-based solutions in various application areas, e.g. video surveillance, intelligent vehicles, human-machine interfaces and quality control. They will be proficient in current development environments and will be able to use current image processing and pattern recognition tools.
Prerequisites	Required: Basics of digital image processing, knowledge of programming in Python.
Recommended reading	• D. Forsyth, J. Ponce: Computer Vision: A Modern Approach (2nd edition), Pearsons (2012). • R. Szeliski: Computer Vision: Algorithms and Applications (2nd edition), Springer Verlag (2021). • R. Hartley, A. Zisserman: Multiple View Geometry in Computer Vision (2nd edition), Cambridge University Press (2011). • R. Gonzalez, R. Woods: Digital Image Processing (4th edition) , Pearson (2018).
Teaching methods	Seminar-based instruction with integrated exercises/integrated internship
Assessment methods	Written exam, 90 min, plus voluntary exercises with the option to get additional points (max. 20%)
Language of instruction	English
Name of lecturer	Prof. Dr. Fabian Flohr, Prof. Dr. Alfred Schöttl
Email	fabian.flohr@hm.edu
Link	https://www.ee.hm.edu/fk04/profs/flohr.de.html
Course content	See handbook for the master program "Elektrotechnik", https://w3-mediapool.hm.edu/mediapool/media/fk04/fk04_lokal/studienplan__modulhandbuch__neu_/modulhandbuecher/mosulhandbuecher_ws_2022_23/MHB-2022-09-22-1.pdf
Remarks	