3 D Computer Vision					AR-213
Rota annually SS	**Duration** 1 Semester	**Semester** 2nd (Semester)	**SWS** 3 SWS	**Credit Points** 5	**Workload** 150 h

1 Modul structure

Course (Abbreviation)	Type/ SWS	Presence	Self study	Credits
a) 3D Computer Vision	Lecture/ 2 SWS	30 h	60 h	3
b) 3D Computer Vision	Tutorial/ 1 SWS	15 h	45 h	2

2 Language

English

3 Content

1. Introduction to projective geometry
2. Linear and nonlinear approaches to the calibration of camera systems
3. 3D reconstruction based on photogrammetric methods, especially bundle adjustment
4. Pattern classification methods for establishing point correspondences between images
5. Model-based 3D pose estimation
6. 3D reconstruction based on the point spread function (depth from focus/defocus)
7. 3D reconstruction of surfaces based on their physical reflectance properties (photoclinometry, shape from shading/polarisation)
8. Technical and scientific applications

Literature:

- Horn: Robot Vision
- Klette, Koschan, Schlüns: Computer Vision: Three-Dimensional Data from Images;
- Hartley/Zisserman: Multiple Viewpoint Geometry

4 Goals

The students obtain the ability to understand, develop, and implement 3D computer vision methods and apply them to practical technical or scientific problems.

5 Examination Requirements

The final exam will be an oral or written exam (form will be announced in the third week of the course).
Each student has to participate in 5 practical programming lectures successfully.

6 Formality of Examination

☒ Module Finals ☐ Accumulated Grade

7 Module Requirements (Prerequisites)

Good knowledge in linear algebra as well as linear and nonlinear optimization.

8 Allocation to Curriculum:

Program: Automation & Robotics, Field of study: Robotics, Cognitive Systems

Program: Electrical Engineering und Information Technology (ETIT-233)

9 Responsibility/ Lecturer

*Prof. Dr. C. Wöhler/*Prof. Dr. C.Wöhler