Mobile Robots					AR-225
Rota annually SS	**Duration** 1 Semester	**Semester** 2nd (Semester)	**SWS** 4 SWS	**Credit Points** 5	**Workload** 150 h

1	**Modul Structure**				
	Course (Abbreviation)	**Type/ SWS**	**Presence**	**Self Study**	**Credit Points**
	a) Mobile Robots (MR)	Lecture/ 2 SWS	30 h	30 h	3
	b) Mobile Robots (MR)	Tutorial/ 2 SWS	30 h	60 h	2

2 **Language**
English

3 **Content**

1. Robot Operating System (ROS)
2. Robotics System Toolbox Matlab
3. Sensors, actuators and kinematics of mobile robots
4. Homing and trajectory following
5. Obstacle avoidance (Vector Field Histograms)
6. Localisation
7. Path planning (Rapidly Exploring Random Trees, Probabilistic Roadmap)
8. Navigation (Pure Pursuit, ROS Navigation Stack)
9. Online trajectory optimization
10. Mapping and SLAM

Literature:

- Siciliano, Khatib: Springer Handbook of Robotics
- selected papers on mobile robotics from journals and conferences

4 **Competencies**
The students acquire a profound knowledge of fundamental concepts and practical experience on mobile robots. Students are able to solve mobile robotic tasks such as obstacle avoidance, navigation and localization in a self-dependent manner with selected methods and algorithms in ROS/Matlab.

5 **Examination Requirements**
- successful completion of 75% programming assignments (prerequisite for eligibility to the written exam
- written exam

6 **Formality of Examination**
☒ Module Finals ☐ Accumulated Grade

7 **Module Requirements (Prerequisites)**

8 **Allocation to Curriculum:**
Program: Automation & Robotics, Field of study: Robotics, Cognitive Systems

9 **Responsibility/ Lecturer**
apl. Prof. Dr. F. Hoffmann/ apl. Prof. Dr. F. Hoffmann