

Module MA-INF 4310	Lab Mobile Robots				
Workload 270 h	Credit points 9 CP	Duration 1 semester	Frequency at least every year		
Module coordinator	Prof. Dr. Sven Behnke				
Lecturer(s)	Prof. Dr. Sven Behnke, Dr. Nils Goerke				
Classification	Programme M. Sc. Computer Science		Mode Optional	Semester 2. or 3.	
Technical skills	Participants acquire basic knowledge and practical experience in the design and implementation of control algorithms for simple structured robotic systems using real mobile robots. Fundamental paradigms for mobile robots will be identified and implemented in 2 person groups.				
Soft skills	Self-competences (time management, goal-oriented work, ability to analyze problems and to find practical solutions), communication skills (Work together in small teams, oral and written presentation of solutions, critical examination of implementations)				
Contents	Robot middleware (e.g. ROS), robot simulation tools, basic capabilities for mobile robots: reactive control, SMPA architecture, navigation, path planning, localisation, simultaneous localization and mapping (SLAM), visual based object detection, learning robot control.				
Prerequisites	Recommended: At least 1 of the following: BA-INF 132 – Grundlagen der Robotik BA-INF 131 – Intelligente Sehsysteme MA-INF 1314 – Online Motion Planning MA-INF 2201 – Computer Vision MA-INF 4113 – Cognitive Robotics MA-INF 4114 – Robot Learning MA-INF 4203 – Autonomous Mobile Systems				
Format	Teaching format	Group size	h/week	Workload[h]	CP
	Lab	8	4	60 T / 210 S	9
	T = face-to-face teaching; S = independent study				
Exam achievements	Oral presentation, written report (graded)				
Study achievements	none (not graded)				
Forms of media	Robots simulation environments, robot control middleware, computer vision libraries, programming, demonstration of robot capabilities (real robotic systems), presentation and written report of approach and results.				
Literature	<ul style="list-style-type: none">• S. Thrun, W. Burgard and D. Fox: Probabilistic Robotics. MIT Press, 2005.• J. Buchli: Mobile Robots: Moving Intelligence, Published by Advanced Robotic Systems and Pro Literatur Verlag• B. Siciliano, O. Khatib (Eds.): Springer Handbook of Robotics, 2008.• Additional State-of-the-art publications.				