

Networked Mobile Robot Systems					AR-302
Rota	Duration	Semester	SWS	Credit Points	Workload
annually SS	1 Semester	2 nd (Semester)	3 SWS	5	150 h
1	Modul Structure				
	Course (Abbreviation)	Type/ SWS	Presence	Self Study	Credit Points
	a) Netw. Mob. Robot Systems (NRS)	Lecture/ 2 SWS	25 h	65 h	3
	b) Netw. Mob. Robot Systems (NRS)	Tutorial/ 1 SWS	15 h	30 h	1,5
	c) Netw. Mob. Robot Systems (NRS)	Lab	3 h	2 h	0,5
2	Language English				
3	Content <ol style="list-style-type: none"> 1. Concept of operations: definitions, impact and history of networked robot systems, use cases. 2. Localization: basic localization technologies, indoor and outdoor localization systems, proximity sensing and localization, mobility analytics. 3. Information & communication technologies: local area networks, mobile radio networks, robust mesh/relay communication protocols, routing protocols, wireless mesh networks and standards, fast handovers. 4. Swarm strategies: self-learning, controlled mobility, autonomous behavior and learning, distributed coordination. 5. Decentralized mission scheduling & task distribution: Algorithms for strategic goal and tactical task management, autonomous agents, role models, role switching, association of tasks and responsibilities, tasks vs. communication performance 6. Performance evaluation: event-driven simulations, system and analytical modeling (for channel conditions, mobility, communication protocols). <p>Literature:</p> <ul style="list-style-type: none"> • Slides of all lectures will be supplied online 				
4	Competencies The course introduces concepts, methods and the performance evaluation of wireless networking, distributed problem solving, cooperative algorithms and swarm based behavior to accomplish easy deployment and appropriate mission scheduling for networked robotics systems.				
5	Examination Requirements The final exam will be an oral (30 minutes) exam.				
6	Formality of Examination <input checked="" type="checkbox"/> Module Finals <input type="checkbox"/> Accumulated Grade				
7	Module Requirements (Prerequisites) We assume that the participants have basic knowledge of mathematical modeling. A basic understanding of fundamental control concepts and distributed systems is helpful but not mandatory.				
8	Allocation to Curriculum: Program: Automation & Robotics, Field of study: Robotics, Cognitive Systems				
9	Responsibility/ Lecturer Jun.-Prof. Dr. Fang-Jing Wu/ Jun.-Prof. Dr. Fang-Jing Wu				