

Networked Mobile Robot Systems					AR-302
Rota	Duration	Semester	SWS	Credit Points	Workload
annually SS	1 Semester	2nd (Semester)	3 SWS	5	150 h
<b>1</b>	<b>Modul Structure</b>				
	<b>Course (Abbreviation)</b>	<b>Type/ SWS</b>	<b>Presence</b>	<b>Self Study</b>	<b>Credit Points</b>
	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
<b>2</b>	<b>Language</b> English				
<b>3</b>	<p><b>Content</b></p> <p><u>Concept of Operations:</u> Definitions, Impact and History of Networked Robot Systems, Robot Systems, Use Cases, Business Cases</p> <p><u>Information &amp; Communication Technologies:</u> Mobile Radio Networks, Robust Mesh/Relay Communication Protocols, fast handovers, real-time requirements</p> <p><u>Swarm strategies:</u> Self learning, controlled mobility, autonomous behavior and learning, distributed systems</p> <p><u>Decentralized Mission Scheduling &amp; Task Distribution:</u> Algorithms for strategic goal and tactical task management, autonomous agents, role models, role switching, association of tasks and responsibilities, task vs. communication performance</p> <p><u>Performance Evaluation:</u> Event-Driven Simulation, random generators, system models (channel, mobility, protocols), statistical relevance, experiments, analytical modeling (Markov state models)</p> <p><b>Literature:</b> Slides of all lectures will be supplied online</p>				
<b>4</b>	<p><b>Competencies</b></p> <p>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.</p>				
<b>5</b>	<p><b>Examination Requirements</b></p> <p>The final exam will be an oral (30 minutes) exam.</p>				
<b>6</b>	<p><b>Formality of Examination</b></p> <p><input checked="" type="checkbox"/> Module Finals <span style="float: right;"><input type="checkbox"/> Accumulated Grade</span></p>				
<b>7</b>	<p><b>Module Requirements (Prerequisites)</b></p> <p>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.</p>				
<b>8</b>	<p><b>Allocation to Curriculum:</b></p> <p>Program: Automation &amp; Robotics, Field of study: Robotics, Cognitive Systems</p>				
<b>9</b>	<p><b>Responsibility/ Lecturer</b></p> <p>Jun.-Prof. Dr. Fang-Jing Wu/Jun.-Prof. Dr. Fang-Jing Wu</p>				