

<b>Name of module:</b>	<b>Automotive Communications</b>
<b>Keywords:</b>	Wireless and wired Onboard and Offboard communication systems, Man Machine Interaction
<b>Modulenummer:</b>	<b>ASM 213</b>
<b>Target group(s):</b>	2. Semester ASM
<b>ECTS-Credits:</b>	8
<b>Language of instruction:</b>	english
<b>Module owner:</b>	Prof. Dr. rer. nat. Martin Zieher

**Extent of work (hours)**

Workload	Contact hours	Self study	Exam preparation
240	120	70	50

<b>Prerequisites:</b>	<p>Part 1: Wireless and wired Onboard and Offboard communication systems</p> <ul style="list-style-type: none"> <li>• Basics in communication systems and computer networks,</li> <li>• Programming in C/C++/Java</li> </ul> <p>Part 2: Man Machine Interaction</p> <ul style="list-style-type: none"> <li>• Knowledge of a programming language, preferable C/C++/Java</li> </ul>
<b>Total target:</b>	<p><b>Part 1: Wireless and wired Onboard and Offboard communication systems:</b> The student understands architecture, functionality and application of wired and wireless Onboard and Offboard communication systems.</p> <p><b>Part 2: Man Machine Interaction</b> Basic knowledge of aspects of man machine interaction in automotive systems</p>

<p><b>Module content:</b></p>	<p><b>Part 1: Wireless and wired Onboard and Offboard communication systems:</b></p> <p>Protocol architectures of communications systems</p> <ul style="list-style-type: none"> <li>• OSI/RM</li> <li>• TCP/IP</li> </ul> <p>Wireless Onboard Communication Systems</p> <ul style="list-style-type: none"> <li>• Bluetooth</li> <li>• RFID</li> <li>• ZigBee</li> </ul> <p>Wired Onboard Communication Systems (vehicle busses)</p> <ul style="list-style-type: none"> <li>• Multimedia bus (MOST)</li> </ul> <p><b>Part 2: Man Machine Interaction</b></p> <ul style="list-style-type: none"> <li>• Basics</li> </ul> <p>Terms, historical view on man machine dialogue, requirements of graphical user interfaces, design requirements (software ergonomics, usability, dialog principles)</p> <p>On-board Pattern Recognition Systems</p> <ul style="list-style-type: none"> <li>• machine vision systems (e.g. in traffic monitoring and automatic congestion detection, in driver assistance systems, for gesture recognition)</li> <li>• speech communication: speech recognition and understanding systems, speech dialogs: speech synthesis and language generation (Human-Machine-Interface)</li> <li>• usability engineering, testing and evaluation of recognition systems</li> </ul> <p>Driver Assistance Systems</p> <ul style="list-style-type: none"> <li>• concepts for programming of driver assistance systems in automobiles: environment models, interpretation and fusion of sensor data, piloting functions, cooperation concepts</li> <li>• implementation of important concepts in laboratory· - user-centered design</li> </ul> <p>Human Factors Engineering</p> <ul style="list-style-type: none"> <li>• human factors, such as vision, cognition</li> <li>• driver attention and distraction</li> <li>• usability, user-centered design</li> <li>• multimodal Interfaces· Lab (programming exercises and presentations; simulation)</li> </ul> <p>Project</p> <ul style="list-style-type: none"> <li>• Selected tasks within overall semester project (group work)</li> </ul>
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<b>Reference material:</b>	<p>Part 1:</p> <ul style="list-style-type: none"> <li>• Selected journal publications,</li> <li>• Lecture documents,</li> <li>• Gremba, Andreas (Editor): "MOST - the automotive multimedia network", Franzis Verlag, 2008, ISBN 978-3-7723-5316-1, also available as free ebook.</li> </ul> <p>Part 2:</p> <ul style="list-style-type: none"> <li>• Karl-Friedrich Kraiss, Advanced Man-Machine Interaction. Fundamentals and Implementation (Signals and Communication Technology), Springer 2006</li> </ul>
<b>Offered:</b>	Summer term only

### Submodules and assessment

<b>Title of submodule</b>	<b>Wireless and wired Onboard and Offboard communication systems</b>
<b>Type of instruction / form of learning:</b>	Lecture
<b>ECTS-Credits:</b>	4
<b>Hours per week:</b>	4
<b>Aims, learning outcomes:</b>	The student understands architecture, functionality and application of wired and wireless Onboard and Offboard communication systems.
<b>Type of assessment:</b>	final written examination 90 min, assignments and project work

<b>Title of submodule</b>	<b>Man Machine Interaction</b>
<b>Type of instruction / form of learning:</b>	Lecture
<b>ECTS-Credits:</b>	4
<b>Hours per week:</b>	4
<b>Aims, learning outcomes:</b>	Basic knowledge of aspects of man machine interaction in automotive systems
<b>Type of assessment:</b>	Midterm, final written examination 90 min, assignments and project work