

Wahlmodule Vertiefung Automotive IT

Automotive Communications

1	Module Number 13580	Study Program ASM	Semester 2	Offered in ☐ WS ☒ XSS	Duration 1 Semester	Module Type compulsory	Workload (h) 210	ECTS Points 7
2	Courses		Teaching and Learning Forms		Contact Time		Self-Study Time	Language
					(SWS)	(h)	(h)	
	a) Automotive Communication Networks		Lecture		3	45	105	English
	b) Vehicle-to-X (V2X)		Lecture		4	60		
3	Learning Outcomes and Competences Once the module has been successfully completed, the students can... Knowledge and Understanding ... know network architectures used in vehicles for onboard and off board communication. ... understand wired and wireless technologies, protocols, and standards relevant for vehicular networks. ... comprehend use cases and applications of automotive communication. Use, Application and Generation of Knowledge <i>Use and Transfer</i> ... design and implement automotive communication technologies. ... setup and configure networked devices in a vehicle. <i>Scientific Innovation</i> ... evaluate the suitability of different technical solutions. ... use measurements and/or simulation tools to analyze automotive communication. Communication and Cooperation ... communicate actively within an organization and obtain information. ... present technical contents and discuss them. ... communicate and cooperate within the group to find adequate solutions for the task at hand. Scientific Self-Conception/ Professionalism ... derive recommendations for decisions from a social and ethical perspective based on analysis and evaluation.							

4	Contents Lecture a): Communication systems - Fundamentals of communication networks - Ethernet and TCP/IP basics - On-board communication systems in vehicles - Automotive Ethernet technology - Selected applications (e.g., SOME/IP) Lecture b): Vehicle-to-X (V2X) - Fundamentals of radio communication - Radio communication technologies (e.g., 5G, IEEE 802.11p) - Fundamentals of safety - Message encoding (e.g., ASN.1) - Vehicle-to-X (V2X) motivation and use cases - V2X messages - Geo-networking (e.g., addressing, routing) - V2X applications - Simulation tools - Privacy and security for V2X
	Participation Requirements compulsory: - recommended: - Basics of communication systems and computer networks, - Knowledge of a programming language, preferably C/C++ and/or Java
6	Examination Forms and Prerequisites for Awarding ECTS Points Written Examination 120 min
7	Further Use of Module Master Thesis
8	Module Manager and Full-Time Lecturer Prof. Dr.-Ing. Michael Scharf, Prof. Dr. Dominik Schoop, Prof. Dr.-Ing. Harald Melcher
9	Literature - Andrew S. Tanenbaum, Nick Feamster, David Wetherall, "Computer Networks", 6th Edition, Pearson, 2021 - James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 7th edition, Pearson, 2016 - Kirsten Matheus, Thomas Königseder, "Automotive Ethernet", Cambridge University Press, 2015 - Christoph Sommer, Falko Dressler, "Vehicular Networking", Cambridge University Press, 2014 - Standards of the European Telecommunications Standards Institute (ETSI), Intelligent Transport Systems (ITS)
10	Last Updated 06.12.2023