



Ruhr Master School
of Applied Sciences

Dieses Wahlpflichtmodul ist ein Angebot der:

**Fachhochschule
Dortmund**

University of Applied Sciences and Arts

**Master Embedded Systems for
Mechatronics**

Automotive Systems

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Hochschule
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University of Applied Sciences

STIFTUNG
MERCATOR



Automotive Systems (MOD-E10)					
Code Number	Workload	Credits	Semester	Frequency	Duration
10410	180 h	6		annually	1 Semester
1	Course Title Automotive Systems	Contact hours 4 SWS / 60 h	Self-Study 120 h	Planned Group Size 25 students	
2	Course Description Automotive systems are a major application domain for mechatronic and embedded systems. Due to the complexity and the specific requirements (e.g. safety) the domain specific engineering is well elaborated and leading edge in the embedded systems industry. The research centre pines deals with various automotive partners and research projects. This course gives an overview about the recent state of the art in automotive systems and transfers recent findings into teaching. The student will learn how to explore and structure a certain automotive application and how to map the acquired skills and knowledge to that particular domain. Furthermore, the students will learn about domain specific standards, processes and frameworks.				
3	Course Structure <ol style="list-style-type: none"> 1. Automotive Standards: e.g. AUTOSAR, Quality Standards, Automotive Spice 2. Automotive development processes 3. Tools in Automotive Engineering (ML/SL, Doors, Enterprise Architect) 4. Automotive Supply Chain 5. Automotive Software Development 6. Functional Safety 7. Testing and Verification 8. Product Qualification 9. Application Examples 10. AMALTHEA Methodology and Tool Chain 				
4	Parameters <ul style="list-style-type: none"> • Course characteristics: elective • Course frequency: every year - winter semester • Capacity: 25 students • Course admittance prerequisites: programming, basics of embedded systems • Skills trained in this course: theoretical, practical and methodological skills • Assessment of the course: Oral Exam (30 min) at the end of the course (50%) and group work as homework (50%): set up of an automotive system development project, modeling and target mapping of an example with AMALTHEA tools, demonstration and presentation • Teaching staff: Prof. Dr. Carsten Wolff, (Prof. Dr. Erik Kamsties) 				
5	Learning outcomes <p>5.1 Knowledge</p> <ul style="list-style-type: none"> • Knows standards and platforms for automotive systems • Knows target systems • Knows specific requirements (e.g. safety) • Has acquired overview of automotive application domain <p>5.2 Skills</p>				

	<ul style="list-style-type: none"> • Can develop automotive software with the AMALTHEA tool chain • Can model an automotive system according to standards • Can select tools and define tool chains and design flows <p>5.3 Competence - attitude</p> <ul style="list-style-type: none"> • Can structure a real automotive system development project • Can communicate and find solutions with automotive experts • Ensures quality and safety of applications
7	<p>Teaching and training methods</p> <ul style="list-style-type: none"> • Lectures, Labs (with AMALTHEA tools and Matlab/Simulink), homework • Access to tools and tool tutorials • Access to recent research papers • Company visit at one of the partner companies (Bosch, BHTC)
8	<p>Course mapping</p> <p>Requires:</p> <ul style="list-style-type: none"> • MOD1-02 – Distributed and Parallel Systems • MOD1-03 - Embedded Software Engineering <p>Connects to:</p> <ul style="list-style-type: none"> • MOD-E01 – Applied Embedded Systems • MOD-E03 – SW Architectures for Embedded and Mechatronic Systems
9	<p>References</p> <p>Klaus Hoermann, Markus Mueller, Lars Dittmann, Joerg Zimmer: Automotive SPICE in Practice. Rocky Nook Inc., US, 2008</p> <p>Markus Maurer, Hermann Winner (Eds.): Automotive Systems Engineering, Springer, 2013</p> <p>Research papers of IDiAL institute and research group: https://www.fh-dortmund.de/en/idual/index.php</p> <p>Specifically: APP4MC: http://wiki.eclipse.org/APP4MC KUKSA: https://www.eclipse.org/kuksa/</p>