



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**

IoT & Edge Computing

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Hochschule Bochum
Bochum University
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**Fachhochschule
Dortmund**
University of Applied Sciences and Arts



**Westfälische
Hochschule**
Gelsenkirchen Bocholt Recklinghausen
University of Applied Sciences

**STIFTUNG
MERCATOR**



IoT & Edge Computing (MOD-E05)						
Code Number		Workload	Credits	Semester	Frequency	Duration
10405		180 h	6		annually	1 Semester
1	Course Title Internet of Things		Contact hours 4 SWS / 60 h		Self-Study 120 h	Planned Group Size 25 students
2	Course Description Internet of things (IoT) is a fundamental building block for digitization and the upcoming information society. This course provides insights into key IoT-technologies including embedded systems, networks and cloud computing. For the selection of use cases and technologies the course focuses on the area of Edge Computing. Within this area student will learn about latency analysis and optimization in distributed systems. Last not least, the course offers hands on experiences with IoT and Edge Computing technologies through focused team projects and homework assignments.					
3	Course Structure 1. Introduction 2. Real-time Embedded Systems 3. Real-Time Networking 4. Cloud Computing 5. Edge Computing					
4	Parameters <ul style="list-style-type: none">• Course characteristics: elective• Course frequency: every year - summer semester• Capacity: 25 students• Course admittance prerequisites: Basics in embedded systems, networks and programming• 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%)• Teaching staff: Prof. Dr. Rolf Schuster					
5	Learning outcomes 5.1 Knowledge <ul style="list-style-type: none">• Knows concepts and architectures of real-time embedded systems• Knows key aspects of real-time networking• Has acquired overview of cloud computing and selected cloud platforms 5.2 Skills <ul style="list-style-type: none">• Can implement, deploy and test simple IoT-systems• Can set-up and utilize a cloud system• Can analyze the E2E latency in distributed systems 5.3 Competence - attitude <ul style="list-style-type: none">• Can design a simple IoT system for a given set of requirements• Can structure an IoT development project regarding function and time• Can propose and implement measures to reduce latency in a distributed system					

6	Teaching and training methods <ul style="list-style-type: none"> • Lectures, group project, homework • Access to tools and tool tutorials • Access to recent research papers
7	Course mapping Module shared with Master Digital Transformation Requires: <ul style="list-style-type: none"> • MOD1-02 – Distributed and Parallel Systems • MOD1-03 – Embedded Software Engineering • MOD1-05 – Scientific & Transversal Skills
8	References Peter Marwedel: Embedded System Design, 2nd Edition, Springer, 2011 Andrew S. Tanenbaum, David J. Wetherall: Computer Networks, 5th Edition, Pearson Education, 2014 Thomas Erl, Zaigham Mahmood, Ricardo Puttini, Cloud Computing, Prentice Hall, 2013 Open Edge Computing Initiative: https://www.openedgecomputing.org/