Valid from 2027.FS

Module description: Design and Develop AI Systems

Module Code	w.MA.XX.DAIS.26HS
ECTS Credits	3
Language of Instruction/Examination	English
Module Description	The “Design and Develop” module covers the design, development, and evaluation of adaptive human-AI interaction systems. Building on the fundamentals covered in the “Human-Computer Interaction” module, students design dynamic interactions between humans and AI-controlled, embodied agents. The focus is on two application scenarios: a human communicating with multiple virtual avatars in desktop and immersive VR environments (1), and multiple humans interacting with a physical table robot (m:1). For both scenarios, students develop adaptive interaction mechanisms that use observable behavioral characteristics, interaction data, and, where applicable, physiological sensor signals to dynamically control system behavior. To this end, they design and implement algorithmic feedback loops that purposefully link measured variables and system responses. The focus is on interaction design, algorithmic modeling, adaptive system control, and the technical implementation, verification, and optimization of the developed solutions. In practice-oriented development tasks, students formulate testable design hypotheses, build functional prototypes, and evaluate them through systematic testing, debugging, and structured peer reviews.
Organizational Unit	Institut für Wirtschaftsinformatik
Module Coordinator	Alexandre de Spindler
Deputy Module Coordinator	Thomas Keller
Program and Specialization	Business Information Technology
Legal Framework	Academic Regulations MSc in Business Information Technology dated 22.08.2019, Appendix to the Academic Regulations for the degree program in Business Information Technology, first adopted on 10.07.2012
Module Category	**Module Type** Compulsory Elective
Contribution to Learning Objectives (by the concerned Module)	• Professional Competence • Methodological Competence • Social Competence • Self-Competence
Contribution to Learning Objectives	**Professional Competence** • Knowing and Understanding Content of Theoretical and Practical Relevance • Apply, Analyze, and Synthesize Content of Theoretical and Practical Relevance • Evaluate Content of Theoretical and Practical Relevance **Methodological Competence** • Problem-Solving & Critical Thinking • Scientific Methodology • Work Methods, Techniques, and Procedures • Information Literacy • Creativity & Innovation **Social Competence** • Written Communication • Oral Communication • Teamwork & Conflict Management • Intercultural Insight & Ability to Change Perspective **Self-Competence**

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- Self-Management & Self-Reflection
- Ethical & Social Responsibility
- Learning & Change

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<tr><td>Module Learning Objectives</td><td>

Students...

- design adaptive human-AI interaction systems for 1:m and m:1 communication.
- use behavioral, interaction, and sensor data to control adaptive systems.
- algorithmically model and implement closed-loop feedback systems.
- systematically test and optimize the functionality and robustness of adaptive systems.

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<tr><td>Module Content</td><td>

- Adaptive human–AI interaction and embodied AI
- Multi-agent- and multi-user communication (1 and m:1)
- Multi-modal interaction and sensor integration
- Algorithmic modeling of adaptive feedback loops
- Adaptive system control and state models

Peer review and iterative system optimization

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<tr><td>Links to other modules</td><td>

Prerequisite Module
w.MA.XX.HCI.26HS / Human Computer Interaction

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<tr><td>Digital Learning Resources</td><td>

- Robots
- VR app

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<tr><td>Methods of Instruction</td><td>

- Project Work
- Explorative Learning
- Exercises

Social Settings Used

- Pair Work

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<tr><td>Type of Instruction</td><td>

	Classroom Instruction	Guided Self-Study	Autonomous Self-Study
Lecture	28 h	62 h	
Excercise	-	-	
Project Work	-	-	
Seminar	-	-	
Total 90	**28 h**	**62 h**	**0 h**

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<tr><td>Performance Assessment</td><td>

End-of-module exam	Form	Length (min.)	Weighting
-			
Permitted Resources			

Others	Assessment	Format	Length (min.)	Weighting
Prototype	Grade	Pair work	0	100.00%

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<tr><td>Classroom Attendance Requirement</td><td>None</td></tr>
<tr><td>Comments</td><td>Supplementary examinations may not be set, and assessed work may not be resubmitted.</td></tr>
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