

<b>Module title</b>		<b>Abbreviation</b>
Multimodal User Interfaces		10-HCI=MMUI-161-m01
<b>Module coordinator</b>		<b>Module offered by</b>
holder of the Chair of Computer Science IX		Institute of Computer Science
<b>ECTS</b>	<b>Method of grading</b>	<b>Only after succ. compl. of module(s)</b>
5	numerical grade	--
<b>Duration</b>	<b>Module level</b>	<b>Other prerequisites</b>
1 semester	graduate	--
<b>Contents</b>		
<p>The multimodal interaction paradigm simultaneously uses various modalities like speech, gesture, touch, or gaze, to communicate with computers and machines. Basically, multimodal interaction includes the analysis as well as the synthesis of multimodal utterances. This course concentrates on the analysis, i.e., the input processing. Input processing has the goal to derive meaning from signal to provide a computerized description and understanding of the input and to execute the desired interaction. In multimodal systems, this process is interleaved between various modalities and multiple interdependencies exist between simultaneous utterances necessary to take into account for a successful machine interpretation.</p> <p>In this course, students will learn about the necessary steps involved in processing unimodal as well as multimodal input. The course will highlight typical stages in multimodal processing. Using speech processing as a primary example, they learn about:</p> <ol style="list-style-type: none"> <li>1. A/D conversion</li> <li>2. Segmentation</li> <li>3. Syntactical analysis</li> <li>4. Semantic analysis</li> <li>5. Pragmatic analysis</li> <li>6. Discourse analysis</li> </ol> <p>A specific emphasize will be on stages like morphology and semantic analysis. Typical aspects of multimodal interdependencies, i.e., temporal and semantic interrelations are highlighted and consequences for an algorithmic processing are derived. Prominent multimodal integration (aka multimodal fusion) approaches are described, including transducers, state machines, and unification.</p>		
<b>Intended learning outcomes</b>		
<p>After the course, the students will be able to build their own multimodal interfaces. They will have a broad understanding of all the necessary steps involved and will know prominent algorithmic solutions for each of them. Student will learn about available tools for reoccurring tasks and their pros and cons.</p>		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
V (2) + Ü (2)		
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
<p>presentation of project results (approx. 40 minutes)            Language of assessment: German and/or English            creditable for bonus</p>		
<b>Allocation of places</b>		
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<b>Additional information</b>		
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<b>Workload</b>		
150 h		
<b>Teaching cycle</b>		
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Master's degree (1 major) Computer Science (2016)  
 Master's degree (1 major) Mathematics (2016)  
 Master's degree (1 major) Computational Mathematics (2016)  
 Master's degree (1 major) Computer Science (2017)  
 Master's degree (1 major) Computer Science (2018)  
 Master's degree (1 major) Computational Mathematics (2019)  
 Master's degree (1 major) Mathematics (2019)  
 Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)  
 Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)  
 Master's degree (1 major) Aerospace Computer Science (2020)  
 Master's degree (1 major) Computer Science (2021)  
 Master's degree (1 major) Aerospace Computer Science (2021)  
 Master's degree (1 major) Computational Mathematics (2022)  
 Master's degree (1 major) Mathematics (2022)  
 Master's degree (1 major) Computer Science (2023)  
 Master's degree (1 major) Aerospace Computer Science (2023)  
 Master's degree (1 major) Computational Mathematics (2024)  
 Master's degree (1 major) Mathematics (2024)