

## UCM - Ubiquitous Computing & Media

## UCM - Ubiquitous Computing & Media

<b>Allgemeine Informationen</b>	
<b>Modulkürzel oder Nummer</b>	UCM
<b>Eindeutige Bezeichnung</b>	UbiqCompMed-01-MA-M
<b>Modulverantwortlich(e)</b>	Prof. Dr. Manzke, Robert (robert.manzke@haw-kiel.de)
<b>Lehrperson(en)</b>	Prof. Dr. Manzke, Robert (robert.manzke@haw-kiel.de)
<b>Wird angeboten zum</b>	Sommersemester 2026
<b>Moduldauer</b>	1 Fachsemester
<b>Angebotsfrequenz</b>	Regelmäßig
<b>Angebotsturnus</b>	In der Regel im Sommersemester
<b>Lehrsprache</b>	Englisch
<b>Empfohlen für internationale Studierende</b>	Ja
<b>Ist als Wahlmodul auch für andere Studiengänge freigegeben (ggf. Interdisziplinäres Modulangebot - IDL)</b>	Nein

<b>Studiengänge und Art des Moduls (gemäß Prüfungsordnung)</b>
Studiengang: M.Sc. - MCS - Computer Science (PO 2023, V1) Schwerpunkt: Computer Science for Media Modulart: Verpfl. Wahlmodul, PVO §3 Fachsemester: 1, 2
Studiengang: M.Sc. - MCS - Computer Science (PO 2023, V1) Modulart: Wahlmodul Fachsemester: 1, 2
Studiengang: M.Sc. - MIE - Information Engineering (PO 2022, V3) Modulart: Wahlmodul Fachsemester: 1, 2, 3

<b>Kompetenzen / Lernergebnisse</b>
<i>Kompetenzbereiche: Wissen und Verstehen; Einsatz, Anwendung und Erzeugung von Wissen; Kommunikation und Kooperation; Wissenschaftliches Selbstverständnis/Professionalität.</i>
Students who successfully complete this course will have a general understanding of "Ubiquitous and Pervasive Computing" and its relation to multi-media applications. The course will cover relevant areas of hardware and software development, with a special focus on distributed multi-media computing, wireless sensor networks, mobile computing and real-time applications. Embedded systems development capabilities will be obtained. Application knowledge in the domain of Internet-of-Things, wearable computing and mobile computing will be deepened. Server- and cloud back ends will be used for sensor data processing.
Students will learn to realize embedded systems applications, wireless connectivity and distributed media applications.
Students will carry out projects, which will require team work of 3-4 people. Project management will be applied.
Students will be able to deepen their general scientific competencies (including formulation, presentation etc.).

<b>Angaben zum Inhalt</b>	
<b>Lehrinhalte</b>	<ul style="list-style-type: none"> <li>- Ubiquitous Computing and trends</li> <li>- Distributed multi-media computing (audio and video)</li> <li>- Real-time media networking and synchronization of distributed systems (PTP, gPTP, QoS, AES67/Ravenna, AVB)</li> <li>- Context Aware Applications</li> <li>- Location Sensing</li> <li>- Multi-Sensor Systems, Sensor networks</li> <li>- Computer-Augmented Environments</li> <li>- Project-based learning</li> <li>- Internet-of-Things</li> <li>- Deepening embedded systems skills</li> <li>- Wireless sensor technologies</li> </ul> <p>Projects will encompass:</p> <ul style="list-style-type: none"> <li>- Work with embedded platforms such as ESP32, BeagleBone and Raspberry Pi as well as server back-ends and cloud end points</li> <li>- Real-time low latency applications</li> <li>- Real-time media networking using protocols such as AVB, AES-Ravenna, Ableton Link</li> <li>- Wireless technology such as WiFi, Bluetooth LE and LoRa / LoRaWAN</li> <li>- Protocols such as MQTT, OSC</li> <li>- Mesh networks (ESP32 Mesh)</li> <li>- Distributed media applications (audio and video)</li> <li>- Cloud backends for sensor data processing (e.g. AWS, Azure, ...)</li> </ul>
<b>Literatur</b>	<ul style="list-style-type: none"> <li>- Stefan Poslad: Ubiquitous Computing: Smart Devices, Environments and Interactions, 2009, Wiley, ISBN 0470035609</li> <li>- Amber Case, Calm Technology: Principles and Patterns for Non-Intrusive Design, 2015, O'Reilly Media, ISBN-13: 978-1491925881</li> <li>- <a href="https://www.ravenna-network.com/what-is-aes67/">https://www.ravenna-network.com/what-is-aes67/</a></li> <li>- <a href="https://www.ieee802.org/1/pages/802.1ba.html">https://www.ieee802.org/1/pages/802.1ba.html</a></li> </ul>

<b>Lehrformen der Lehrveranstaltungen</b>	
<b>Lehrform</b>	<b>SWS</b>
Labor	2
Lehrvortrag	2

<b>Arbeitsaufwand</b>	
<b>Anzahl der SWS</b>	4 SWS
<b>Leistungspunkte</b>	5,00 Leistungspunkte
<b>Präsenzzeit</b>	48 Stunden
<b>Selbststudium</b>	102 Stunden

<b>Modulprüfungsleistung</b>	
<b>Voraussetzung für die Teilnahme an der Prüfung gemäß PO</b>	Keine
<b>UCM - Portfolioprfung</b>	<p>Prüfungsform: Portfolioprfung</p> <p>Gewichtung: 100%</p> <p>wird angerechnet gem. § 11 Absatz 2 PVO: Nein</p> <p>Benotet: Ja</p> <p>Anmerkung: Mid-term test and project related work.</p> <p>Details will be presented in the lecture.</p>