<table>
<tr><th colspan="5">Mobile and Pervasive Computing</th><th>AR-319</th></tr>
<tr><td>Rota
annually WS</td><td>Duration
1 Semester</td><td>Semester
3rd (Semester)</td><td>SWS
4 SWS</td><td>Credit Points
6</td><td>Workload
180 h</td></tr>
<tr><td>1</td><td colspan="5">Modul Structure</td></tr>
<tr><td></td><td colspan="2">Course (Abbreviation)</td><td>Type/ SWS</td><td>Presence</td><td>Self Study</td><td>Credit Points</td></tr>
<tr><td></td><td colspan="2">f) Mobile and Pervasive Computing (MPC)</td><td>Lecture/ 2 SWS</td><td>25 h</td><td>65h</td><td>3</td></tr>
<tr><td></td><td colspan="2">g) Mobile and Pervasive Computing (MPC)</td><td>Seminar/ 2 SWS</td><td>25 h</td><td>65 h</td><td>3</td></tr>
<tr><td>2</td><td colspan="5">Language
English</td></tr>
<tr><td>3</td><td colspan="5">Content
As advanced sensing and communication technologies have been rapidly developed, mobile and pervasive computing technologies have been paid a lot of attention to enable intelligent services in our daily life. These services provide new insights into unstructured and uncertain information from a variety of data sources in sensor-rich environments and mobile devices. The lecture covers theoretical fundamentals in sensing and computing techniques, how to apply them in practical systems, and design principles in mobile and pervasive computing techniques. The content includes the following topics:
• Wireless perception and computing: active and passive wireless sensing techniques, wireless-based localization, wireless-based mobility analytics, wireless-based activity recognition, and applications based on wireless signals.
• Visual & acoustic perception and computing technologies: Visual-based and acoustic-based localization, image registration, and mobility analytics based on visual and acoustic information.
• Mobile sensing and computing: mobile crowdsourcing in smart cities, privacy-preserving sensing techniques for mobile devices, multi-modal data fusion techniques based on smart devices.
• Edge computing and software-defined computing framework: computation task offloading techniques for low-latency and real-time services, service-oriented/user-centric dynamic computing flows among mobile devices, edge devices, and Cloud.
Literature:
Books:
• Minyi Guo, Jingyu Zhou, Feilong Tang, and Yao Shen, "Pervasive Computing: Concepts, Technologies and Applications", Published by CRC Press, 2020.
• Mohammad S. Obaidat, Mieso Denko, and Isaac Woungang, “Pervasive Computing and Networking”, published by Wiley, 2011.
• Sherali Zeadally (Editor), Nafaâ Jabeur (Editor), "Cyber-Physical System Design with Sensor Networking Technologies", IET Press in London, England, 2015.
Research papers published in areas of mobile computing, pervasive computing, and communication networking e.g. IEEE Percom, IEEE trans. on Mobile Computing, IEEE ICC/WCNC/Globecom/VTC, and ACM/IEEE IPSN.
Slides of all lectures will be available online.</td></tr>
<tr><td>4</td><td colspan="5">Competencies
The goal of the lecture is to establish knowledge of the fundamentals, advanced techniques of mobile and pervasive computing. After completing the lecture, students can independently design innovative pervasive computing systems on mobile and smart platforms, decompose dependency between computation modules and software required by applications, and optimize usage of sensing and computing resources in mobile computing systems.</td></tr>
<tr><td>5</td><td colspan="5">Examination Requirements</td></tr>
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	All students need to successfully pass 50% of assignments to be admitted to the final exam. The final exam is an oral exam (30 minutes).
6	**Formality of Examination** ☒ Module Finals ☒ Accumulated Grade
7	**Module Requirements (Prerequisites)** Recommendations (helpful but not mandatory): knowledge in foundations of algorithms and wireless communications.
8	**Allocation to Curriculum:** Program: Automation & Robotics, Field of study: Robotics, Cognitive Systems Program: Electrical Engineering and Information Technology Program: Informatik
9	**Responsibility/ Lecturer** *Jun.-Prof. Dr. Fang-Jing Wu/* Jun.-Prof. Dr.-Fang-Jing Wu