

**Module 681 Digitalization**

1	<b>Module number</b> 681	<b>Study programme</b> WNB	<b>Semester</b> 5	<b>Offered in</b> <input checked="" type="checkbox"/> WS <input checked="" type="checkbox"/> SS	<b>Duration</b> 1 semester	<b>Module type</b> Compulsory	<b>Workload (h)</b> 150	<b>ECTS points</b> 5
2	<b>Courses</b>		<b>Teaching and learning form</b>		<b>Contact time</b>		<b>Self-study</b>	<b>Language</b>
	a) Digitalization		Course		<b>(SWS)</b> 4	<b>(h)</b> 60	<b>(h)</b> 75	English
	b) Lab Digitalization		Project Work		1	15		
3	<b>Learning outcomes and competences</b> After successfully completing the module, students can...  <b>Knowledge and understanding</b> <ul style="list-style-type: none"> <li>• Basic competences in the areas of IoT, Cloud, Big Data, AI</li> <li>• Effects of digital technologies on the environment and society, e.g. data privacy, impacts on the society as a whole, consumption of resources</li> <li>• Current topics of digitalization</li> </ul> <b>Use, application and generation of knowledge</b>  <i>Use and transfer</i> <ul style="list-style-type: none"> <li>• Use of digital technologies for sustainability and energy efficiency</li> <li>• Independently carry out a digitization project related to sustainability, energy efficiency, or similar</li> <li>• Use and apply libraries and tools from the areas of IoT, AI and Big Data</li> <li>• Use cloud platforms with their services and resources</li> </ul> <i>Scientific innovation</i> <ul style="list-style-type: none"> <li>• Carry out their own assessment of digitization issues in relation to the environment and society</li> </ul> <b>Communication and cooperation</b> <ul style="list-style-type: none"> <li>• Work out results as a team member and present and discuss them in front of other students</li> <li>• Explain in their own words the techniques and procedures from the lecture in a clear and correct way</li> <li>• Safely deal with the technical language and the technical terms from the lecture and apply them correctly and precisely</li> </ul> <b>Scientific self-conception/professionalism</b> <ul style="list-style-type: none"> <li>• Plan, implement and evaluate a digitization project independently</li> </ul>							
4	<b>Content</b> a) Course: <ul style="list-style-type: none"> <li>• Basic concepts from the areas of IoT, AI and Big Data</li> <li>• practical exercises related to the respective topics from the lecture using single-board computers (Raspi or similar), selected cloud providers and python libraries</li> </ul> b) Lab: <ul style="list-style-type: none"> <li>• digitization project related to sustainability, energy efficiency, or similar</li> </ul>							
5	<b>Participation requirements</b>  obligatory: none recommended: 612 Informatik 1, 618 Informatik 2							
6	<b>Forms of examination and requirements for awarding credit points</b>  a) and b) written exam 90 minutes [graded] b) attestation [ungraded]							
7	<b>Further use of the module</b> WNB							

8	<b>Module manager and full-time lecturer</b>  Prof. Dr.-Ing. Philipp Bulling
9	<b>Literature</b> <ul style="list-style-type: none"> <li>• Baun, Christian (2010): Cloud Computing. Web-basierte dynamische IT-Services. Berlin: Springer (Informatik im Fokus)</li> <li>• McKinney, Wes (2019): Datenanalyse mit Python. Auswertung von Daten mit Pandas, NumPy und IPython. 2. Auflage, Heidelberg: O'Reilly</li> <li>• Shovic, John C. (2021): Raspberry Pi IoT Projects. Prototyping Experiments for Makers. Second edition. New York: Apress (Springer eBook Collection)</li> <li>• Borgmeier, Arndt; Grohmann, Alexander; Gross, Stefan F. (2017): Smart services und Internet der Dinge. Geschäftsmodelle, Umsetzung und Best Practices : Industrie 4.0, Internet of Things (IoT), Machine-to-Machine, Big Data, Augmented Reality Technologie. München: Hanser</li> <li>• Harrison, Matt (2021): Machine learning. Die Referenz : mit strukturierten Daten in Python arbeiten. 1. Auflage, Deutsche Ausgabe. Heidelberg: O'Reilly</li> </ul>
10	<b>Last updated</b> 07.02.2025