

Courses in English

Course Description

Department	07 Computer Science and Mathematics
Course title	sustAIbility - Advanced topics in sustainability and artificial intelligence
Hours per week (SWS)	approx. 4 SWS; bi-weekly seminar sessions over 10 weeks and workshop week
Number of ECTS credits	5
Course objective	<p>After successful participation in this module, students are able to</p> <ul style="list-style-type: none">- define the concept of sustainability- describe the term artificial intelligence (AI) and name technologies using AI- explain in their own words the main ideas of sustainable AI- explain in their own words the main ideas of AI for sustainability- analyze and discuss current research in the fields of sustainable AI as well as AI for sustainability- to develop and present solutions for real-world problems based on AI and sustainable development goals- to systematically plan and implement their own projects within this module <p>Students will be able to gain further competences:</p> <ul style="list-style-type: none">- language and communication skills: Working and learning in a diverse, international, and interdisciplinary group of students- presentation skills: in-class presentations during the seminars and during the workshop week
Prerequisites	<p>This module is aimed at all students enrolled in a Master or third year of Bachelor program at the TUM or the Hochschule München University of Applied Sciences (HM); it is thus designed as an interdisciplinary venue which brings together a range of scientific perspectives. No specific prior knowledge is required; however, its project-based character requires high levels of intrinsic motivation and the willingness to actively participate in a project. Students with a technological background are as welcome as students from social sciences, economics, design or humanities.</p>
Recommended reading	<p>[1] van Wynsberghe, A. (2021). Sustainable AI: AI for sustainability and the sustainability of AI. AI and Ethics, (https://www.researchgate.net/publication/349639276_Sustainable_AI_AI_for_sustainability_and_the_sustainability_of_AI)</p> <p>[2] Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., Felländer, A., Langhans, S. D., Tegmark, M., and Nerini, F. F. (2020). The role of artificial intelligence in achieving the sustainable development goals. Nature Communications, https://www.nature.com/articles/s41467-019-14108-y</p> <p>[3] more reading materials will be provided in the self-study materials</p>
Teaching methods	<p>self-study phase (9 weeks) + workshop week</p> <p>Media:</p> <ul style="list-style-type: none">- research papers, blogposts, News articles- powerpoints- podcasts- videos <p>Methods:</p> <ul style="list-style-type: none">- self-study- futurizing workshop- just-in-time-teaching- prototyping- design thinking- group work

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Assessment methods	<p>The module contains self-study phases as well as bi-weekly seminar sessions and an intensive, interactive one-site workshop week. Following the idea of flipped-classroom, students are expected to acquire knowledge during the self-study phase to be able to participate in profound discussions during the seminar sessions and to actively tackle current challenges in the field of AI and sustainability during the workshop week.</p> <p>Over the course of this module, students will have to complete the following tasks:</p> <ul style="list-style-type: none">- Self-Study and Seminar Phase: students have to contribute to the first part of the module by carefully reading the provided material and by completing the accompanying assignments in written and oral form preparatory to the workshop week. The assignments will be presentations or essay-writing in order to prepare and understand the main focus of each unit. They also have to actively take part in the seminar sessions and discussions on-site. The preparation of and the participation in the seminar sessions count 60% to the final grade.- Workshop-Week: students have to form interdisciplinary groups, choose a real challenge and develop a project. By the end of the workshop week students are expected to present their project at the public conference. This presentation counts 40% to the final grade.
Language of instruction	English
Name of lecturer	responsible: Prof. Dr. Gudrun Socher; lecturers are a team of coaches and experts
Email	gudrun.socher@hm.edu
Link	
Course content	<p>Sustainability as a central, political, and societal goal, can serve as an orientation framework for the responsible development of AI technologies as well as a compass for their use. For this to succeed, both sociological and technical perspectives are necessary. For universities - but also for other institutions in politics, society, and business - this means that disciplinary boundaries must increasingly be broken down and interdisciplinary teaching and learning formats should be created. One such format is "sustAIability" during which students approach AI from various sustainability perspectives.</p> <p>Introduction of the topics sustainability and AI</p> <ul style="list-style-type: none">- definition of sustainability and its three dimensions: environmental, economic, and social- definition of AI and AI-based technologies <p>Sustainability of AI:</p> <ul style="list-style-type: none">- research on and examples for sustainable AI in all three dimensions- energy reduction and reduction of CO2-emissions while using AI- ethical justice in data sources/training data <p>AI for Sustainability</p> <ul style="list-style-type: none">- research on and examples for AI for sustainability in all three dimensions- existing tools and technologies for climate protection and biodiversity- challenges and bias <p>Interdisciplinary project in the context of sustainability and AI</p> <ul style="list-style-type: none">- students will apply their understanding of the complex interplay between sustainability and AI- interdisciplinary teams to develop AI-based concepts and approaches addressing key sustainability challenges. The project-methods are not limited to software-based applications.

Remarks