

Modulbezeichnung:	Artificial Intelligence	
Modulnummer: DLMIMWKI	Semester: --	Dauer: Minimaldauer 1 Semester
Modultyp: Wahlpflicht		Regulär angeboten im: WS, SS
Workload: 300 h		ECTS Punkte : 10
Zugangsvoraussetzungen: None		Unterrichtssprache: Englisch
Kurse im Modul: <ul style="list-style-type: none"> • Artificial Intelligence (DLMAIAI01) • Seminar: AI and Society (DLMAISAI01) 		Workload: Self-study: 210 h Self-examination: 30 h Tutorials: 60 h
Kurskoordinatoren/Tutoren:: Please see the current list of tutors on the Learning Management System.		Modulverantwortliche(r): Dr. Ulrich Kerzel
Bezüge zu anderen Programmen: Master Artificial Intelligence		Bezüge zu anderen Modulen im Programm: <ul style="list-style-type: none"> • Advanced Robotics 4.0 • Techniken und Methoden der agilen Softwareentwicklung
Qualifikations- und Lernziele des Moduls :		
Artificial Intelligence On successful completion of this course in the module, students will be able to:		
<ul style="list-style-type: none"> • remember the historical developments in the field of artificial intelligence. • analyze the different application areas of artificial intelligence. • comprehend expert systems. • apply Prolog to simple expert systems. • comprehend the brain and cognitive processes from a neuro-scientific point of view. • understand modern developments in artificial intelligence. 		
Seminar: AI and Society On successful completion of this course in the module, students will be able to:		
<ul style="list-style-type: none"> • name selected current societal topics and issues related to artificial intelligence. • explain the influence and impact of artificial intelligence on societal and political topics. • transfer theoretically-acquired knowledge to real-world cases. • treat in a scientific manner a select topic in the form of a written essay. • critically question and discuss current societal and political issues arising from the application of artificial intelligence techniques. • develop own problem-solving skills and processes through reflection on the possible impact of their future occupation in the sector of artificial intelligence. 		

Lehrinhalt des Moduls:		
<p>Artificial Intelligence</p> <ul style="list-style-type: none"> • History of AI • AI application areas • Expert systems • Neuroscience • Modern AI systems <p>Seminar: AI and Society In this module, students will reflect on current societal and political implications of artificial intelligence. To this end, pertinent topics will be introduced via articles that are then critically evaluated by the students in the form of a written essay. A current list of topics is located in the Learning Management System.</p>		
Lehrmethoden:	See the contributing course outline	
Literatur:	See the contributing course outline	
Anteil der Modulnote an der Gesamtabschlussnote des Programms : --	Prüfungszulassungsvoraussetzung:	Abschlussprüfungen:
	See course outline	DLMAIAI01: Exam, 90 min. (50%) DLMAISAI01: Written Assessment: Research Essay (50%)

Kursnummer: DLMAIAI01	Kursname: Artificial Intelligence	Gesamtstunden: 150 h ECTS Punkte: 5 ECTS
Kurstyp: Pflicht, Wahlpflicht Zu Details beachte bitte das Curriculum des jeweiligen Studiengangs Kursangebot : Kursdauer : Minimum 1 semester		Zugangsvoraussetzungen: None
Kurskoordinator(en) / Dozenten / Lektoren: Siehe aktuelle Liste der Tutoren im Learning Management System		Bezüge zu anderen Modulen: Siehe Modulbeschreibung
<p>Beschreibung des Kurses:</p> <p>The quest for artificial intelligence has captured humanity's interest for many decades and has been an active research area since the 1960s. This course will give a detailed overview of the historical developments, successes, and set-backs in AI, as well as the development and use of expert systems in early AI systems.</p> <p>In order to understand cognitive processes, the course will give a brief overview of the biological brain and (human) cognitive processes and then focus on the development of modern AI systems fueled by recent developments in hard- and software. Particular focus will be given to discussion of the development of "narrow AI" systems for specific use cases vs. the creation of general artificial intelligence.</p> <p>The course will give an overview of a wide range of potential application areas in artificial intelligence, including industry sectors such as autonomous driving and mobility, medicine, finance, retail, and manufacturing.</p> <p>Course Objectives and Outcome:</p> <p>On successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> • remember the historical developments in the field of artificial intelligence. • analyze the different application areas of artificial intelligence. • comprehend expert systems. • apply Prolog to simple expert systems. • comprehend the brain and cognitive processes from a neuro-scientific point of view. • understand modern developments in artificial intelligence. <p>Teaching Methods:</p> <p>The learning materials include printed and online course books, vodcasts, online knowledge tests, podcasts, online tutorials, and case studies. This range of learning materials is offered to students so they can study at a time, place, and pace that best suits their circumstances and individual learning style.</p> <p>Course Content:</p> <p>1. History of AI</p> <p>1.1 Historical Developments</p> <p>1.2 AI Winter</p> <p>1.3 Notable Advances in AI</p> <p>2. Expert Systems</p> <p>2.1 Overview Over Expert Systems</p>		

2.2 Introduction to Prolog

3. Neuroscience

3.1 The (Human) Brain

3.2 Cognitive Processes

4. Modern AI Systems

4.1 Recent Developments in Hard- and Software

4.2 Narrow vs General AI

4.3 NLP and Computer Vision

5. AI Application Areas

5.1 Autonomous Vehicles & Mobility

5.2 Personalized Medicine

5.3 FinTech

5.4 Retail & Industry

Literatur:

- Bear, F., Barry, W., & Paradiso, M. (2006). Neuroscience: Exploring the brain (3rd ed.). Baltimore, MD: Lippincott Williams and Wilkins.
- Bratko, I. (2011). Prolog programming for artificial intelligence (4th ed.). Hoboken, NJ: Pearson.
- Jackson, P. (1998). Introduction to expert systems (3rd ed.). Chicago, IL: Addison Wesley Longman.
- Nilsson, N. (2009). The quest for artificial intelligence. Cambridge: Cambridge University Press.
- Russel, S., & Norvig, P. (2009). Artificial intelligence: A modern approach (3rd ed.). Malaysia: Pearson.

A current list with course-specific compulsory reading, as well as references to further literature, is stored in the Learning Management System.

Prüfungsleistung:

Exam, 90 min.

Student Workload (in hours): 150

Self-study: 90

Self-testing: 30

Tutorials: 30

Kursnummer: DLMAISAI01	Kursname: Seminar: AI and Society	Gesamtstunden: 150 h ECTS Punkte: 5 ECTS
Kurstyp: Pflicht, Wahlpflicht Zu Details beachte bitte das Curriculum des jeweiligen Studiengangs Kursangebot : Kursdauer : Minimum 1 semester		Zugangsvoraussetzungen: None
Kurskoordinator(en) / Dozenten / Lektoren: Siehe aktuelle Liste der Tutoren im Learning Management System		Bezüge zu anderen Modulen: Siehe Modulbeschreibung
Beschreibung des Kurses: In the current decade, impressive advances have been achieved in the field of artificial intelligence. Several cognitive tasks like object recognition in images and video, natural language processing, game strategy, and autonomous driving and robotics are now being performed by machines at unprecedented levels of ability. This course will examine some of societal, economic, and political implications of these developments. Course Objectives and Outcome: On successful completion of this course, students will be able to: <ul style="list-style-type: none"> • name selected current societal topics and issues in artificial intelligence. • explain the influence and impact of artificial intelligence on societal, economic, and political topics. • transfer theoretically-acquired knowledge to real-world cases. • treat in a scientific manner a select topic in the form of a written essay. • critically question and discuss current societal and political issues arising from the recent advances in artificial intelligence methodology. • develop own problem-solving skills and processes through reflection on the possible impact of their future occupation in the sector of artificial intelligence. Teaching Methods: The learning materials include printed and online course books, vodcasts, online knowledge tests, podcasts, online tutorials, and case studies. This range of learning materials is offered to students so they can study at a time, place, and pace that best suits their circumstances and individual learning style. Course Content: The seminar covers current topics concerning the societal impact of artificial intelligence. Each participant must create a seminar paper on a topic assigned to him/her. A current list of topics is given in the Learning Management System.		

Literatur:

- Boddington, P. (2017). Towards a code of ethics for artificial intelligence (1st ed.). New York, NY: Springer International Publishing.
- Bostrom, N. (2016). Superintelligence: Paths, dangers, strategies. Oxford: Oxford University Press.
- Tegmark, M. (2018). Life 3.0: Being human in the age of artificial intelligence. New York, NY: Penguin.
- Wachter-Boettcher, S. (2017). Technically wrong: Sexist apps, biased algorithms, and other threats of toxic tech. New York, NY: W. W. Norton & Company.

A current list with course-specific compulsory reading, as well as references to further literature, is stored in the Learning Management System.

Prüfungsleistung:

Written Assessment: Research Essay

Student Workload (in hours): 150

Self-study: 120

Self-testing: --

Tutorials: 30