Exclosure to Subject Specific Regulations
from 16.11.2022
for Master-Programme Data Science
at TUHH
Programme Director: Prof. Tobias Knopp
Total: 120 CP
Number of Specilisations to choose: 4

Course Scheme Master Data Science (DSMS)

Consolidated Version
for Study Cohort: WiSe23/24
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and Approval of Chair from:
21.06.2023
Replaces Version from: 15.03.2023
In Force on: 01.10.2023
Out of Force on: 30.09.2026

Ein Modul kann pro Studienverlauf nur einmal belegt werden.

Information regarding the lectures are available in the TUHH modul manuals as well as in the course catalogue.

	Module							Examination			Course Work		
	Re-com. Term	Module Name (German / English)	Language	ModuleResponsability	Institute	C/EC (1)	CM/ OM (2)	CP (4)	Grade	Exami-nation Form(3)	Compulsory	Course Work Type	Bonus (in %)
Core Qualification Compulsory Courses: 48 LP Optional Courses: 0 LP													
	1	Fortgeschrittenes maschinelles Lernen / Advanced Machine Learning	DE / EN	Dr. Zemke	E-10	C	CM	6	Y	KL			
	2	Big Data / Big Data	EN	Prof. Schulte	E-19	C	CM	6	Y	FFA			
	2	Statistical Models / Statistical Models	EN	Prof. Schulte	E-10	C	CM	6	Y	MP			
	3	Advanced Seminar Computer Science and Communication Technology / Advanced Seminar Computer Science and Communication Technology	EN	Dozenten des SD E	SD-E	C	CM	3	Y	RE			
	3	Forschungsprojekt Informatik / Research Project Computer Science	DE / EN	Dozenten des SD E	SD-E	C	CM	12	Y	STA			
	3	Scientific Methods / Scientific Methods	EN	Prof. Schulte	E-19	C	CM	3	N	FFA			
	1-3	Nichttechnische Angebote im Master / Non-technical Courses for Master	DE / EN	Richter	0-TUHH	C	OM	6	Selection out of seperatly published Catalogue				
	1-3	Betrieb & Management / Business & Management	DE / EN	Prof. Meyer	W-1	C	OM	6	Selection out of seperatly published Catalogue				
Specialisation I. Mathematics Compulsory Courses: 0 LP Optional Courses: 6 LP													
	1	Hierarchische Algorithmen / Hierarchical Algorithms	DE / EN	Prof. Le Borne	E-10	EC	CM	6	Y	MP			
	1	Lineare und Nichtlineare Optimierung / Linear and Nonlinear Optimization	DE / EN	Prof. Mnich	E-11	EC	CM	6	Y	KL	N	ÜA	20
	1	Matrixalgorithmen / Matrix Algorithms	DE / EN	Dr. Zemke	E-10	EC	CM	6	Y	MP			

	Module							Examination			Course Work		
	Re-com. Term	Module Name (German / English)	Language	ModuleResponsability	Institute	C/EC (1)	CM/ OM (2)	CP (4)	Grade	Exami-nation Form(3)	Compulsory	Course Work Type	Bonus (in %)
	2	Informationstheorie und Codierung / Information Theory and Coding	EN	Prof. Bauch	E-8	EC	CM	6	Y	KL			
	2	Numerik gewöhnlicher Differentialgleichungen / Numerical Methods for Ordinary Differential Equations	DE / EN	Prof. Ruprecht	E-10	EC	CM	6	Y	KL			
	2	Numerische Mathematik II / Numerical Mathematics II	DE / EN	Prof. Le Borne	E-10	EC	CM	6	Y	MP			
	2	Randomisierte Algorithmen und Zufällige Graphen / Randomised Algorithms and Random Graphs	DE / EN	Prof. Taraz	E-10	EC	CM	6	Y	MP			
	2	Wahrscheinlichkeitstheorie / Probability Theory	EN	Prof. Schulte	E-10	EC	CM	6	Y	MP			
Specialisation II. Computer Science Compulsory Courses: 0 LP Optional Courses: 6 LP													
	1	Bildverarbeitung / Image Processing	DE / EN	Prof. Knopp	E-5	EC	CM	6	Y	KL			
	1	Digitale Nachrichtenübertragung / Digital Communications	DE / EN	Prof. Bauch	E-8	EC	CM	6	Y	KL	Y	SA	0
	1	Massiv parallele Systeme: Architektur und Programmierung / Massively Parallel Systems: Architecture and Programming	EN	Prof. Lal	E-EXK5	EC	CM	6	Y	MP	Y	FFST	20
	1	Sicherheit von Cyber-physischen Systemen / Security of Cyber-Physical Systems	EN	Prof. Fröschle	E-15	EC	CM	6	Y	KL	N	ÜA	10
	1	Softwareverifikation / Software Verification	EN	Prof. Schupp	E-16	EC	CM	6	Y	KL	Y	ÜA	15
	2	Advanced Internet Computing / Advanced Internet Computing	EN	Prof. Schulte	E-19	EC	CM	6	Y	FFA			
	2	Angewandte Kryptographie / Applied Cryptography	EN	Prof. Fröschle	E-15	EC	CM	6	Y	KL	N	ÜA	10
	2	Autonomous Cyber-Physical Systems / Autonomous Cyber-Physical Systems	EN	Prof. Renner	E-24	EC	CM	6	Y	KL	N	TE	10
	2	Data Science zur Cybersicherheit / Cybersecurity Data Science	EN	Prof. Scandariato	E-22	EC	CM	6	Y	KL	N	FFST	5
	2	Entwicklung von sicherer Software / Secure Software Engineering	EN	Prof. Scandariato	E-22	EC	CM	6	Y	KL	N	FFST	5
	2	GPU Architectures and Programming / GPU Architectures and Programming	EN	Prof. Lal	E-EXK5	EC	CM	6	Y	MP			
	2	Software für Eingebettete Systeme / Software for Embedded Systems	DE / EN	Prof. Renner	E-24	EC	CM	6	Y	KL	N	TE	10
	2	Softwaretesten / Software Testing	EN	Prof. Schupp	E-16	EC	CM	6	Y	FFA			
Specialisation III. Applications Compulsory Courses: 0 LP Optional Courses: 6 LP													
	1	Angewandte Humanoide Robotik / Applied Humanoid Robotics	DE / EN	Göttsch	E-14	EC	CM	6	Y	SA			
	1	Digital Health / Digital Health	EN	Prof. Göldner	W-EXK2	EC	CM	6	Y	KL	Y	ÜA	20
	1	Intelligente Systeme in der Medizin / Intelligent Systems in Medicine	EN	Prof. Schlaefer	E-1	EC	CM	6	Y	KL	Y	SA	10
											Y	RE	10

	Module							Examination			Course Work		
	Re-com. Term	Module Name (German / English)	Language	ModuleResponsability	Institute	C/EC (1)	CM/ OM (2)	CP (4)	Grade	Exami-nation Form(3)	Compulsory	Course Work Type	Bonus (in %)
	1	Machine Learning for Physical Systems / Machine Learning for Physical Systems	EN	Prof. Cyron	M-15	EC	CM	6	Y	KL			
	1	Medizinische Bildgebung / Medical Imaging	DE / EN	Prof. Knopp	E-5	EC	CM	6	Y	KL			
	1-2	Betriebsaspekte in der Luftfahrt (Variante A: 6 LP) / Operational Aspekts in Aviation	DE	Prof. Gollnick	M-28	EC	OM	6	Selection out of Catalogue below				
	2	Causal Data Science für Business Analytics / Causal Data Science for Business Analytics	EN	Prof. Ihl	W-11	EC	CM	6	Y	FFA			
	2	Data-Driven Innovation / Data-Driven Innovation	EN	Prof. Göldner	W-EXK2	EC	CM	6	Y	KL	Y	ÜA	20
	2	Maschinelles Lernen in der Elektro- und Informationstechnik / Machine Learning in Electrical Engineering and Information Technology	EN	Prof. Bauch	E-8	EC	CM	6	Y	MP			
	2	Robotik und Navigation in der Medizin / Robotics and Navigation in Medicine	EN	Prof. Schlaefer	E-1	EC	CM	6	Y	KL	Y	SA	10
											Y	RE	10
	3	Deep Learning für Social Analytics / Deep Learning for Social Analytics	EN	Prof. Ihl	W-11	EC	CM	6	Y	FFA			
Specialisation IV. Special Focus Area Compulsory Courses: 0 LP Optional Courses: 24 LP													
	1	Angewandte Humanoide Robotik / Applied Humanoid Robotics	DE / EN	Göttsch	E-14	EC	CM	6	Y	SA			
	1	Machine Learning for Physical Systems / Machine Learning for Physical Systems	EN	Prof. Cyron	M-15	EC	CM	6	Y	KL			
	1	Medizinische Bildgebung / Medical Imaging	DE / EN	Prof. Knopp	E-5	EC	CM	6	Y	KL			
	2	Advanced Internet Computing / Advanced Internet Computing	EN	Prof. Schulte	E-19	EC	CM	6	Y	FFA			
	2	Angewandte Kryptographie / Applied Cryptography	EN	Prof. Fröschle	E-15	EC	CM	6	Y	KL	N	ÜA	10
	2	Autonomous Cyber-Physical Systems / Autonomous Cyber-Physical Systems	EN	Prof. Renner	E-24	EC	CM	6	Y	KL	N	TE	10
	2	Causal Data Science für Business Analytics / Causal Data Science for Business Analytics	EN	Prof. Ihl	W-11	EC	CM	6	Y	FFA			
	2	Data Science zur Cybersicherheit / Cybersecurity Data Science	EN	Prof. Scandariato	E-22	EC	CM	6	Y	KL	N	FFST	5
	2	Data-Driven Innovation / Data-Driven Innovation	EN	Prof. Göldner	W-EXK2	EC	CM	6	Y	KL	Y	ÜA	20
	2	Entwicklung von sicherer Software / Secure Software Engineering	EN	Prof. Scandariato	E-22	EC	CM	6	Y	KL	N	FFST	5
	2	GPU Architectures and Programming / GPU Architectures and Programming	EN	Prof. Lal	E-EXK5	EC	CM	6	Y	MP			
	2	Informationstheorie und Codierung / Information Theory and Coding	EN	Prof. Bauch	E-8	EC	CM	6	Y	KL			

	Module							Examination			Course Work		
	Re-com. Term	Module Name (German / English)	Language	ModuleResponsability	Institute	C/EC (1)	CM/ OM (2)	CP (4)	Grade	Exami-nation Form(3)	Compulsory	Course Work Type	Bonus (in %)
	2	Maschinelles Lernen in der Elektro- und Informationstechnik / Machine Learning in Electrical Engineering and Information Technology	EN	Prof. Bauch	E-8	EC	CM	6	Y	MP			
	2	Numerik gewöhnlicher Differentialgleichungen / Numerical Methods for Ordinary Differential Equations	DE / EN	Prof. Ruprecht	E-10	EC	CM	6	Y	KL			
	2	Numerische Mathematik II / Numerical Mathematics II	DE / EN	Prof. Le Borne	E-10	EC	CM	6	Y	MP			
	2	Randomisierte Algorithmen und Zufällige Graphen / Randomised Algorithms and Random Graphs	DE / EN	Prof. Taraz	E-10	EC	CM	6	Y	MP			
	2	Robotik und Navigation in der Medizin / Robotics and Navigation in Medicine	EN	Prof. Schlaefer	E-1	EC	CM	6	Y	KL	Y	SA	10
											Y	RE	10
	2	Software für Eingebettete Systeme / Software for Embedded Systems	DE / EN	Prof. Renner	E-24	EC	CM	6	Y	KL	N	TE	10
	2	Softwaretesten / Software Testing	EN	Prof. Schupp	E-16	EC	CM	6	Y	FFA			
	2	Technischer Ergänzungskurs für DSMS (laut FSPO) / Technical Complementary Course for DSMS (according to Subject Specific Regulations)		Prof. Knopp	SD-E	EC	OM	6	according to Subject Specific Regulations				
	2	Wahrscheinlichkeitstheorie / Probability Theory	EN	Prof. Schulte	E-10	EC	CM	6	Y	MP			
	3	Bildverarbeitung / Image Processing	DE / EN	Prof. Knopp	E-5	EC	CM	6	Y	KL			
	3	Deep Learning für Social Analytics / Deep Learning for Social Analytics	EN	Prof. Ihl	W-11	EC	CM	6	Y	FFA			
	3	Digital Health / Digital Health	EN	Prof. Göldner	W-EXK2	EC	CM	6	Y	KL	Y	ÜA	20
	3	Digitale Nachrichtenübertragung / Digital Communications	DE / EN	Prof. Bauch	E-8	EC	CM	6	Y	KL	Y	SA	0
	3	Hierarchische Algorithmen / Hierarchical Algorithms	DE / EN	Prof. Le Borne	E-10	EC	CM	6	Y	MP			
	3	Intelligente Systeme in der Medizin / Intelligent Systems in Medicine	EN	Prof. Schlaefer	E-1	EC	CM	6	Y	KL	Y	RE	10
											Y	SA	10
	3	Lineare und Nichtlineare Optimierung / Linear and Nonlinear Optimization	DE / EN	Prof. Mnich	E-11	EC	CM	6	Y	KL	N	ÜA	20
	3	Massiv parallele Systeme: Architektur und Programmierung / Massively Parallel Systems: Architecture and Programming	EN	Prof. Lal	E-EXK5	EC	CM	6	Y	MP	Y	FFST	20
	3	Matrixalgorithmen / Matrix Algorithms	DE / EN	Dr. Zemke	E-10	EC	CM	6	Y	MP			
	3	Sicherheit von Cyber-physischen Systemen / Security of Cyber-Physical Systems	EN	Prof. Fröschle	E-15	EC	CM	6	Y	KL	N	ÜA	10
	3	Softwareverifikation / Software Verification	EN	Prof. Schupp	E-16	EC	CM	6	Y	KL	Y	ÜA	15
Thesis Compulsory Courses: 30 LP Optional Courses: 0 LP													
	4	Masterarbeit / Master Thesis		Professoren der TUHH	0-TUHH	C	CM	30	Y	AB			

Operational Aspekts in Aviation

Course					Examination			
Course Name (German / English)	Course Form LV(5)	Language (6)	SWS (7)	Sem. LV	CP (4)	Grade	Examination Form(3)	Additional information
Betrieb einer Luftverkehrsgesellschaft / Airline Operations	VL	DE	3	SoSe	3	Y	KL	
Flugführung I (Grundlagen) / Flight Guidance I (Introduction)	VL	DE	2	WiSe	2	Y	KL	
Flugführung I (Grundlagen) / Flight Guidance I (Introduction)	HÜ	DE	1	WiSe	1	Y	KL	
Flughafenbetrieb / Airport Operations	VL	DE	3	WiSe	3	Y	KL	
Flughafenplanung / Airport Planning	VL	DE	2	WiSe	2	Y	KL	
Flughafenplanung / Airport Planning	GÜ	DE	1	WiSe	1	Y	KL	
Luftverkehr und Umwelt / Aviation and Environment	VL	DE	3	SoSe	3	Y	KL	

Explanation:

[1]C=Compulsory, EC=Elective Compulsory
[2]CM=Compulsory Defined Module, OM=Optional Defined Module
[3]KL=Written exam, SA=Written elaboration, FFST=Subject theoretical and practical work, FFA=Subject theoretical and practical work, MP=Oral exam, RE=Presentation, STA=Study work, ÜA=Excercises, AB=Thesis, SA lt. FPrO=Written elaboration (accord. to Internship Regulations), TE=Attestation
[4]CP=Credit Points
[5]VL=Lecture, SE=Seminar, GÜ=Recitation Section (small), PBL=Project-/problem-based Learning, PR=Practical Course, PS=Project Seminar, PK=Projection Course, HÜ=Recitation Section (large)
[6]DE=German, EN=English, DE/EN=German and English
[7]SWS=Contact hours