Module Catalog 2024/2025 Master of Science Computer Science

HPI-CS-AAC: Applied Algorithm	ns - Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	algorithms. In par area of algorithms program. Various algorithmic numbe Qualification goal Students acquire of module. Students - become famil implementation of - Can analyze a of problem, - are able to span code, - can solve algorit	is module is the cond ticular, it is about the s and then the subse topics from the areas er theory or related ar s: detailed knowledge o iar with technique falgorithms as compu- complex, linguistic p the entire spectrum fr hmic problems creating ate algorithms into eff	e creative solution t quent implementation of graph algorithms eas are covered. If the specialized to s and libraries ther programs, roblem and convert om problem descriptively,	to problems in the ion as a computer , string algorithms, pic covered in the for the efficient ct it into a formal ption to executable
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time	120			
(in hours [h]):				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (at	-
(lecture or seminar)			least 50%)	
Frequency of offer:		WiSe and SoSe		
Prerequisite:		none		
Department:		Digital Engineering		

HPI-CS-AAD: Applied Algorithm	ns - Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
Content and qualification goals of the module:	implementation of advanced problem as a computer pro- algorithms, string covered. Qualification goal Students acquire of module. Students - become familian implementation of - can analyze a co problem, - are able to span executable code; - can creatively so	this in-depth mod Salgorithms. In particu- is in the field of algor ogram. Various adva algorithms, algorithm s: detailed knowledge of with advanced tech Salgorithms as compu- complex, linguistic p the entire spectrum fi lve advanced algorith	ular, it is about the c ithms and subseque need topics from t nic number theory c of the specialist top niques and librarie tter programs, roblem and conver rom complex probl	reative solution of nt implementation he areas of graph or related areas are ics covered in the s for the efficient t it into a formal em descriptions to
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time	120			
(in hours [h]):				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (at	-
(lecture or seminar)			least 50%)	
Frequency of offer: Prerequisite:		WiSe and SoSe Prior participation in	n HPI-CS-AAC is r	ecommended.
Department:		Digital Engineering		

HPI-CS-AAS: Applied Algorithm	ns - Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	implementation of advanced problem as a computer pro- algorithms, string covered. Qualification goal Students acquire of module. Students - become familiar implementation of - can analyze a co problem, - are able to span executable code, - can creatively so	this in-depth mod algorithms. In partic is in the field of algor ogram. Various adva algorithms, algorithm s: detailed knowledge of with advanced tech algorithms as compu- complex, linguistic p the entire spectrum f lve advanced algorithm	ular, it is about the o ithms and subseque inced topics from t nic number theory o of the specialist top iniques and librarie iter programs, roblem and conver from complex probl	creative solution of ent implementation the areas of graph or related areas are ics covered in the es for the efficient et it into a formal em descriptions to
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	esearch results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
(Incluse of Seminal)			10ast 5070)	
Frequency of offer: Prerequisite:		WiSe and SoSe Prior participation in HPI-CS-AAC is recommended.		
Department:		Digital Engineering		

HPI-CS-ADC: Advanced Data S	ystems - Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	(e.g., production, medicine, trade, disciplines. The ur methods for stori structures and ac- limitations. Buildi discussed. This m using intelligent a different types, ar Access and query hardware-related of Qualification goal Students - learn scalable da - gain knowledge - learn implementa - expand their prof- gain the ability information to sol- - learn how to inde literature,	ta structures and acce of intelligent query pr ation concepts and alg fessional judgment sk to independently a	n many application nunication, and im systems require effi ata. This module t their advantages, d of scalable inform the efficient prod a. The requests are as are discussed for ther improved, for ess methods, rocessing, gorithms, tills, access and use su topic based on prim	s, for example in many scientific icient concepts and eaches basic data isadvantages, and lation systems are cessing of queries characterized into processing them. example, through itable sources of ary and secondary
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe None Digital Engineering		

HPI-CS-ADD: Advanced Data S	ystems - Deep Dive	2	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	using common so are compared with are thus shown and Students are made their own solution Qualification goal Students - learn the practica - can assess the algorithms and the - acquire the abil information to solu- - learn how to inc based on primary a - are able to follo work,	al mastery of data sys differences betweer current state of the a lity to independently	access methods and he art. The limits of e current state of the lems and are instru- rch questions. tems, n classic access m art, access and use s t the in-depth inves ure, rends and incorpora	d query algorithms classic techniques art also examined. cted in developing ethods and query uitable sources of stigation of a topic ate them into their
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, score For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation i Digital Engineering		ecommended.

HPI-CS-ADS: Advanced Data Sy	vstems - Specializat	tion	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	context of scalable weaknesses in the related, specialized primarily done usi Qualification goals Students - work on develop data systems, - deal with new technologies, - learn how to sciet area of scalable da - gain subject-spec - can select and a specialized proble - learn to follow c their work, - are able to inc individual topics, - gain experience i - get to know crite	ing limitations and ex advanced data proce ntifically process curr ta systems, cific theoretical, meth pply suitable solutio	cularly deals with the art and the scientifi- tient access and quer fic, advanced applic attensions of existing essing methods, su rent, in-depth resear odological and prace n concepts and strate arch trends and inco- and evaluate scien nd abstraction of in- scientific writing,	ne identification of ic development of y methods. This is eation scenarios. g scalable complex ach as in-memory ch questions in the etical knowledge, ategies to a given, orporate them into tific literature on -depth problems,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			
Self-study time	120			
(in hours [h]):				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-AIC: AI Applications -	Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	and is increasingly and concepts in processing (NLP) practical knowled various forms of Students gain ex systems as well as an in-depth unde strengths and weat and risks in the understanding of r Qualification goal Students - learn the practica - acquire the abil information to sol- - learn how to inc based on primary a - learn to follow co	al mastery of artificial ility to assess the algorithms, lity to independently	fe. This module cov s computer vision, tudents acquire bo t of AI systems; for or suitable optimiz ng application-speci- n-specific data. This AI paradigms with otential ethical or so fic AI application n the lecture by pra intelligence method differences between access and use su the in-depth investire, and incorporate the	vers AI techniques natural language th theoretical and example, through zation algorithms. cific models and s module provides th regard to their ocial opportunities ns. The practical ctical exercises. ds, en various model uitable sources of tigation of a topic em into their work,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-
Self-study time	120			
(in hours [h]):				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements e) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe None Digital Engineering		

HPI-CS-AID: AI Applications -	Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ive module		
Content and qualification goals of the module:	and is increasingly and concepts in processing (NLP) practical knowled various forms of Students gain ex systems as well as an in-depth unde strengths and weat and risks in the understanding of r Qualification goal Students - learn the practica - acquire the ab architectures and a - can independent problems, - learn how to inco based on primary - learn to follow co	al mastery of artificial ility to assess the	fe. This module cov s computer vision, tudents acquire bo t of AI systems; for or suitable optimiz ng application-speci- n-specific data. This AI paradigms with obtential ethical or se fic AI application in the lecture by pra l intelligence method differences between itable sources of inf t the in-depth investire, and incorporate the	vers AI techniques natural language th theoretical and example, through zation algorithms. cific models and s module provides th regard to their ocial opportunities ns. The practical ctical exercises. ds, en various model formation to solve tigation of a topic em into their work,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-
Self-study time (in hours [h]):	120			
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Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of		accompanying module (partial) exam (s)
	,	module	module exam	(number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
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Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation i		commended.
Department:		Digital Engineering		

HPI-CS-AIS: AI Applications - S	pecialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	and is increasingly and concepts in a processing (NLP) practical knowled various forms of Students gain ex systems as well as an in-depth under strengths and weal and risks in the understanding of r Qualification goal Students - learn the practica - acquire the ab architectures and a - can independent problems, - learn how to ind based on primary a - learn to follow cu	al mastery of artificial ility to assess the	fe. This module con- s computer vision, tudents acquire bo t of AI systems; for or suitable optimiz- ng application-spe n-specific data. This AI paradigms wi otential ethical or su- fic AI application n the lecture by pra- intelligence metho differences between table sources of in- t the in-depth invess- ire, and incorporate the	vers AI techniques natural language th theoretical and example, through zation algorithms. cific models and s module provides th regard to their ocial opportunities ns. The practical ctical exercises. ds, en various model formation to solve tigation of a topic em into their work,
	Exam types: Paper of at least 8 pages, together with a presentation of research results 45 mins.) Written exam, 90-120 mins.			
	Paper of at least 8 45 mins.)	120 mins.	a presentation of re	search results (20-
form, scope): Self-study time	Paper of at least 8 45 mins.) Written exam, 90-	120 mins.	a presentation of re	search results (20-
form, scope): Self-study time	Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45	120 mins. mins.		
Partial module exams (number, form, scope): Self-study time (in hours [h]):	Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45 120	120 mins. mins.	am requirements	Course accompanying
form, scope): Self-study time (in hours [h]):	Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45	120 mins. mins. Supplementary ex	am requirements	Course
form, scope): Self-study time	Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45 120 Contact time (in semester	120 mins. mins. Supplementary ex (number, form, scop For completion of	am requirements be) For admission to	Course accompanying module (partial) exam (s) (number, form,
form, scope): Self-study time (in hours [h]): Courses (teaching format) Project seminar/seminar/ lecture (lecture or seminar)	Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45 120 Contact time (in semester hours)	120 mins. mins. Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam Exercises (at	Course accompanying module (partial) exam (s) (number, form,
form, scope): Self-study time (in hours [h]): Courses (teaching format) Project seminar/seminar/ lecture	Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45 120 Contact time (in semester hours)	120 mins. mins. Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam Exercises (at least 50%)	Course accompanying module (partial) exam (s) (number, form, scope) -

HPI-CS-ALG: Algorithmics			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ıle/ compulsory electi	ive module	
Content and qualification goals of the module:	As part of these co analyzed. Focus to geometric probles matching algorithm Concrete proof str Qualification goal The students acqui module. Students - familiarize them their analyses; - understand in det for classical proble - are able to inco presented areas; - can fluently reas as evidence;	ire detailed knowledg selves with various a cail the advantages and ems and the reasons f dependently analyze son mathematically an	riate data structures problems (e.g., path gs) or string prob hematical analysis a and deepened. e of the specialist to algorithms for class d disadvantages of d or these differences and develop algo nd express their ide	are presented and problems, flows), lems (e.g., string and formal proofs. pics covered in the ical problems and ifferent algorithms ; rithms within the
Partial module exams (number, form, scope):	- gain insight into the current state of research. Exam types: Written exam, 90-120 mins. Oral exam, 30-45 mins.			
Self-study time (in hours [h]):	120			
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	Contact time	Supplementary ex (number, form, scop	am requirements	accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (50%)	-
(lecture or seminar)	I			l
Frequency of offer:		WiSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-AMC: Advanced Machi	ne Learning - Coro	e	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	foundations of n probabilistic learn supervised learnin processes as well modeling, recommended challenges such as model validation as students should be innovative problem Qualification goal The students acquir module. Students - gain comprehenses machine learning, - acquire the abilit make predictions a - can implement a digital health relev or financial analys - deepen knowled are essential for m - can apply what the exercises and proj - gain in-depth knowled	ire detailed knowledg sive knowledge of con- ity to recognize and and decisions, algorithms and train vant-areas, such as im- sis, ge of statistical meth- lachine learning, hey have learned and	nd artificial intell reinforcement lea the optimization of s in digital health, mage and text anal tting. Students also luation. After comp v machine learning chine learning. e of the specialist to neepts, algorithms, a analyze complex da models in order to age recognition, lar lods and optimizati develop their own r	igence, including arning and semi- `machine learning such as predictive lysis. It highlights learn methods for leting the module, methods and find pics covered in the and applications of ata patterns and to solve problems in nguage processing, on techniques that models in practical
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-
Self-study time (in hours [h]):	120			
(m nours [n]):	I			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form,
D · · · · · · · · · · · · · · · · · · ·				scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
E		W.G. 10.0		
Frequency of offer: Prerequisite:		WiSe and SoSe None		
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HPI-CS-AMD: Advanced Machi	ne Learning - De	ep Dive	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory elec	ctive module		
	foundations of probabilistic lear supervised learn processes as we modeling, recon challenges such model validation students should	ovides knowledge of a machine learning a urning, deep learning ing. Content includes Il as practical use case nmendation systems, i as data bias and overfin and performance eva be able to develop nev em solutions using ma	nd artificial intell , reinforcement lea the optimization of es in digital health, image and text anal itting. Students also luation. After comp w machine learning	igence, including arning and semi- machine learning such as predictive lysis. It highlights learn methods for leting the module,
Content and qualification goals of the module:	Qualification goals: The students acquire detailed knowledge of the specialist topics covered in the module. Students			
	 Students gain comprehensive knowledge of concepts, algorithms, and applicatio machine learning, acquire the ability to recognize and analyze complex data patterns at make predictions and decisions, can implement algorithms and train models in order to solve probler digital health relevant-areas, such as image recognition, language process or financial analysis, deepen knowledge of statistical methods and optimization techniques are essential for machine learning, can apply what they have learned and develop their own models in prace exercises and projects, 			ata patterns and to solve problems in nguage processing, on techniques that
Partial module exams (number, form, scope):	world of artificia Exam types: Paper of at least 45 mins.) Written exam, 90	al intelligence and mac 8 pages, together with 0-120 mins.	hine learning.	
Self-study time (in hours [h]):	Oral exam, 30-4 120	o mins.		
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Courses (teaching format)	Contact time (in semester hours)	(number, form, scope For completion of	For admission to	accompanying module (partial) exam (s)
		module	module exam	(number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (at least 50%)	-
(lecture or seminar)				
· · · · · · · · · · · · · · · · · · ·		WiSe and SoSe		
(lecture or seminar) Frequency of offer: Prerequisite:		WiSe and SoSe Prior participation in	HPI-CS-AMC is re	commended

HPI-CS-AMS: Advanced Machin	ne Learning - Spec	ialization	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory elec	tive module		
Content and qualification goals of the module:	foundations of n probabilistic learn supervised learnin processes as well modeling, recommended challenges such as model validation as students should be innovative problem Qualification goal The students acquis module. Students - gain comprehenss machine learning, - acquire the abilit make predictions a - can implement a digital health relev or financial analys - deepen their know that are essential f - can apply what tt exercises and proj - gain in-depth know	ire detailed knowledg sive knowledge of con- ty to recognize and a and decisions, algorithms and train vant-areas, such as im- sis, owledge of statistical for machine learning, hey have learned and ects, nowledge needed to	nd artificial intell , reinforcement lea the optimization of s in digital health, mage and text anal tting. Students also luation. After comp w machine learning chine learning. e of the specialist to neepts, algorithms, a analyze complex da models in order to tage recognition, lar methods and optim develop their own t	igence, including arning and semi- machine learning such as predictive lysis. It highlights learn methods for leting the module, methods and find pics covered in the and applications of ata patterns and to solve problems in nguage processing, ization techniques models in practical
Partial module exams (number, form, scope):	 world of artificial intelligence and machine learning. Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins. 			search results (20-
Self-study time (in hours [h]):	120			
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Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of	am requirements be) For admission to	Course accompanying module (partial) exam (s)
		module	module exam	(number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
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Frequency of offer: Prerequisite:		WiSe and SoSe Prior participation i	HIDLOS AMO	
		EPTIOD DATE CONSTRUCTION 1	n HPLL N_/\// 10 1	

HPI-CS-ASC: Algorithms and S	ecurity - Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	of digital health. attacks and three implementing secu This module also p structures relevant as sorting algorit algorithms. Qualification goal The students acqui module. Students: - learn decision-r treatment plannin artificial intelligen - master the proo- techniques such a machine learning, - deepen their km techniques, secur methods, - expand their km	ire detailed knowledge making algorithms in ng using machine l uce and other technique cessing and analysis s data mining, statist owledge of cryptogra e communication, d nowledge of security measures related to c	ving security risks, integrity and con- sures. on to the basics of a industry. This inclu- times, graph algorit e of the specialist top n medical diagnos earning algorithms les, of large data sets ical analysis, patter aphy and data prot- igital signatures ar in connected dev	protecting against nfidentiality, and lgorithms and data ides concepts such hms and optimal pics covered in the is, prognosis and s, decision trees, a (big data) using m recognition and ection, encryption nd anonymization ices and systems,
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 mins.	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
(III IIOUIS [II]).				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe None Digital Engineering		

HPI-CS-ASD: Algorithms and Security - Deep Dive

Number of credit points (CP):

HFI-CS-ASD: Algorithms and S	ecurity - Deep Dive	5	6	credit points (CP):
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Partial module exams (number, form, scope):	In today's connecte module provides s defend against att and implement sec An important aspe risks. Students le threats in digital network commun vulnerability, inad a deeper understar appropriate protec can be used to dete Qualification goal The students acqui module. Students: - learn decision- treatment plannir artificial intelligen - master the proo techniques such a machine learning, - deepen their kn techniques, secur methods, - expand their kn	ire detailed knowledg making algorithms i ng using machine l nce and other techniqu cessing and analysis s data mining, statist owledge of cryptogra e communication, d nowledge of security measures related to c	of sensitive health d d knowledge to ider ure data integrity a easures. the identification of analyze potential we ese include, among ess control, softwa d social engineering students are able to ithms play a crucia nd against threats a e of the specialist to n medical diagnos earning algorithms les, of large data sets ical analysis, patter aphy and data prot igital signatures and in connected dev	lata is critical. This ntify security risks, nd confidentiality, f complex security vulnerabilities and g others, insecure are and hardware g attacks. Through take and develop l role here as they nd attacks. pics covered in the is, prognosis and s, decision trees, a (big data) using rn recognition and ection, encryption nd anonymization ices and systems,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scor For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in HPI-CS-ASC is recommended. Digital Engineering		

HPI-CS-ASS: Algorithms and Se	curity - Specializat	tion	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	In today's connect module provides security risks, we confidentiality, and An important aspe risks. Students lean and threats in digi network commun vulnerability, inad a deeper and more take and develop a role here as they ca attacks. Qualification goals The students acqui module. Students: - learn decision-ri- treatment plannin artificial intelligen - master the proo- techniques such a machine learning, - deepen their kno- techniques, secure- methods, - expand their kno-	nts acquire detailed knowledge of the specialist topics covered ir ecision-making algorithms in medical diagnosis, prognosis planning using machine learning algorithms, decision tr ntelligence and other techniques, the processing and analysis of large data sets (big data) u s such as data mining, statistical analysis, pattern recognition		data is critical. The vledge to identify lata integrity and res. f complex security olex vulnerabilities ng others, insecure are and hardware g attacks. Through students are able to hms play a crucial against threats and pics covered in the is, prognosis and s, decision trees, s (big data) using rn recognition and ection, encryption nd anonymization ices and systems,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-ATC: Algorithm Theory	- Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory	elective module		
Content and qualification goals of the module:	approximation focus is on the analysis and a algorithm device Qualification The students the module. Students - know appro- know centra - understand solving NP-h - can independ areas, - deepen their evidence,		rized algorithms) a of the solution, es sibility results comp dge of the specialist rd problems, and disadvantages relop algorithms wi natically and write o	re discussed. The pecially algorithm lement the field of t topics covered in of the approach to thin the presented
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			
Self-study time	120			
(in hours [h]):				
	Contact time (in semester	Supplementary exat (number, form, scope)	m requirements	Course accompanying module (partial)
ourses (teaching format) (III seniester hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)	
Project seminar/seminar/ lecture	4	-	Exercises (at	-
(lecture or seminar)			least 50%)	
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-ATD: Algorithm Theory	y - Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	algorithms, param mathematical ver algorithm design. development. Qualification goal The students acqui module. Students - know approaches - know central imp - understand in de solving NP-hard p - can independent areas, - deepen their abil evidence,	tre detailed knowledg s for solving NP-hard possibility results, etail the advantages a roblems, tly analyze and deve ity to reason mathem	are discussed. The n, especially algori s complement the ge of the specialist to l problems, and disadvantages of elop algorithms with natically and write d	e focus is on the thm analysis and field of algorithm pics covered in the of the approach to thin the presented
Partial module exams (number, form, scope):	 gain in-depth insights into the current state of research. Exam types: Paper of at least 8 pages, together with a presentation of research results (20-45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins. 			search results (20-
Self-study time	120			
(in hours [h]):				
	Contact time (in semester	Supplementary ex (number, form, sco		Course accompanying module (partial)
ourses (teaching format) (III seriester hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)	
Project seminar/seminar/ lecture	4	-	Exercises (50%)	-
(lecture or seminar)				
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-ATS: Algorithm Theory	- Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
Content and qualification goals of the module:	Content: In this module, approaches for solving NP-hard problems (e.g., approximation algorithms, parameterized algorithms) are discussed. The focus is on the mathematical version of the solution, especially algorithm analysis and algorithm design. Impossibility results complement the field of algorithm development. Qualification goals: The students acquire detailed knowledge of the specialist topics covered in the module. Students - know approaches for solving NP-hard problems, - know central impossibility results, - understand in detail the advantages and disadvantages of the approach to solving NP-hard problems, - can independently analyze and develop algorithms within the presented areas, - deepen their ability to reason mathematically and write down their ideas as evidence, - gain in-depth insights into the current state of research.			e focus is on the thm analysis and field of algorithm pics covered in the of the approach to thin the presented
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			esearch results (20-
Self-study time	120			
(in hours [h]):				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (at	-
(lecture or seminar)			least 50%)	
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-C: Cryptography			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ıle/Compulsory electi	ve module	
Content and qualification goals of the module:	security propertie cryptographic met and algorithms ar procedures such a encryption to prot authentication co authenticity. The cryptography are of able to understand able to use them c Qualification goal The students acqui module. Students - acquire a com cryptographic ma cryptographic ma cryptographic ma cryptographic hasl - become versed complexity theory gain an algorithm and understand sec - know the most signatures - can decide which in practice	s: ire detailed knowledg prehensive understar ethods (e.g., asymm h functions), in the basic princ security nic and formal unders	and the function nmetrical and asym r properties analyz actions and symmet y of information, a gnatures to prote oundations required bleting the module, and procedures of cry e of the specialist to nding of the prop metric and symmetric standing in order to es for encryption, l edures may be used	ality of modern metrical methods ted. These include ric and public-key s well as message ect integrity and d for asymmetric students should be yptography and be pics covered in the perties of various netric encryption, cryptography and be able to analyze key exchange and
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
х Б а/		1		
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
F 0.00				
Frequency of offer:		SoSe		
Prerequisite: Department:		None Digital Engineering		
		Digital Engineering		

HPI-CS-CAC: Cyber Attack and	d Defense - Core		Number of (CP): 6	credit points	
Module type (compulsory or compulsory elective module):	Compulsory election	ive module			
Content and qualification goals of the module:	systems and comp attack as well as analysis and detect by which an attack for preventing spe Qualification goal The students acqui module. Students - gain subject-spect - expand their prot - develop discussive - gain experience if and complex infra - are able to indep solve problems; - can assess the a problems; - gain the ability to	ire detailed knowledg cific theoretical and m fessional judgment sk on skills and techniqu in dealing with concep structures; endently develop and applicability of solut apply suitable solutio o present and defend to mine solutions to pro	Ve consider the rele d methods. In add presented for the atta the corresponding p ed. e of the specialist to nethodological know ills; les; ots and methods for use suitable sources ion concepts and stra- their work,	evant phases of an dition, appropriate ack methods used, phase, and options pics covered in the vledge; defending systems s of information to strategies to given ategies to a given	
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-	
Self-study time (in hours [h]):	120				
L J/	•	1			
	Contact time (in semester	Supplementary ex (number, form, scop	am requirements be)	Course accompanying module (partial)	
Courses (teaching format)	hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)	
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-	
Fragueness of offer		WiSe and SoSe			
Frequency of offer: Prerequisite:		3.7	None Digital Engineering		

HPI-CS-CAD: Cyber Attack and	l Defense - Deep Di	ive	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
Content and qualification goals of the module:	systems and comp attack as well as analysis and detect by which an attach for preventing spe Qualification goal The students acqui module. Students - gain subject-spea - expand their prot - develop discussio - gain experience if and complex infra - are able to indep solve problems, - can assess the a problems, - gain the ability to - can critically exa	s module teaches basic concepts and methods for the attack and defense o tems and complex infrastructures. We consider the relevant phases of an uck as well as the commonly used methods. In addition, appropriate lysis and detection approaches are presented for the attack methods used which an attack can be identified in the corresponding phase, and options preventing specific attacks considered. alification goals: e students acquire detailed knowledge of the specialist topics covered in the dule. dents an subject-specific theoretical and methodological knowledge, spand their professional judgment skills, evelop discussion skills and techniques, an experience in dealing with concepts and methods for defending system I complex infrastructures, e able to independently develop and use suitable sources of information to ve problems, an assess the applicability of solution concepts and strategies to given blems, an select and apply suitable solution concepts and strategies to a given		
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-
Self-study time (in hours [h]):	120			
	•			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-CAS: Cyber Attack and	l Defense - Specializ	zation	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ive module		
Content and qualification goals of the module:	systems and comp attack as well as analysis and detect by which an attack for preventing spe Qualification goal The students acqui module. Students - gain subject-spect - expand their prot - develop discussion - gain experience if and complex infra - are able to indep solve problems, - can assess the ap problems, - can select and a problem, - gain the ability to	ire detailed knowledg cific theoretical and n fessional judgment sk on skills and techniqu in dealing with concep structures, endently develop and applicability of solut apply suitable solution o present and defend amine solutions to pro-	Ve consider the rele d methods. In add oresented for the att the corresponding p ed. e of the specialist to nethodological know tills, nes, ots and methods for use suitable source ion concepts and str their work,	evant phases of an lition, appropriate ack methods used, phase, and options pics covered in the vledge, defending systems s of information to strategies to given ategies to a given
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-
Self-study time (in hours [h]):	120			
		1		
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	accompanying module (partial) exam (s) (number, form,
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	scope) -
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in		ecommended
Department:		Digital Engineering		

HPI-CS-CPC: Advanced Crypto	graphy and Protoc	cols - Core	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	in the area of cr security protocol cryptography are computation, thres the fundamental re and analysis of the relevant scenarios. Qualification goal The students acqui module. Students - know advanced co protocols, - can analyze comp correctness, - are familiar with examine given pro- can analyze secu - are familiar with and have developed area, - are able to con-	s: ire detailed knowledge concepts and methods plex cryptographic pr a known attack metho otocols for them, rity protocols for vulu current research tren ed an awareness of th mmunicate complex	imunication protoc ad advanced meth zero-knowledge p nd post-quantum sec students become ve ctionality and applic e of the specialist to of cryptography and imitives and protoco ods and vulnerabiliti nerabilities, ds and developmen e challenges and op theoretical concep	ols. Network and hods of modern roofs, multi-party curity. Building on ersed in the design cations in practice- pics covered in the d complex security ols and prove their ies and are able to ts in cryptography pportunities in this
Partial module exams (number, form, scope):	decision-makers in an understandable manner. Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 mins. Oral exam, 30-45 mins.			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe None Digital Engineering		

HPI-CS-CPD: Advanced Crypto	graphy and Protoc	cols - Deep Dive	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
Content and qualification goals of the module:	in the area of cr security protocol cryptography are computation, thres the fundamental r and analysis of the relevant scenarios Qualification goal The students acqui module. Students - know advanced of protocols, - can analyze com correctness, - are familiar with examine given pro- can analyze secu - are familiar with and have developed area, - are able to cor	s: ire detailed knowledg concepts and methods plex cryptographic pr 1 known attack metho	imunication protoc ad advanced meth zero-knowledge p nd post-quantum sec students become ve ctionality and applic e of the specialist top of cryptography and imitives and protoco ods and vulnerabiliti nerabilities, ds and developmen e challenges and op	ols. Network and hods of modern roofs, multi-party curity. Building on ersed in the design cations in practice- pics covered in the d complex security ols and prove their ies and are able to ts in cryptography oportunities in this
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	(Contact time in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe	LIDI CO CDC .	1 1
Prerequisite:		Prior participation in		ecommended.
Department:		Digital Engineering		

HPI-CS-CPS: Advanced Crypto	graphy and Protoc	ols - Specialization	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ive module		
Content and qualification goals of the module:	in the area of cr security protocol cryptography are computation, thres the fundamental r and analysis of the relevant scenarios Qualification goal The students acqui module. Students - know advanced of protocols, - can analyze com correctness, - are familiar with examine given pro - can analyze secu - are familiar with and have developed area, - are able to con	s: ire detailed knowledg concepts and methods plex cryptographic pr 1 known attack metho	imunication protoc ad advanced meth zero-knowledge p nd post-quantum sec students become ve ctionality and applic e of the specialist to of cryptography and imitives and protoco ods and vulnerabiliti nerabilities, ds and developmen e challenges and op	ols. Network and hods of modern roofs, multi-party curity. Building on ersed in the design cations in practice- pics covered in the d complex security ols and prove their ies and are able to ts in cryptography oportunities in this
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time	120			
(in hours [h]):				
	Contact time	Supplementary ex (number, form, scop	am requirements	accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
E 6.00				
Frequency of offer:		WiSe and SoSe Prior participation in		aammandad
Prerequisite: Department:		Digital Engineering		commended.

HPI-CS-CR: Critical Reading an	nd Discussion		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ıle		
Content and qualification goals of the module:	of current literatur events in this mod presentation and of this module, a gree research area. Qualification goal Students improve Students - practice reading - can integrate van a topic, - develop their al writing, - deepen their abil - gain in-depth ins	with the compilation, re with a research foc- lule are assigned to sp discussion of content eat depth of understan s: their methodological and understanding cu- rious, sometimes (see bility to present find ity to argue and evalu- ights into the current	us on computer scie becific tracks. Furth is at the level of cr nding is achieved ir skills within their tr rrent literature on a mingly) contradicto lings and connection tate,	ence. Accordingly, ermore, the verbal urrent research. In n a highly focused rack. topic, ory information on
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Paper of at least 12	pages, together with 2 pages	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
		1		1
	Contact time	Supplementary exam requirements (number, form, scope)		accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Critical Reading and Discussion	4	-	-	-
(Seminar)				
Frequency of offer:		WiSe and SoSe		
Prerequisite:		It is recommended that students first visit at least two compulsory modules of the track to which the respective course in this module is assigned.		
Department:		Digital Engineering		

HPI-CS-DA: Data Analytics			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ale/ compulsory elect	ive module	
Content and qualification goals of the module:	the areas of superv and interactive dat and other machine basic methods for paradigms that so provided a profi- paradigms. A pra exercises in empir Qualification goal The students acquir module. Students - understand the n - acquire knowled data sets such as c - can assess these n compare them on - gain experience 1 - know which profi- have gained insi	eaches advanced techniques and concepts related to research in pervised learning, unsupervised learning, multivariate statistics e data exploration, such as clustering, classification, regression thine learning methods. Students are exposed to the limits of s for mastering large and complex data and taught new t scale with the size and complexity of the data. They are profound, formal understanding of various data analysis practical understanding of the methods is deepened through appirical comparison that accompany the lectures. goals: cquire detailed knowledge of the specialist topics covered in the me need for advanced data analytics concepts, wedge of different methods for analyzing large and complex as clustering, classification, or regression, ese methods in terms of their effectiveness and applicability and on a formal and empirical level, nee handling data analytics systems and tools, problems are currently open in the area of data analytics, insights into current approaches of solutions in industrial and ets and into the current state of research.		
Partial module exams (number, form, scope):	Exam types: Written exam, 90- Oral exam, 30-45			
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, score	am requirements	Course accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-DAC: Data Systems - C	ore		Number of credit points (CP): 6		
Module type (compulsory or compulsory elective module):	Compulsory electronic	ive module			
Content and qualification goals of the module:	sources with comp subject of of data techniques for syst concepts and met complex data suc sequences, time se and complex quer or methods for pro Qualification goal The students acqui module. Students: - gain subject-sp various data syster - master the repress data, - expand their pro - acquire the abil information to sol - learn how to indel literature,	ire detailed knowledg ecific theoretical and ms, sentation, storage and fessional judgment sk ity to independently	cialization area of d th methods, concept use such data. Study g, storing, processi and networks, exec nedia data. Topics s database concepts, are also covered. e of the specialist to d methodological 1 analysis of, for exan tills, develop and use s topic based on prim	lata systems in the iss, procedures, and ents learn the basic ing and analyzing cution data, event such as specialized modern hardware, pics covered in the knowledge of the mple, graph or text uitable sources of ary and secondary	
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-	
Self-study time (in hours [h]):	120				
(m nourb [n]).					
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture	4	-	Exercises (at	-	
(lecture or seminar)			least 50%)		
Frequency of offer:		WiSe and SoSe			
Prerequisite:		None			
Department:		Digital Engineering			

HPI-CS-DAD: Data Systems - Do	eep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	specialization area of text and multim focus is on current Students examine complex data type Among the data type Among the data type event sequences, t Qualification goal Students acquire d module. Students: - gain subject-spe data systems, - learn to process of - expand their prof - acquire the abili independently dev - learn how to inder literature, - are able to follo work, - can select and	letailed knowledge ab ecific methodological complex data types su fessional judgment sk lity to solve probler relop and use suitable ependently work on a ow current research the apply appropriate so are able to follow cu	dule courses include , graphs or data strea s, and tools from sci systems deal with t tion, processing, sto , graphs and networ ell as image and aud pout the specialist to l and practical know uch as executive and cills, ms of various type sources of informa topic based on prime rends and incorpora	e those on the topic ams. The module's ience and industry. the challenges that rage, and analysis. ks, execution data, io data. pics covered in the wledge of various d multimedia data, s complex and to tion, hary and secondary the these into their nd strategies to a
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 minutes	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation i Digital Engineering		ecommended.

Module type (compulsory or compulsory elective module):			(CP): 6	
Simpaison, creative module).	Compulsory electi	ive module		
Content and qualification goals of he module:	 engineering in the examine the efficiency of complex data, we beyond classic parteristics. Content complex data, we beyond classic parteristics. Content complex data, we beyond classic parteristics, computer retrieval for complex data of the data. expression of the data of the data. expression of the data of the d	s: letailed knowledge ab itations and extension data technologies suc fic analysis of current ct and apply suitable 7 to follow current r	a "data systems." ction, processing, st ad innovative appro- is on current resea e of research on top l language proces- ning, graph synopsi bout the specialist top as of existing compl ch as natural langu research questions solution concepts a research trends on e scientific literature patracting problems	Students thereby torage and analysis aches and systems irch questions and bics such as stream ssing, multimedia is and information pics covered in the lex data systems, tage processing or in the area of data and strategies to a data systems and e on specific topics,
Partial module exams (number, form, scope):	their professional s Exam types:	pages, together with 120 minutes		
Gelf-study time in hours [h]):	120			
Courses (teaching format)	Contact time (in semester	Supplementary ex (number, form, scop For completion of		Course accompanying module (partial) exam (s)
	hours)	module	module exam	(number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (at	-
lecture or seminar)			least 50%)	
		WiSe and SoSe		
C CC		I WING and NoNg		
Frequency of offer: Prerequisite:		Prior participation in		1 1

HPI-CS-DEC: Application Deve Core	lopment and Softw	are Engineering -	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	development, inc methodologies, ve and data integratio digital health appl systems and devic Furthermore, par implementation of use of programmi implement feature The module pr requirements for of conception and de includes understar using modeling tee Qualification goal Students acquire d module. Students: - learn to develop - gain programmit that meet the requi- effectively in the of - learn to select a application to creat - are able to appl healthcare sources	rticipants gain an f software developme ng languages and fra es such as database a ovides knowledge ligital health applicat sign of the software a nding user needs, cre chniques, such as use	re life cycle, ag and quality assurand ue of implementing e exchange of data understanding of ant in digital health. meworks to develo access, user interface about identifying ions and provides a architecture of these ating requirements cases or user storie out the specialist to I health applications chniques to create althcare, ware architectures istry, and organize the ntainable solution, ques to integrate d ability between diff	gile development ce, interoperability interoperability in between different of the practical. This includes the p applications and ces and interfaces. g and recording an overview of the applications. This specifications and s. pics covered in the s, software solutions that can be used components of an ata from different cerent systems,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-DED: Application Devel Deep Dive	opment and Softwa	are Engineering -	Number of (CP): 6	credit points	
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module			
Content and qualification goals of the module:	including softward testing and quality the implementation the exchange of da This module als development in di and frameworks t features such as da provides deeper k digital health appli design of the soft depth understandin using modeling teo Qualification goals The students acqui module. Students: - practice developi - gain advanced p solutions that mee - expand their abil be used effectively - practice selectin components of an - evaluate and app sources in the hea systems,	ovides advanced kn e life cycle, agile de assurance, interopera n of interoperability i ata between different so deepens the pra- igital health. This ind to develop more con atabase access, user i knowledge of identifi- ications and offers a f ware architecture of ng of user needs, cre chniques such as user s: ire detailed knowledg ing and implementing rogramming knowled t the requirements of lity to design more co y in the digital healthon ng architectural patt application to create oly the optimal techn lth sector and to ens	velopment methods ibility, and data inter- n digital health app systems and devices interfaces and devices applex applications a neterfaces and inter- ying and recording urther overview of t these applications. ating requirements cases or user stories e of the specialist top g digital health appli lage and techniques digital healthcare, implex software arc care industry, erns, analyzing an a scalable and main iques to integrate d ure interoperability	s, version control, gration. It deepens lications to enable s. tion of software mming languages and to implement faces. The module requirements for the conception and This includes in- specifications and pics covered in the cations, to create software hitectures that can ad organizing the tainable solution, lata from different	
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-	
Self-study time (in hours [h]):	120				
	1		• /	Course accompanying module (partial)	
	Contact time	Supplementary ex (number, form, scop	1		
Courses (teaching format)	Contact time (in semester hours)		1	accompanying	
Project seminar/seminar/ lecture	(in semester	(number, form, scop For completion of	For admission to	accompanying module (partial) exam (s) (number, form,	
Project seminar/seminar/ lecture (lecture or seminar)	(in semester hours)	(number, form, scop For completion of module	For admission to module exam Exercises (at	accompanying module (partial) exam (s) (number, form, scope)	
Courses (teaching format) Project seminar/seminar/ lecture (lecture or seminar) Frequency of offer: Prerequisite:	(in semester hours)	(number, form, scop For completion of module	For admission to module exam Exercises (at least 50%)	accompanying module (partial) exam (s) (number, form, scope)	

HPI-CS-DES: Application Devel Specialization	opment and Softwa	are Engineering -	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	including softward testing and quality the implementation the exchange of da This module als development in di and frameworks the features such as da provides deeper ke digital health appli- design of the soft depth understandin using modeling tea Qualification goals The students acquire module. Students: - practice developi- gain advanced p solutions that mee - expand their abil- be used effectively - practice selectin components of an - evaluate and app sources in the hear systems,	ovides advanced know e life cycle, agile de assurance, interopera n of interoperability i ata between different iso deepens the pra- igital health. This ind to develop more com- atabase access, user i knowledge of identif- ications and offers a f ware architecture of ng of user needs, crea- chniques such as use of s: ire detailed knowledge ing and implementing rogramming knowled t the requirements of lity to design more co- y in the digital healthco- ng architectural patt application to create a oly the optimal techn lith sector and to ensu- skills in working wit	velopment methods bility, and data inter- n digital health app systems and devices ctical implementa cludes using progra- aplex applications in nterfaces and inter- ying and recording urther overview of t these applications. ating requirements cases or user stories e of the specialist top digital health appli- lege and techniques digital healthcare, mplex software arc are industry, erns, analyzing an a scalable and main iques to integrate d are interoperability	s, version control, gration. It deepens lications to enable s. tion of software mming languages and to implement faces. The module requirements for the conception and This includes in- specifications and pics covered in the cations, to create software hitectures that can ad organizing the tainable solution, ata from different between different
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
	·			
	1			
Courses (teaching format)	Contact time (in semester	Supplementary ex (number, form, scop	am requirements e)	Course accompanying module (partial) exam (s)
Courses (teaching format)	Contact time (in semester hours)		1	accompanying
Project seminar/seminar/ lecture	(in semester	(number, form, scop For completion of	e) For admission to	accompanying module (partial) exam (s) (number, form,
Project seminar/seminar/ lecture (lecture or seminar)	(in semester hours)	(number, form, scop For completion of module -	e) For admission to module exam Exercises (at	accompanying module (partial) exam (s) (number, form, scope)
Courses (teaching format) Project seminar/seminar/ lecture (lecture or seminar) Frequency of offer: Prerequisite:	(in semester hours)	(number, form, scop For completion of module	e) For admission to module exam Exercises (at least 50%)	accompanying module (partial) exam (s) (number, form, scope)

HPI-CS-DIC: Data Integration -	Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ıle		
Content and qualification goals of the module:	sources with differ be collected, pre-p data usable. The d preprocessing (dat cleansing, as well a is on the correspon structural and sem systems. Qualification goal The students acqui module. Students: - learn concepts a data profiling and - can assess the da - can select and a problem, - expand their prof - acquire the abil information to sol- - learn about relev - evaluate data into - recognize comp appropriate solution	ire detailed knowledg nd methods, for exan data cleansing, ta quality of various apply suitable solution fessional judgment sk ity to independently ve problems, ant analysis methods egration strategies for lex data development on strategies, language knowledge	ema and data. Such i . Data integration is ds include concepts zing the raw data (d aggregation. The for oncepts and method of diverse data sour e of the specialist to mple in the areas of data sources and mo on concepts and str cills, develop and use s confiderent requirement problems and ar	data often needs to about making this for data selection, ata profiling), data ocus of this module s for the technical, ces for data-based pics covered in the f data preparation, odels, ategies to a given uitable sources of ents,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time	120			
(in hours [h]):				
Courses (teaching format)	Contact time (in semester	(number, form, scop		Course accompanying module (partial) exam (s)
	hours)	For completion of module	For admission to module exam	(number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-DID: Data Integration	- Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	sources with differ be collected, pre-p data usable. The d preprocessing (dat cleansing, as well is on the correspon structural and sen systems. Qualification goal The students acqui module. Students: - learn concepts a data profiling and - can assess the da - can select and a problem, - expand their pro- acquire the abil information to sol- - learn about relev - evaluate data inte - recognize comp appropriate solution	ire detailed knowledg and methods, for exan data cleansing, ita quality of various apply suitable solution fessional judgment sk ity to independently ve problems, vant analysis methods egration strategies for olex data development on strategies, l language knowledge	ema and data. Such . Data integration is ds include concepts zing the raw data (d aggregation. The fo oncepts and method f diverse data sour e of the specialist to mple in the areas o data sources and mo on concepts and str ills, develop and use s	data often needs to about making this for data selection, ata profiling), data ocus of this module s for the technical, ces for data-based pics covered in the f data preparation, odels, ategies to a given suitable sources of ents,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	esearch results (20-
Self-study time (in hours [h]):	120			
(m nours [n]).				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form,
		module		scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in		commended.
Department:		Digital Engineering		

HPI-CS-DIS: Data Integration -	Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
Content and qualification goals of the module:	sources with differ be collected, pre-p data usable. The d preprocessing (dat cleansing, as well is on the correspon structural and sen systems. Qualification goal The students acquir module. Students: - learn concepts a data profiling and - can assess the da - can select and a problem, - expand their pro- acquire the abil information to sol- - learn about relev - evaluate data intu- recognize comp appropriate solution	ire detailed knowledg nd methods, for exar data cleansing, ta quality of various of apply suitable solution fessional judgment sk ity to independently ve problems, ant analysis methods, egration strategies for lex data development on strategies, language knowledge	ema and data. Such a . Data integration is ds include concepts zing the raw data (d aggregation. The fo incepts and methods f diverse data source e of the specialist to mple in the areas of data sources and mo n concepts and stra- ills, develop and use s	data often needs to about making this for data selection, ata profiling), data ocus of this module s for the technical, ces for data-based pics covered in the f data preparation, odels, ategies to a given uitable sources of ents,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester	Supplementary ex (number, form, scop	am requirements be)	Course accompanying module (partial) exam (s)
	hours)	For completion of module	For admission to module exam	(number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in HPI-CS-DIC is recommended.		
Department:		Digital Engineering		

HPI-CS-DM: Data Management	and Data Science		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	lle/compulsory election	ve module	
Content and qualification goals of the module:	data sources are imparting of bas management is interdisciplinary se medicine, enables health data. These and provide recor answers generated methods used mus aspects of organiz This module provi as part of the analy Qualification goal The students acqui module. Students: - gain subject-sp generation and dat - understand the of clinical research p - can use suitable research questions - gain experience tools, - gain the ability to - are able to use a organize data, and - learn statistical m and trends in the d - master the basic decisions, - gain insights int	re detailed knowledg ecific methodologic: a analysis in the field challenges of data m	cs for digital hear ne areas of data cience in Digital cion of statistics, ma calth-relevant insight research questions, tion. To ensure the ty, and reliability of nanagement in digit ng, and access contri- of data science and f digital health data. e of the specialist to al and practical kin of digital health, anagement of healt cally investigate given data (health data) and interpret the resul o design databases, and data protection learning algorithms in and learn to mal oproaches from indu-	th. Therefore, the science and data Health, as an chine learning and nts from extensive , make predictions, e accuracy of the of the data and the tal health includes rol for health data. I data management pics covered in the nowledge in data th data (e.g., from ven problems and uestions, nd the appropriate Its of data analysis, collect, store, and to identify patterns ke evidence-based
Partial module exams (number, form, scope):	Exam types: Written exam, 90- Oral exam, 30-45			
Self-study time (in hours [h]):	120			
			•	
	Contact time	Supplementary ex (number, form, scop	am requirements	Course accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (50%)	-
Frequency of offer:		SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-DS: Data Systems			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	lle/compulsory electiv	ve module	
Content and qualification goals of the module:	whose characteris growing amounts is techniques and m module teaches is processing of dat processing system handling data fro acquisition frequen (Volume). In addi uses, the focus o architecture, data distribution, imple the art. Qualification goal The students acqui module. Students - recognize the cha data engineering o - master the basic of their structure, and - can select and a problem, - gain experience system architectur - acquire the abilit and distributed dat - gain subject-spec - can independent problems, - gain insights in	ire detailed knowledg illenges of big data pro- n IT systems, characteristics of big d can incorporate thes upply suitable solution in dealing with soft es, y to evaluate and app	g differ from prev ting analysis possible g, transforming and ethods for the di e challenges faced scussion of system ources (Variety), ing times (Velocity), tion of the systems racteristic system p actional behavior, and their classificat e of the specialist to oblems (volume, van data and data engine the into development on concepts and str ware systems and ily methods and pro odological, and pra- itable sources of int pproaches in indus	vious data. These ilities, require new 4 processing. This stributed, parallel by scalable data an architectures for data with a high and extensive data and their intended properties such as scalability and tion in the state of pics covered in the riety, velocity) and eering systems and processes, ategies to a given tools and scalable cedures of parallel ctical knowledge, formation to solve
Partial module exams (number, form, scope):	Exam types: Written exam, 90- Oral exam, 30-45			
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (50%)	-
· · · · ·	•	·	• •	•
Frequency of offer:		WiSe		
Prerequisite:		None		
Department:		Digital Engineering		

Module type (compulsory or compulsory elective module): Content and qualification goals of	development and o Scientific concept covered, such as integrity. Through methods and techn networks. Qualification goals The students acqui module. Students: - gain subject-spec - expand their prof - develop discussion	thes scientific concept operation of dependates and methods for of availability, reliability out the module, study aiques for safety-critic s: ire detailed knowledg	ble systems. ne or more aspects ty, safety, informa ents deal with, for e cal systems, secure s e of the specialist to	s of reliability are tion security, and example, concepts, systems or reliable pics covered in the	
Content and qualification goals of	This module teac development and of Scientific concept covered, such as integrity. Through methods and techn networks. Qualification goal: The students acqui module. Students: - gain subject-spect - expand their profi- develop discussion	operation of depended s and methods for o availability, reliabili out the module, stud- niques for safety-critic s: ire detailed knowledg	ble systems. ne or more aspects ty, safety, informa ents deal with, for e cal systems, secure s e of the specialist to	s of reliability are tion security, and example, concepts, systems or reliable pics covered in the	
the module:	- develop discussion	This module teaches scientific concepts, methods and techniques for development and operation of dependable systems. Scientific concepts and methods for one or more aspects of reliabilit covered, such as availability, reliability, safety, information security integrity. Throughout the module, students deal with, for example, com- methods and techniques for safety-critical systems, secure systems or re- networks. Qualification goals: The students acquire detailed knowledge of the specialist topics covered module. Students: - gain subject-specific theoretical and methodological knowledge, - expand their professional judgment skills,			
	 expand their professional judgment skins, develop discussion skills and techniques, acquire experience in dealing with reliability in the development operation of systems, and aspects of reliability regarding the tools used; are able to independently develop and use suitable sources of informatic solve problems, can assess the applicability of solution concepts and strategies to g problems, can select and apply suitable solution concepts and strategies to a g problem, can present self-developed solutions to problems and defend their work can critically question solutions to problems developed by others and cl their professional suitability. 			e tools used; s of information to strategies to given ategies to a given end their work,	
Partial module exams (number, form, scope):	45 mins.)	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 minutes			
Self-study time (in hours [h]):	120				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-	
Frequency of offer: Prerequisite: Department:		WiSe and SoSe None Digital Engineering			

HPI-CS-DSD: Dependable System	ms - Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	as well as current and operation of d Advanced scientif questions are ince reliability: such as integrity. For exan methods and tech distributed system Qualification goal The students acqu the module. Students: - gain further subje - expand their prof - practice discussio - acquire further ex- operation of system - are able to indepen- solve additional pri- can assess the a advanced problem - can present self- against critical obj	ire further knowledge ect-specific theoretica fessional judgment sk on skills and technique xperience in dealing v ns and aspects of reli endently evaluate and roblems, applicability of solut s; l apply suitable soluti ; -developed solutions	nd results, regarding and techniques, an hore of the fundar ility, safety, inform ils with advanced s research questions tems and high-avail about the specialis al and methodologic ills, tes, with reliability in the ability in terms of the use suitable source ion concepts and state to further problems	g the development d current research mental aspects of ation security and cientific concepts, for safety-critical lability systems. t topics covered in cal knowledge, e development and he tools used, s of information to strategies to given rategies to a given s and defend them
Partial module exams (number, form, scope):	and check their professional suitability. Exam types: Paper of at least 8 pages, together with a presentation of research results 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-DSS: Dependable System	ns - Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	as well as current and operation of d Advanced scientif questions are ince reliability: such as integrity. For exar methods and tech distributed system Qualification goal The students acqu the module. Students: - gain further subje - expand their prof - practice discussion - acquire further ex- operation of system - are able to independ solve additional pro- can assess the a advanced problem - can present self- against critical obj - can critically qu	ire further knowledge ect-specific theoretica fessional judgment sk on skills and technique xperience in dealing v ns and aspects of reli endently evaluate and roblems, applicability of solut s; l apply suitable soluti ; -developed solutions	and techniques, an nore of the fundar ility, safety, inform ils with advanced s research questions tems and high-avail about the specialis about the specialis al and methodologic ills, tes, with reliability in the ability in terms of th use suitable source ion concepts and sta- to further problems	g the development d current research mental aspects of ation security and cientific concepts, for safety-critical lability systems. t topics covered in cal knowledge, e development and he tools used, s of information to strategies to given rategies to a given s and defend them
Partial module exams (number, form, scope):	45 mins.)	: least 8 pages, together with a presentation of research results (2) m, 90-120 minutes		search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-IGC: HCI and Graphic	s - Core		Number of credit points (CP): 6		
Module type (compulsory or compulsory elective module):	Compulsory election	ive module			
	graphic systems and for visualizing geovisualization, a and computers usi Qualification goal	tes scientific concepts nd human computer in complex issues, su as well as novel conce ng different methods s: ire detailed knowledg	nteraction. Participa ch as software epts for the interaction and devices.	ints learn concepts visualization and on between people	
Content and qualification goals of the module:	- acquire subject-specific theoretical and methodological knowledge,				
Partial module exams (number, form, scope):	their professional suitability. Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-	
Self-study time (in hours [h]):	120				
	1	1			
	Contact time	Supplementary ex (number, form, scop	am requirements	Course accompanying	
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-	
Frequency of offer:		WiSe and SoSe			
Prerequisite:		None			
Department:		Digital Engineering			

HPI-CS-IGD: HCI and Graphics	s - Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	computer graphic concepts for visua geovisualization, a computers using d Qualification goal The students acqu the module. Students: - acquire subject-s - expand their prof - develop discussio - acquire experien of systems and, th - are able to indep solve problems, - can assess the a problems; - can select and a problem, - can present self-o	ire further knowledge pecific theoretical and fessional judgment co on skills and techniqu ce in handling reliabi ereby, the tools imple endently develop and applicability of solut apply suitable solution developed solutions to unine solutions to pro	a computer interact s, such as software epts for the interact devices are deepend about the specialist d methodological knowpetency, les, lity in the developm mented for aspects use suitable sources ion concepts and stra- p problems and defe	tion. In this way, e visualization and ion of people with ed. t topics covered in nowledge, nent and operation of reliability, s of information to trategies to given ategies to a given end their work,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in HPI-CS-IGC is recommended.		
Department:		Digital Engineering		

HPI-CS-IGS: HCI and Graphics	- Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	computer graphic concepts for visual geovisualization, a computers using d Qualification goals. The students acqui the module. Students: - acquire subject-s - expand their prof - develop discussio - acquire experien of systems and, the - are able to independ solve problems, - can assess the a problems; - can select and a problem, - can present self-o	ire further knowledge specific theoretical an fessional judgment co on skills and techniqu ce in handling reliabi ereby, the tools imple endently develop and applicability of solut apply suitable solution developed solutions to mine solutions to pro	a computer interact is, such as software epts for the interact devices are deepend about the specialist d methodological knowpetency, les, lity in the developm mented for aspects use suitable sources ion concepts and stra- p problems and defe	tion. In this way, e visualization and ion of people with ed. t topics covered in nowledge, hent and operation of reliability, s of information to trategies to given ategies to a given end their work,
Partial module exams (number, form, scope):	45 mins.) Written exam, 90-	am types: per of at least 8 pages, together with a presentation of research results (20		
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
		1		
Frequency of offer:		WiSe and SoSe		1.1
Prerequisite:		Prior participation in		commended.
Department:		Digital Engineering		

HPI-CS-IRP: Individual Resear	ch Project		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
	research work car analyzed, and a so constructively, in scientifically docu- strengths and wea with other solution understanding of extensive insights and participate in	with a selected, reserved out at the depart lution is designed for tegrated into the resourced on the solution knesses. Through a solution of the solution of the solution them in a theoretical into the current researced into the current researced the development of m carried out by the stuss:	tment of supervision a sub-area, which is search work of the ons are always eve comparative evalua systems, participar and practical ser rech work being done new solutions. Work	n. The question is then implemented e department and valuated for their tion of the results the gain a deeper nse. Students gain e in the department c on the individual
Content and qualification goals of the module:	Students improve area as well as the They: - train their readin topic, - practice the pr measurable solutio - further develop the in writing; - deepen their abil - gain in-depth ins Students develop out the project, stu- already have. This means that carrying out even To prepare for the	s: their methodologica ir skills in scientific v ng and understanding actical implementati ons in the context of a heir ability to present ity to argue and evalu ight into the current s these skills through r udents expand and (or students have ready more extensive project project, students write and tasks, and the sc	vork. g of current scienti on of their ideas a research project; findings and connec- tate in a balanced w tate of research. esearch-relevant co or) deepen the profe- y-to-use experienti- cts in a research con- e an exposé (1 page 1	fic literature on a into provable or ctions verbally and ay, ntent. By carrying essional skills they al knowledge for itext. max.) that contains
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Paper (at least 12	pages, together with	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Seminar (Seminar)	4	-	-	-
Frequency of offer: Prerequisite:		WiSe and SoSe Prior participation in at least two courses in the subject		
Department:		area is recommende Digital Engineering		

HPI-CS-ISC: Intelligent System	ıs - Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ive module		
Content and qualification goals of the module:	the development languages (AI pro This includes com artificial intelliger This module ther machine learning, Qualification goal The students acqui module. Students: - gain subject-spec - expand their pro - develop discussion - gain experience decision-making artificial intelliger - are able to indep solve problems, - can assess the a problem, - can select and a problems, - can present self- - can critically que	ire detailed knowledg cific theoretical and n fessional judgment sk on skills and techniqu in dealing with metho and optimization as nee and hardware-rela endently develop and pplicability of solution apply suitable solution developed solutions to pro-	ributed systems a , r one or more funda- ed AI, accuracy, and eets such as distrilly s and hardware-spect e of the specialist to methodological known tills, les, ods of machine learn s well as distribut ted programming, use suitable source on concepts and stra- on concepts and stra- on problems and defe	amental aspects of nd fault tolerance. buted systems for ific AI algorithms. pics covered in the vledge, ning and automatic red algorithms of s of information to rategies to a given ategies to a given end their work,
Partial module exams (number, form, scope):	their professional suitability. Exam types: Paper of at least 8 pages, together with a presentation of research results (2 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite:		WiSe and SoSe None		
Department:		Digital Engineering		

HPI-CS-ISD: Intelligent Systems	s - Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ıle		
	the development languages (AI pro This includes com artificial intelligen		ributed systems a). r one or more funda efficiency and prog	amental aspects of rammability. This
Content and qualification goals of the module:	The students acquimodule. Students: - gain subject-speed - expand their prod - develop discussi- gain experience decision-making artificial intelliger - are able to indep solve problems, - can assess the aproblem, - can select and a problem, - can present self defend their work, - can critically que their professional	ire detailed knowledg cific theoretical and n fessional judgment sk on skills and techniqu in dealing with metho and optimization as ace and hardware-rela endently develop and applicability of solut apply suitable solutions c-developed solutions	nethodological know ills, es, ods of machine learn well as distribut ted programming, use suitable sources ion concepts and str to problems and h	vledge, ting and automatic ed algorithms of s of information to trategies to given ategies to a given have the ability to
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45			
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, score	am requirements	Course accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
		MPA 12 2		
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in		commended.
Department:		Digital Engineering		

HPI-CS-ISS: Intelligent Systems	- Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	the development languages (AI prog This includes cond artificial intelliger module also deal hardware-specific Qualification goals The students acqui module. Students: - gain subject-spec - expand their prof - develop discussio - gain experience i decision-making artificial intelligen - are able to indepe solve problems, - can assess the a problem, - can present self- defend their work,	s: re detailed knowledge eific theoretical and m fessional judgment sk on skills and technique n dealing with metho and optimization as ce and hardware-rela endently develop and applicability of solut apply suitable solutions developed solutions	ributed systems a rone or more funda- efficiency and prog as probabilistic e of the specialist to hethodological know ills, ds of machine learr well as distribut ted programming, use suitable source ion concepts and str to problems and h	and programming amental aspects of grammability. This programming and pics covered in the wledge, hing and automatic ted algorithms of s of information to strategies to given ategies to a given have the ability to
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
	Contact time	Supplementary exam requirements (number, form, scope)		Course accompanying
				1 2 0
Courses (teaching format)	Contact time (in semester hours)			module (partial) exam (s)
Courses (teaching format) Project seminar/seminar/ lecture (lecture or seminar)	(in semester	(number, form, scop For completion of	For admission to	module (partial) exam (s) (number, form,
Project seminar/seminar/ lecture (lecture or seminar)	(in semester hours)	(number, form, scop For completion of module	For admission to module exam Exercises (at	module (partial) exam (s) (number, form,
Project seminar/seminar/ lecture	(in semester hours)	(number, form, scop For completion of	For admission to module exam Exercises (at least 50%)	module (partial) exam (s) (number, form, scope) -

Courses (teaching format) (in hours) semester hours) For completion of module module exam (s) (number, scope) Project activity (project) 8 - - - Frequency of offer: WiSe and SoSe WiSe and SoSe -	HPI-CS-LAB: Computer Science	e Lab		Number of (CP): 12	credit points
In the Computer Science Lab, students work together in a group on a s research-related question from a track in the degree program. The qu analyzed, and a solution is designed for a sub-area, which is then imple constructively and scientifically documented. The solutions are evaluated for their strengths and weaknesses. A practical understar them is deepened by a comparative evaluation with other solutions, algorithms, or systems. Students thereby gain deep insights current research work being conducted in the tracks and subject areas as participating in the development of new solutions. Accordingly, a in this module are assigned to specific tracks. This module deep students' scientific training. The lab activity takes place in project usually with at least three and a maximum of six members each. Ur lecturers from the Digital Engineering Faculty suggest projects from th Qualification goals: The students acquire detailed knowledge of the specialist topics cover module: Students: gain subject-specific theoretical, methodological, and practical know - can select and apply suitable solution concepts and strategies to problem, - learn how to independently work on a topic on the basis of prim secondary literature. - are able to independently address re		Compulsory modu	ıle		
form, scope): Paper of at least 12 pages, together with a presentation of research resu 30-45 mins.) Self-study time (in hours [h]): 240 Courses (teaching format) Contact time (in semester hours) Supplementary exam requirements (number, form, scope) Course accompation module exam (s) (number, scope) Project activity (project) 8 - - Frequency of offer: WiSe and SoSe WiSe and SoSe	Content and qualification goals of	In the Computer S research-related quanalyzed, and a so constructively an evaluated for their them is deepened b solutions, algorithm current research we as participating in in this module an students' scientific usually with at leas lecturers from the of work, design the Qualification goal The students acquir module. Students: - gain subject-spect - can select and a problem, - learn how to ind secondary literatur - are able to ind individual topics, - gain skills in the gain sovereignty	uestion from a track is lution is designed for d scientifically doct r strengths and weak by a comparative eval ms, or systems. Stude ork being conducted the development of a re assigned to specific training. The lab ac ast three and a maxim Digital Engineering F eir content and suppor s: ire detailed knowledge cific theoretical, meth apply suitable solution dependently work on re, dependently access a in formalizing and ab- criteria and principles area of project manag- in the collaborative a	n the degree progra- a sub-area, which is umented. The solu- nesses. A practical luation with other nts thereby gain dec- in the tracks and sub- new solutions. Acco- ic tracks. This mo- citivity takes place num of six member aculty suggest proje- t the students in the e of the specialist to- odological, and pra- n concepts and str- a topic on the bas- and evaluate scien stracting problems, of scientific writin- gement by working nd divisional proce	m. The question is then implemented ttions are always l understanding of ep insights into the bject areas, as well ordingly, activities odule deepens the in project groups, s each. University ects from their area ir implementation. pics covered in the ctical knowledge, ategies to a given sis of primary and tific literature on g into practice, in teams;
(in hours [h]): 240 Courses (teaching format) Contact time (in semester hours) Supplementary exam requirements (number, form, scope) Course accompany module For completion of module For admission to module exam module exam (s) (number, scope) Project activity (project) 8 - - Frequency of offer: WiSe and SoSe Wise and SoSe		Paper of at least 12	2 pages, together with	a presentation of res	search results (talk,
Courses (teaching format) Contact time (in semester hours) (number, form, scope) accompant module For completion of module For admission to module exam module exam (s) (number, scope) Project activity (project) 8 - - Frequency of offer: WiSe and SoSe -		240			
Project activity (project) 8 - - Frequency of offer: WiSe and SoSe	Courses (teaching format)	(in semester	(number, form, scop For completion of	e) For admission to	accompanying module (partial) exam (s) (number, form,
	Project activity (project)	8	-	-	-
	Frequency of offer:		WiSe and SoSe		
Department: Digital Engineering	Prerequisite:		Prior successful part prerequisite for t recommended.		

HPI-CS-LSA: Large-Scale System	ms Architectures		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ile/compulsory electiv	ve module	
Content and qualification goals of the module:	larger problems the search engines or a large machine lead infrastructure that operating costs, er This module prim perspective. A sect are relevant for 1 aspects begin with addressing the of applications), add management and of project planning, of both perspectives. taken into account Qualification goal Students acquire topics covered in the Students - gain advanced, s - expand their pro- develop discussion - acquire basic exp systems and the te - are able to indep solve basic proble - can assess the ap problems, - can present self ability to defend the - can critically examines.	s: detailed knowledge the module. ubject-specific, theor fessional judgment sk on skills and techniqu perience in dealing w chniques, challenges endently develop and ms, plicability of solution apply suitable solution t	r systems. Classic s; a modern exampl applications requir several aspects (e., effort, development infrastructures from s aspects of softward large infrastructure ceture of an indivi- PUs are relevant data center, and the ystem. All phases of cisions, and operati- bustness or energy of and advanced skill etical and methodol fills with the help of the based on this kn- with the development and tools used, use suitable source concepts and strate on concepts and strate to advanced problems de	examples are web le is the training of e a corresponding g., investment and t effort). m a technological e development that res. Technological dual system (e.g., for typical ML en questions of the of a life cycle from on are covered for efficiency are also s in the specialist ogical knowledge, f this knowledge, owledge; at and operation of gies to given basic ategies to a given ems and have the
Partial module exams (number, form, scope):	Exam types: Written exam, 90- Oral exam, 30-45	120 minutes	<u>.</u>	
Self-study time (in hours [h]):	120			
		Supplement		Course
	Contact time	Supplementary ex (number, form, scop	am requirements	accompanying
Courses (teaching format)	(in semester			module (partial)
, , ,	hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe		
Prerequisite:		None		

Frequency of offer:	WiSe
Prerequisite:	None
Department:	Digital Engineering

HPI-CS-ML: Machine Learning			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ile/compulsory electiv	ve module	
Content and qualification goals of the module:	Contents: This module teaches the basics of machine learning and artificial intelligence Content includes machine learning methods as well as practical use cases i digital health, such as classification, distributed learning, predictive modeling and transparent methods. Methods for validating machine learning procedure are covered. Emphasis is further placed on the preprocessing of data require for machine learning, such as data cleaning, feature extraction and selection After completing the module, students should be able to find and implement innovative problem solutions using machine learning. Qualification goals: The students acquire detailed knowledge of the specialist topics covered in the module. Students: - learn concepts and methods, - master the basics of machine learning and artificial intelligence in the contex of digital health, - learn relevant machine learning algorithms and techniques that can be applied in digital health to develop medical diagnoses, prognosis, and decision support systems, - are able to collect, clean, and prepare data for healthcare machine learning to create high quality models, - can develop, train and evaluate models for machine learning in healthcare.			etical use cases in edictive modeling, earning procedures ng of data required tion and selection. ind and implement pics covered in the ence in the context iques that can be nosis, and decision e machine learning
Partial module exams (number, form, scope):	Exam types: Written exam, 90- Oral exam, 30-45			
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (50%)	-
(lecture or seminar)				
Frequency of offer:		SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-MLC: Machine Learnin	g - Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	areas of machine I decision trees, cor- that range from learning. It forges learning to progra energy-efficient h module focuses on of the data. Stud paradigms of mac provided in lectr machine learning a Qualification goal The students acqui module. Students - understand the r stochastics, statistic computer architect - are versed in met methods (e.g., grad - can assess these r derive, expand, an - have gained expo- - have gained inse	re detailed knowledg necessity of mathema ics, as well as the nec ture, distributed system hods for analyzing lea	obabilistic methods cal programming) i ation, and ranking ematical modeling programming langu machine learning. that scale with the si th, formal understa- ctical understanding rogramming tasks es. e of the specialist to atical concepts such ed for system-related ms and programmin arning algorithms su heir effectiveness an smal level, h machine learning n focus of machine lo olution approaches	e (neural networks, n application areas to reinforcement and the theory of age concepts, and Furthermore, this ize and complexity anding of various of the methods is and projects of pics covered in the as linear algebra, d concepts such as g language theory, the as optimization d applicability and systems and tools, learning,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
(5 0 × 5 [×]).	1			
Courses (teaching format)	Contact time (in semester	(number, form, scop		accompanying module (partial)
r c j r	hours	For completion of module	For admission to module exam	exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None Digital Engineering		
Department:		Digital Engineering		

HPI-CS-MLD: Machine Learnin	g - Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	areas of machine I decision trees, cor- that range from learning. It forges learning to progra energy-efficient h module focuses on of the data. Stud paradigms of mac provided in lectr machine learning a Qualification goal The students acqui module. Students - understand the r stochastics, statistic computer architect - are versed in met methods (e.g., grad - can assess these r derive, expand, am - have gained expe - have gained inse	ire detailed knowledg necessity of mathema ics, as well as the nee ture, distributed system hods for analyzing lea	obabilistic methods cal programming) in ation, and ranking ematical modeling programming langu- machine learning. that scale with the si th, formal understa- tical understanding rogramming tasks es. e of the specialist to thical concepts such and programmina arning algorithms su heir effectiveness an smal level, h machine learning n focus of machine l olution approaches	a (neural networks, n application areas to reinforcement and the theory of age concepts, and Furthermore, this ize and complexity anding of various of the methods is and projects of pics covered in the as linear algebra, d concepts such as g language theory, ich as optimization d applicability and systems and tools, learning,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time	120			
(in hours [h]):				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Enormous of offer		Wills and S-S-		
Frequency of offer: Prerequisite:		WiSe and SoSe Prior participation in	n HPI-CS-MI C is r	ecommended
		I I HOI DALIGIDAUOII I	0 1 1 1 1 T A A T IVI I A / IS I	COMPRESSION CONTRACTOR OF CONT

Computed vertice module). Con Thi area dec that lean ene moo of para	as of machine l ision trees, cord t range from rning. It forges rning to progra rgy-efficient h dule focuses on	ve module nes basic methods an earning using non-pr e algorithms, and logi regression, classifica the link from mathe umming languages, p ardware for modern	obabilistic methods cal programming) in tion, and ranking	(neural networks, n application areas
Thi area dec that lean lean ene mou of para	s module teach as of machine l ision trees, core t range from rning. It forges rning to progra rgy-efficient h dule focuses on	earning using non-pr e algorithms, and logi regression, classifica the link from mathe umming languages, p	obabilistic methods cal programming) in tion, and ranking	(neural networks, n application areas
Content and qualification goals of the module: The module: Content and qualification goals of the module: Content Stu - un stoo con - ar met - ca der - ha - kr - ca	adigms of mac vided in lectric chine learning a alification goal e students acqui dule. dents inderstand the m chastics, statisti inputer architect e versed in met thods (e.g., grad un assess these r ive, expand, an ave gained expen- now which prob- an analyze the	distributed methods t ents gain an in-dept hine learning. A prac ure-accompanying p algorithms in exercise	rogramming langua machine learning. that scale with the si th, formal understa- tical understanding rogramming tasks es. e of the specialist top tical concepts such d for system-related ns and programming trning algorithms su eir effectiveness and mal level, h machine learning si focus of machine l pproaches in indust	and the theory of age concepts, and Furthermore, this ze and complexity anding of various of the methods is and projects of pics covered in the as linear algebra, d concepts such as g language theory, ich as optimization d applicability and systems and tools, earning,
Partial module exams (number, form, scope):	am types: ber of at least 8 mins.) itten exam, 90- al exam, 30-45		a presentation of res	search results (20-
Self-study time (in hours [h]): 120)			
Courses (teaching format)	ntact time semester ırs)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture 4 (lecture or seminar)		-	Exercises (at least 50%)	-
· · · · · · · · · · · · · · · · · · ·			/	L
Frequency of offer:		WiSe and SoSe		<u> </u>
Prerequisite: Department:		Prior participation in Digital Engineering	n HPI-CS-MLC is re	ecommended.

HPI-CS-MMC: Mathematical M	Iodelling - Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
Content and qualification goals of the module:	 especially stocha: application in vari- models are exam specialized proble them are taught. Students: have gained a c advanced mathem can analyze and mathematical mod are able to ana structural properti- have gained in practical knowledge can independent further problems, know which sp modeling and are 	evaluate complex ted lels used, lyze advanced mode es using the appropria n-depth subject-spec ge, ly develop and use su pecialized problems	models, as well r science. Common in greater detail. techniques and algor standing of the pro- chniques and algori els at a theoretical ate analysis techniquific theoretical, mo- titable sources of in exist in the field	as their in-depth and currently used More advanced, orithms for solving operties of various thms based on the level and extract ues, ethodological and formation to solve of mathematical
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 minutes	-	
Self-study time (in hours [h]):	120			
(in nour [n]).				
	Contact time	Supplementary ex (number, form, scop	am requirements	Course accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture	4	-	Exercises (at	-
(lecture or seminar)			least 50%)	
Frequency of offer::		WiSe and SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-MMD: Mathematical M	lodelling - Deep Div	ve	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
	especially stocha application in vari models are exan specialized proble them are taught. Qualification goal The students acqui module. Students:	ire detailed knowledg	models, as well r science. Common in greater detail. techniques and algo e of the specialist to	as their in-depth and currently used More advanced, orithms for solving pics covered in the
Content and qualification goals of the module:	advanced mathem - can analyze and mathematical mod - are able to ana structural properti - have gained in practical knowled - can independent further problems, - know which sp modeling and are - have in-depth ins	evaluate complex tec lels used, lyze advanced mode es using the appropria n-depth subject-speci ge, ly develop and use su pecialized problems	chniques and algori els at a theoretical ate analysis techniqu fic theoretical, mo itable sources of in exist in the field	thms based on the level and extract ues, ethodological and formation to solve of mathematical
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form,
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	scope) -
	1	I		
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in	n HPI-CS-MMC is	recommended.
Department:		Digital Engineering		

HPI-CS-MMS: Mathematical Mo	odelling - Specializ	ation	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ıle		
	especially stocha: application in vari- models are exam specialized proble them are taught. Qualification goal	ides advanced knowle stic and statistical ous areas of computer nined and analyzed ms are discussed and s: ire detailed knowledge	models, as well science. Common in greater detail. techniques and algo	as their in-depth and currently used More advanced, prithms for solving
Content and qualification goals of the module:	 have gained a c advanced mathem can analyze and mathematical mod are able to ana structural propertion have gained in practical knowledge can independent further problems, know which sp modeling and are 	evaluate complex tec lels used, lyze advanced mode es using the appropria h-depth subject-speci ge, ly develop and use su pecialized problems	chniques and algori els at a theoretical the analysis techniqu fic theoretical, mo itable sources of in exist in the field	thms based on the level and extract ues, ethodological and formation to solve of mathematical
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		recommended.

HPI-CS-PMC: Probabilistic Ma	chine Learning - C	ore	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ive module		
Content and qualification goals of the module:	makes it possible reliability. This is The focus of thi theoretical concep account. Students graphical models statistical learning Qualification goal The students acqui module. Students: - learn advanced probabilistic mode - are able to eval these on existing of - can select and a complex problem, - can evaluate and - expand their pro- are able to independent	s: ire detailed knowledg l concepts and met eling and statistical le uate necessary prece data, apply suitable solution implement the learne fessional judgment sk endently evaluate and oblems, echnical language know	ns and make state listic and statistical oridging the gap b real data, while tak others, Bayesian 1 on-making processo e of the specialist to hods, for example arning, onditions and assun on concepts and str ed procedures in ter- cills, use suitable source	ments about their learning methods. between advanced ing scalability into learning methods, es, and advanced pics covered in the in the areas of aptions and check ategies to a given ms of software,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (24 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
	Contact time (in semester	Supplementary exam requirements (number, form, scope)		Course accompanying module (partial)
Courses (teaching format)	hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite: Department:		None Digital Engineering		

HPI-CS-PMD: Probabilistic Ma	chine Learning - De	eep Dive	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	makes it possible reliability. This is The focus of thi theoretical concep account. Students graphical models statistical learning Qualification goal The students acqui module. Students: - learn advanced probabilistic mode - are able to eval these on existing of - can select and a complex problem, - can evaluate and - expand their prof - are able to indeposolve complex pro-	s: ire detailed knowledg concepts and metheling and statistical leau uate necessary preco lata, apply suitable solution implement the learner fessional judgment sk endently evaluate and oblems, echnical language know	ns and make states listic and statistical oridging the gap b real data, while taki others, Bayesian 1 on-making processo e of the specialist to hods, for example arning, onditions and assun on concepts and str ed procedures in terr cills, use suitable source	ments about their learning methods. between advanced ing scalability into earning methods, es, and advanced pics covered in the in the areas of aptions and check ategies to a given ms of software,
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 minutes	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester	Supplementary ex (number, form, scop	am requirements be)	accompanying module (partial)
(hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-PMS: Probabilistic Mac	chine Learning - Sp	ecialization	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ve module		
Content and qualification goals of the module:	makes it possible reliability. This is The focus of thi theoretical concep account. Students graphical models statistical learning Qualification goal The students acqui module. Students: - learn advanced probabilistic mode - are able to eval these on existing of - can select and a complex problem, - can evaluate and - expand their pro- are able to indep	s: ire detailed knowledge concepts and metheling and statistical leauate necessary preco data, apply suitable solution implement the learne fessional judgment sk endently evaluate and oblems, echnical language know	ns and make state listic and statistical oridging the gap b real data, while taki others, Bayesian I on-making processo e of the specialist to hods, for example arning, onditions and assun on concepts and str ed procedures in ter- ills, use suitable source	ments about their learning methods. between advanced ing scalability into learning methods, es, and advanced pics covered in the in the areas of aptions and check ategies to a given ms of software,
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 minutes	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		ecommended.

HPI-CS-PSC: Provable Security	- Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	 complex systems algorithms (e.g., cryptographic has various methods discussed. Qualification goal The students acqui module. Students: have a complex cryptographic print can assess the secryptographic algot are able to design the appropriate crypering the appropriate crypering have gained secryptographic and knowledge, can independent problems, know which problems 	ire detailed knowledg rehensive understand	non and currently u symmetric cryptog mined in greater d their mathematica e of the specialist top ling of the prope systems and protoc tify vulnerabilities, protocols at a theo s, etical, methodologi itable sources of im-	sed cryptographic graphic methods, letail. In addition, il foundations are pics covered in the erties of various cols based on the pretical level using ical and practical formation to solve yptography,
Partial module exams (number, form, scope):	Exam types:			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None Disital Ensine		
Department:		Digital Engineering		

HPI-CS-PSD: Provable Security	- Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	attention is paid to real-world applic fundamental result knowledge proo cryptography. Qualification goal The students acqui module. Students: - can independent primitives, - can analyze given and prove their co - are versed in kn given protocols fo - are versed in cur develop an awarer - are able to con	ire detailed knowledg ly develop complex n and self-developed or rrectness, nown attack methods	ysis of provable se an expanded undo as homomorphic cryptography, an e of the specialist to cryptographic proto cryptographic primit and vulnerabilities ind developments in and opportunities in theoretical concep	cure protocols for erstanding of the encryption, zero- nd post-quantum pics covered in the pcols from learned tives and protocols and can examine cryptography and n this area,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, scop		Course accompanying
Courses (teaching format) (in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture	4	-	Exercises (at	-
(lecture or seminar)			least 50%)	
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in	n HPI-CS-PSC is re	commended.
Department:		Digital Engineering		

HPI-CS-PSS: Provable Security	- Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	attention is paid to real-world applic fundamental result knowledge proo cryptography. Qualification goal The students acqui module. Students: - can independent primitives, - can analyze given and prove their co - are versed in kn given protocols fo - are versed in cur develop an awarer - are able to con	ire detailed knowledg ly develop complex n and self-developed or rrectness, nown attack methods	ysis of provable se an expanded undo as homomorphic cryptography, an e of the specialist to cryptographic proto cryptographic primi- and vulnerabilities nd developments in and opportunities in theoretical concep	cover protocols for erstanding of the encryption, zero- nd post-quantum pics covered in the pools from learned tives and protocols and can examine cryptography and n this area,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
(III IIOurs [II]).				
	Contact time	Supplementary ex (number, form, scop		Course accompanying
Courses (teaching format) (in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture	4	-	Exercises (at	-
(lecture or seminar)			least 50%)	
Frequency of offer:		WiSe and SoSe		
Prerequisite:		Prior participation in	h HPI-CS-PSC is re	commended.
Department:		Digital Engineering		

HPI-CS-RE: Research Methods	& Ethics		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ıle		
Content and qualification goals of the module:	 philosophy of scie The focus here is of (conferences, jour scientific practice presentation. Qualification goal The students improstudents: gain knowledge interconnect, understand ethica develop their skii deepen their abil gain insight into 	ls with selected top nce, and ethics, each y on scientific practice, rnals, peer reviews, , topic identification s: ove their methodolog e of the institutions al problems related to Ils related to scientific ity to express argume modern scientific arc	with a connection to such as data use, sci citations, etc.), gu , experiment design ical skills at a resea of modern science oscientific activity, c methods, for exan ents in written and g	computer science. ientific institutions idelines for good n, evaluation, and rch level. ce and how they nple experiments,
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Paper (at least 12	pages, together with	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
		1		
	Contact time (in semester	Supplementary ex (number, form, scop		Course accompanying module (partial)
Courses (teaching format)	hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)
Lecture or seminar (lecture or seminar)	4	-	Interim presentation (15 min.)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		

HPI-CS-S: Network Security			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ile/compulsory electiv	ve module	
Content and qualification goals of the module:	networked infras characteristics of categorize attack w in design principle communication sy layer. In this way concepts and meas for specific attack Qualification goal The students acqui module. Students: - familiarize thems common systems a - are able to indep methods at a theor - evaluate describ attacks, - gain experience analyze security m - know which pro- relevant and currer - gain insights in	s: ire detailed knowledg selves with relevant c and networks, as well bendently analyze sys retical level and ident ed security measures in dealing with syste neasures and identify oblems in the area of	odule first looks id networks in ord- ilnerabilities. Stude ms and vulnerabiliti a transmission layer consider various th camine their practic e of the specialist to haracteristics and se as potential vulner- stems and networks ify potential attack ver in the context of v ms and tools that n potential attack vec of systems and net	at the relevant er to identify and nts become versed ies of network and to the application neoretical security al implementation pics covered in the ecurity concepts of abilities, using appropriate vectors, various threats and nake it possible to tors, work security are
Partial module exams (number, form, scope):	Exam types: Written exam, 90- Oral exam, 30-45			
Self-study time (in hours [h]):	120			
	1			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		WiSe		
Prerequisite:		None Digital Engineering		
Department:		Digital Engineering		

HPI-CS-SDC: Systems Developn	nent Techniques an	d Tools - Core	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	functional, logical - Deepening of itt implementation, m - Design, implem (high-level) progra - Design, imple environments for u - Expansion, use a self-sustaining sys - Design, implem iterative, explorate and maintenance a Qualification goals The students acquir module. Students: - acquire subject expand their prof discussion skills an - gain experience and the techniques - are able to indepus solve problems, - can assess the a fundamental probl - can present self against critical obj	basic programming , or imperative, dec erative, exploratory, naintenance, and asses- entation, application amming languages mentation, application inversal and (domair and assessment of pro- tems entation, application ory, user-oriented tec and assessment. s: re detailed knowledge -specific theoretical essional judgment sl nd the associated disc in dealing with the dis- challenges and tools endently develop and applicability of solutions estions, estion solutions to pro-	e of the specialist top and methodologic kills as well as the user or and start and assessment of and assessment of chniques for design and methodologic kills as well as the ussion techniques, evelopment and ope s used, use suitable sources ion concepts and start to problems and opension	ised,) niques for design f domain-specific ent of execution ning languages endlessly running f tools to support n, implementation pics covered in the cal knowledge to e development of eration of systems s of information to trategies to given ategies to a given defend their work
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 minutes	a presentation of rea	search results (20
Self-study time (in hours [h]):	120			
	-			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial exam (s) (number, form scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-

Frequency of offer:	WiSe and SoSe
Prerequisite:	None
Department:	Digital Engineering

HPI-CS-SDD: Systems Development Techniques and Tools - Deep DiveNumber of credit points (CP): 6					
Module type (compulsory or compulsory elective module):	Compulsory election	ve module			
Content and qualification goals of the module:	emphasis on pr paradigms/languag prevalent compror in detail; their co historical context The module includ - Deepening of functional, logical - Deepening of it implementation/m - Design, implementation/m - Design, implementation/m - Design, implementation/m Qualification goal topics covered in to Students: - acquire subject expand their prof discussion skills a - gain experience and the techniques - are able to indep solve problems, - can assess the a fundamental probl - can present self against critical obj	basic programming , or imperative, declar erative, exploratory, u aintenance and assessmentation, application amming languages ementation, application and assessment of prog- terms entation, application a oratory, user-orient aintenance and assessment s: The students acquire the module. -specific theoretical a cessional judgment ski ind the associated discu- in dealing with the de- s, challenges and tools endently develop and u applicability of solution ems, apply suitable solutions to prob- tections; estion solutions to prob-	a deeper unde cases covered gms/languages/sys and classified int ls. paradigms (e.g. arative, prompt-ba user-oriented techninent and assessment of n and assessment of specific programm rammable, partly and assessment of techniques nent. detailed knowled and methodologic ills as well as the ssion techniques, velopment and op- used, ise suitable sources on concepts and strates concepts and strates	rstanding of the d. Furthermore, stems are analyzed to the appropriate , object-oriented, used,) niques for design, of domain-specific ent of execution ming languages endlessly running, f tools to support for design, ge of the specialist cal knowledge to e development of eration of systems is of information to strategies to given ategies to a given	
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45		presentation of re	search results (20-	
Self-study time (in hours [h]):	120				
		Supplementary examination of the second seco	m requirements	Course	
Courses (teaching format)	Contact time (in semester hours)	(number, form, scope For completion of module		accompanying module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-	
Frequency of offer:		WiSe and SoSe		nonmended	
Prerequisite:		Prior participation in	прі-US-SDU 18 ře	ecommended.	
Department:		Digital Engineering			

HPI-CS-SDO: Systems Developr	nent and Operation	15	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ile/compulsory electiv	ve module	
Content and qualification goals of the module:	one or more funda IT systems. These oriented IT system topics, this modul for the manual, decisions during d can be presented th or techniques for example. Qualification Goa Qualification goal The students acqui module. Students: - gain advanced su - expand their pro- develop discussion - acquire basic ex- systems and the to - develop and use fundamental probl - assess the app fundamental probl - acquire the abi strategies to a give - present self-dev against critical obj - can critically que	s: ire detailed knowledg ibject-specific theoret fessional judgment sk on skills and techniqu perience in dealing w ools used, e suitable sources of lems; licability of solution lems; lity to select and a en advanced problem; eloped solutions to a	design, developmen requirements for IT chitectures, and varied concepts, method automatic conside- tion decisions durin echniques of process restems or self-adapt e of the specialist to fical and methodolo ills, tes, ith the development information to in n concepts and st pply suitable solut	nt and operation of Systems, process- lants. Among other ds, and techniques eration of design g operation. These ss mining, methods brive systems, for pics covered in the gical knowledge, at and operation of dependently solve trategies to given tion concepts and and defend them
Partial module exams (number, form, scope):	Exam types: Written exam, 90- Oral exam, 30-45			
Self-study time (in hours [h]):	120			
		Supplementary ex	am requirements	Course
Courses (teaching format)	Contact time (in semester hours)	For completion of module		accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer:		SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-CS-SDS: Systems Developm	ent Techniques an	d Tools - Specialization	Number of cr	redit points (CP): 6
Module type (compulsory or	Compulsory electi	ve module		
Content and qualification goals of the module:	Contents: This module deals subject areas. In do understanding of Furthermore, paradigms/languag isolated and classi methods. - Deepening of functional, logical - Deepening and techniques for des - Design, impleme (high-level) languages - Expansion, use running, self-susta - Design, impleme support iterative implementation/m Qualification goal the specialist topic Students: - gain detailed, is knowledge to ex application of disc - deepen and expa and the techniques - evaluate and ind complex problems - assess the applic given complex pro- acquire the abil strategies to a give - can critically qu- and check their pro-	s with advanced and in-d bing so, it places emphasis the paradigms/languages/ prevalent compr ges/systems are analyzed fied into the appropriate h basic programming pa , or imperative, declarated d specializing in iteration, application and ages mplementation, application and ages mplementation, application ments for universal and and assessment of prog ining complex systems entation, application and a , exploratory, user-orice aintenance and assessmen s: The students acquire fu- se covered in the module. in-depth subject-specific pand their professional j ussion skills and associated and experience in the devel s, challenges and tools use ependently use appropriates; cability of specialized solu- bilems, ity to evaluate and apply en complex, specialized pr loped solutions to comple	on problems the systems/tools/u comises in detail, the historical conten- iradigms (e.g. ive, prompt-ba- ive, explorated tenance and assessment of n and assessment of n and assessment of sented techniq t. rther and in-de- theoretical an judgment skill ed discussion techniq discussion techniq t, and assessment of sented techniq t. rther and in-de- theoretical an judgment skill ed discussion techniq t, and assess of in ution concepts v suitable solu oblem, x, specialized p	at require a deeper use cases covered. of modern eir core ideas are ext using scientific , object-oriented, ased,) ory, user-oriented sessment of domain-specific eent of specialized eific programming metimes endlessly pecialized tools to ues for design, epth knowledge of ad methodological ls as well as the echniques, peration of systems formation to solve and strategies for tion concepts and problems and have
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 45 mins.) Written exam, 90- Oral exam, 30-45 120		sentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary exam (number, form, scope) For completion of module	For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite:		WiSe and SoSe Prior participation in HP	I-CS-SDC is re	ecommended.
Department:		Digital Engineering		

HPI-CS-SIC: Systems Infrastructure - Core			Number of credit points (CP): 6	
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module	0	
Content and qualification goals of the module:	perspective. The architectures. Tec levels are emphas computer and its in to distributed and r in the bachelor's d treatment is deepe proofs in system of with a greater em- levels. - Deepening of functional, logical - Deepening and techniques for des - Design, implem (high-level) langua - Further design, i execution environ languages - Expansion, use running, self-susta - Design, implement support iterative implementation/m Qualification goals The students acqui covered in the moo Students: - gain in-depth ar knowledge to exp application of disc - deepen and expa operation of system - evaluate and use complex problemss - assess the applic given complex pro- evaluate and ap complex, specializ - can present self- have the ability to - can critically que	implementation, appl iments for universal and assessment of ining complex system entation, application a s, exploratory, user anintenance and assess s: uire further and in-dep dule. and further subject-spe pand their professio cussion skills and asso and their experience ms and the techniques s, cability of specialized oblems, oply suitable solution	ent sub-areas of 1 gical interactions a e from the consider o operating systems a comparison to corr thematic demands h i matter (e.g., by in the approach is mo itionships between g paradigms (e.g. clarative, prompt-ba- iterative, explorator maintenance and assess and assessment of ication and assessment of ication and assessment of sr-oriented techniq sment. pth knowledge of th ecific theoretical ar nal judgment skill ociated discussion to in dealing with the s, challenges and to of information to in d solution concepts a concepts and stra to complex, special omplex problems de	arge-scale system t different system eration of a single and virtualization, responding courses ere are higher, the cluding optimality re comprehensive, individual system , object-oriented, used,) ory, user-oriented sessment of domain-specific nent of specialized cific programming metimes endlessly pecialized tools to ues for design, ne specialist topics and methodological ls as well as the echniques, e development and ols used, udependently solve and strategies for ategies to a given ized problems and
Partial module exams (number, form, scope):	45 mins.) Written exam, 90- Oral exam, 30-45		a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, scop	am requirements	Course accompanying module (partial)
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	exam (s) (number, form, scope)

Frequency of offer:	WiSe and SoSe	
Prerequisite:	None	
Department:	Digital Engineering	

HPI-CS-SID: Systems Infrastruc	eture - Deep Dive		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
	technological pers sub-areas of large- technical and tech range from the cor to operating syster Qualification goal	ire further and in-dep	evel of detail. The for ctures. Emphasis is os at different syste computer and its in to distributed and n	ocus is on different placed on complex m levels. This can ternal architecture, etworked systems.
Content and qualification goals of the module:	knowledge to ex application of disc - deepen and ex operation of syster - acquire the abilit information to sol - can assess the a for given complex - can evaluate and complex, specializ - can present self- have the ability to - can critically qu	apply suitable soluti	nal judgment skill associated discussio dealing with the s, challenges and to valuate and use app d, lized solution conce ion concepts and st to complex, special	Is as well as the on techniques, development and ols used, ropriate sources of epts and strategies rategies to a given ized problems and
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 minutes	a presentation of re	search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
E 0.00				
Frequency of offer: Prerequisite:		WiSe and SoSePrior participation in HPI-CS-LSA or HPI-CS-SIC is recommended.		
Department:		Digital Engineering		

HPI-CS-SIS: Systems Infrastruc	ture - Specializatio	n	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory election	ive module		
	technological pers sub-areas of large- technical and tech range from the cor to operating system Qualification goal	ire further and in-dep	evel of detail. The for ctures. Emphasis is p os at different syste computer and its in to distributed and n	ocus is on different placed on complex m levels. This can ternal architecture, etworked systems.
Content and qualification goals of the module:	knowledge to ex application of disc - deepen and ex operation of system - acquire the abiliti information to sol - can assess the a for given complex - can evaluate and complex, specializ - can present self- have the ability to - can critically qu	apply suitable solutized problem, developed solutions to defend their work, estion solutions to co	nal judgment skill associated discussic dealing with the s, challenges and too valuate and use appr j lized solution conce to complex, special omplex problems de	s as well as the on techniques, development and ols used, ropriate sources of epts and strategies rategies to a given ized problems and
Partial module exams (number, form, scope):	and check their professional suitability. Exam types: Paper of at least 8 pages, together with a presentation of research results (20- 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, scop		Course accompanying
Courses (teaching format)	ourses (teaching format) (in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Projektseminar/Seminar/Vorlesun g (Vorlesung oder Seminar)	4	-	Exercises (at least 50%)	-
		WPG 12 2		
Frequency of offer: Prerequisite:		WiSe and SoSePrior participation in HPI-CS-LSA or HPI-CS-SIC isrecommended.		
Department:		Digital Engineering		

HPI-CS-SSC: Systems Security -	Core		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	secure application examined for var Students consider and analyze vulne practical level. Qualification goals The students acqui module. Students: - gain subject-spec - expand their prof - develop discussion - gain experience i analysis methods f - acquire the abili information to solv - can assess the a problems, - can select and a problem, - can present self defend their work, - gain the ability others and check t	ire detailed knowledg cific theoretical and m fessional judgment sk on skills and techniqu n the handling of secu for vulnerabilities and ity to independently ve problems, applicability of solut apply suitable solutions	ecurity measures a applications, system alysis that make it p vectors on a theore e of the specialist top nethodological know ills, les, urity measures and c attack vectors, develop and use s ion concepts and stra- to problems and h	and concepts are hs, and networks. possible to identify etical as well as a pics covered in the vledge, concepts as well as uitable sources of trategies to given ategies to a given have the ability to
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (2 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe None Digital Engineering		

HPI-CS-SSD: Systems Security	- Deep Dive		Number of (CP): 6	credit points	
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module			
Content and qualification goals of the module:	secure application examined for van Students consider and analyze vulne practical level. Qualification goal The students acqui module. Students: - gain subject-speed - expand their prot - develop discussion - gain experience in analysis methods the - acquire the abili information to solf - can assess the aproblems, - can select and aproblem, - can present self	ire detailed knowledg cific theoretical and n fessional judgment sk on skills and techniqu in the handling of sec for vulnerabilities and ity to independently ve problems, applicability of solut apply suitable solutions	ecurity measures a applications, system halysis that make it p vectors on a theory e of the specialist to hethodological know tills, les, urity measures and of attack vectors, develop and use s ion concepts and str	and concepts are ns, and networks. possible to identify etical as well as a pics covered in the vledge, concepts as well as uitable sources of strategies to given ategies to a given	
	defend their work,gain the ability to critically question solutions to problems developed by others and check their professional suitability.				
Partial module exams (number, form, scope):	Exam types:	pages, together with 120 minutes		search results (20-	
Self-study time (in hours [h]):	120				
(in nouis [ii]).					
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form,	
Project seminar/seminar/ lecture	4	-	Exercises (at	scope) -	
(lecture or seminar)			least 50%)		
Frequency of offer:		WiSe and SoSe			
Prerequisite:		Prior participation i	n HPI-CS-SSC is re	commended.	
Department:		Digital Engineering			

HPI-CS-SSS: Systems Security -	Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	secure application examined for var Students consider and analyze vulne practical level. Qualification goals The students acqui module. Students: - gain subject-spec - expand their prof - develop discussio - gain experience i analysis methods f - acquire the abili information to solv - can assess the a problems, - can present self defend their work, - gain the ability	ire detailed knowledg cific theoretical and n fessional judgment sk on skills and techniqu n the handling of secu- for vulnerabilities and ity to independently ve problems, applicability of solut apply suitable solutions	ecurity measures a applications, system halysis that make it p vectors on a theore e of the specialist top hethodological know ills, les, urity measures and c l attack vectors, develop and use s ion concepts and stra- to problems and h	and concepts are hs, and networks. possible to identify etical as well as a pics covered in the vledge, concepts as well as uitable sources of trategies to given ategies to a given have the ability to
Partial module exams (number, form, scope):	Exam types: Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Written exam, 90-120 minutes Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
		Supplementary ex	am requirements	Course
Courses (teaching format)	Contact time (in semester hours)	For completion of module		accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Exercises (at least 50%)	-
Frequency of offer: Prerequisite: Department:		WiSe and SoSe Prior participation in Digital Engineering		commended.

HPI-CS-STO: Stochastics			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	ile/compulsory electiv	ve module	
Content and qualification goals of the module:	Content: This module covers concepts from mathematical probability theory. It includes both discrete probability theory and continuous, especially random, processes. Applications essential to computer science are examined (e.g., hashing, random walks). The focus is on mathematical analysis. Qualification goals: The students acquire detailed knowledge of the specialist topics covered in the module. Students - get to know various classical statements and situations in the field of probability theory, as well as their analyses, - understand problems and pitfalls when dealing with probabilities, - can independently model and analyze situations with uncertainties, - are able to solve problems with uncertainties, - gain insights into the current state of research. Exam types:			
Partial module exams (number, form, scope):	Exam types: Written exam, 90-120 minutes Oral exam, 30-45 minutes			
Self-study time (in hours [h]):	120			
	L	1		
	Contact time	Supplementary ex (number, form, scop		Course accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4 - Exercises (50%) -			
Frequency of offer:		SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-DHBMHS: Fundamentals	of Healthcare Syste	ms	Number of (CP): 6	credit points		
Module type (compulsory or compulsory elective module):	Compulsory modu	Compulsory module/compulsory elective module				
Content and qualification goals of the module:	Content: This module provides the basics of international health systems, as well as the specific requirements and special characteristics required for the area of digital health. Qualification goals: Students acquire a broad background knowledge of health systems. Students: - gain subject-specific theoretical, methodological, and practical knowledge, - learn how to independently work on a topic based on primary and secondary literature, - acquire the ability to independently access and evaluate scientific literature on individual topics, - learn and practice basic academic skills.					
Partial module exams (number, form, scope):	Exam types: Written exam, 90-120 minutes Oral exam, 30-45 minutes					
Self-study time (in hours [h]):	120					
	1	1		1		
	Contact time	Supplementary exam requirem (number, form, scope)		accompanying		
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)		
Project seminar/seminar/ lecture (lecture or seminar)	4	-	-	-		
Frequency of offer:		WiSe				
Prerequisite:		None				
Department:		Digital Engineering				

HPI-DHBMPM: Introduction to	Principles in Medi	cine	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory modu	lle/compulsory electiv	ve module	
Content and qualification goals of the module:	Content: This module teaches selected foundations and concepts from various areas of medicine and skills for documenting medical issues that are essential in understanding and applying requirements in the area of Digital Health. Qualification goals: Students acquire a broad background knowledge of health systems. Students: - gain subject-specific theoretical, methodological, and practical knowledge, - learn how to independently work on a topic based on primary and secondary literature, - gain the ability to independently access and evaluate scientific literature on individual topics, - learn and practice basic academic skills.			
Partial module exams (number, form, scope):	Exam types: Written exam, 90-120 minutes Oral exam, 30-45 minutes			
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, scop	am requirements	Course accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Seminar/ lecture (lecture or seminar)	4	-	-	-
Frequency of offer:		WiSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-PSK-DS: Design Thinking -	Specialization		Number of (CP): 6	credit points	
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module			
Content and qualification goals of the module:	Content: This module teaches advanced approaches and principles, techniques, a methods of design thinking—a user-centered concept for designi innovations, business models, and strategic futures. The design thinking process combines methods and tools from the areas of design, engineering and business administration. User orientation is combined with the perspective of technological feasibility and economic sustainability. The team-based approach not only relies on individual creativity but— particular—on collaboration. In this module, central areas of application and developed, discussed, and practiced together with project partners based specific project questions in advanced design studios. The module all provides in-depth discourse, methods, and reflections in order to examine has the integration of human-centered design (HCD) and design thinking can made sustainable and effective in various strategic fields of action. Qualification goals: The students acquire detailed knowledge of the specialist topics covered in the module. Students: - gain further subject-specific theoretical and methodological knowledge, - can develop and try out their creativity, - can present completed tasks and defend their work, - practice advanced methods and techniques, - practice working on and integrating delimited contributions independen in group work, - practice teamwork and collaborative problem-solving, - practice conflict skills in a team, - learn advanced approaches to leadership skills, - gain experience in assuming responsibility.				
Partial module exams (number, form, scope):	 English. The teaching language will be announced in sufficient time before the start of the respective course. Exam types: Paper, at least 12 pages Paper of at least 8 pages, together with a presentation of research results (20 45 mins.) Oral exam, 30-45 minutes 				
Self-study time (in hours [h]):	120				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module	am requirements be) For admission to module exam	Course accompanying module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Interim presentation (15 minutes)	-	

Frequency of offer:	WiSe and SoSe
Prerequisite:	None
Department:	Digital Engineering

HPI-PSK-DT: Design Thinking			Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
Content and qualification goals of the module:	Content: This module teaches advanced approaches and principles, techniques, methods of design thinking—a user-centered concept for design innovations, business models, and strategic futures. The design think process combines methods and tools from the areas of design, engineer and business administration. User orientation is combined with perspective of technological feasibility and economic sustainability. ' team-based approach not only relies on individual creativity but- particular—on collaboration. In this module, central areas of application developed, discussed, and practiced together with project partners based specific project questions in advanced design studios. The module a provides in-depth discourse, methods, and reflections in order to examine f the integration of human-centered design (HCD) and design thinking car made sustainable and effective in various strategic fields of action. Students: - gain further subject-specific theoretical and methodological knowledge, - can develop and try out their creativity, - can present completed tasks and defend their work, - practice dvanced methods and techniques, - practice working on and integrating delimited contributions independent in group work, - practice conflict skills in a team, - learn advanced approaches to leadership skills, - gain experience in assuming responsibility. Depending on the language of instruction, this module is held in German English. The teaching language will be announced in sufficient time between the between the between the teaching language will be announced in sufficient time between the between the provide in sufficient time between the provide in sufficient time between the provide in sufficient time between the provide is neadered in sufficient t			
Partial module exams (number, form, scope):	the start of the respective course.Exam types:Paper of at least 12 pagesPaper of at least 8 pages, together with a presentation of research results (2045 mins.)Oral exam, 30-45 minutes			search results (20-
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, scop	am requirements be)	Course accompanying
Courses (teaching format)	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Interim presentation (15 minutes)	-
Frequency of offer:		Wise and Seco		
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		

HPI-PSK-EI: Entrepreneurship	und Innovation		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
	areas of entreprend learn and practice problems, generat about the challeng a startup themselv		and innovation man ught and action. The em, business mode ss and receive the magnetic covers instruments	agement. Students ney learn to solve els. Students learn notivation to found s from the field of
Content and qualification goals of the module:	 The students acquire detailed knowledge of the specialist topics covered in the module. Students: gain subject-specific theoretical and methodological knowledge, learn a science-oriented way of thinking and proceeding, work on specific problems in a team, can develop and try out their creativity, can present completed tasks and defend their work, learn to work on specific contributions independently in group work, practice teamwork and problem-solving, practice conflict skills in a team, learn approaches to leadership skills, gain experience in assuming responsibility. Depending on the language of instruction, this module is held in German of English. The teaching language will be announced in sufficient time before 			
Partial module exams (number, form, scope):	the start of the respective course. Exam types: Paper, (at least 12 pages) Paper, (at least 8 pages) together with a presentation of research results (20- 45 mins.) Written exam, (90-120 minutes)			
Self-study time (in hours [h]):	120			
	Contact time	Supplementary ex (number, form, scor		Course accompanying
Courses (teaching format))	(in semester hours)	For completion of module	For admission to module exam	module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Interim presentation (15 minutes)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-PSK-ES: Entrepreneurship	- Specialization		Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module		
	Content This module provides fundamental, practical and theoretical knowledge in the areas of entrepreneurship, technology, and innovation management. Students learn and practice entrepreneurial thought and action. They learn to generate creative ideas, transform them into successful business models and communicate them successfully to an audience. The module takes a deep dive into both the challenges as well as the opportunities of founding a company, including new types of companies. Students will be motivated to found a startup themselves.			
Content and qualification goals of the module:	the module. Students: - gain subject-spec - learn a science-o - work on specific - can develop and - can present comp - learn to work on - practice teamwor - practice conflict - learn approaches - gain experience in Depending on the English. The teach	ire detailed knowledg cific theoretical and m riented way of thinkin problems in a team, try out their creativity oleted tasks and defen specific contributions rk and problem-solvin skills in a team, to leadership skills, in assuming responsib language of instructi hing language will be	nethodological know ng and proceeding, 7, nd their work, 5 independently in g ng, pility. on, this module is 1	vledge, group work, held in German or
Partial module exams (number, form, scope):	the start of the respective course. Exam types: Paper, (at least 8 pages) together with a presentation of research results (20- 45 minutes) Written exam, (90-120 minutes) Oral exam, (30-45 minutes)			
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of	For admission to	Course accompanying module (partial) exam (s)
		module	module exam	(number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Interim presentation (15 minutes)	-
Frequency of offer:		WiSe and SoSe		
Prerequisite:		None		
Department:		Digital Engineering		

HPI-PSK-LC: Law and Compliance			Number of credit points (CP): 6		
Module type (compulsory or compulsory elective module):	Compulsory electi	ve module			
Content and qualification goals of the module:	Content: This module provides an overview of legal issues as well as compliance principles and standards in the IT industry. This includes legal issues when creating and using software systems—such as the handling of personal data, liability, copyright, and licensing. These are viewed within a national and international framework. The learning goal is to recognize legal dangers and prevent them from occurring and to act in a legally secure and compliant manner. Qualification goals: The students acquire detailed knowledge of the specialist topics covered in the module. Students: - gain subject-specific theoretical, methodological and practical knowledge, - can select and apply suitable solution concepts and strategies to legal questions, - expand their professional judgment skills, - can address risks through the collection and use of data in a qualified manner, - gain experience in the formalization and abstraction of problems, - are able to independently access and evaluate scientific literature on individual topics. Depending on the language of instruction, this module is held in German or English. The teaching language will be announced in sufficient time before the start of the respective course.				
Partial module exams (number, form, scope):	Exam types: Paper, (at least 12 Paper, (at least 8 p 45 minutes)	Exam types: Paper, (at least 12 pages) Paper, (at least 8 pages) together with a presentation of research results (20-			
Self-study time (in hours [h]):	120				
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)	
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Interim presentation (15 minutes)	-	
Frequency of offer: Prerequisite: Department:		WiSe and SoSe None Digital Engineering			

HPI-PSK-ML: Management und Leaders	ship		Number of (CP): 6	credit points
Content and qualification goals of the module:	Compuls	ory elective module		
Content and qualification goals of the module:	and mana in the are The offer skills, soo Qualifica The stud covered i Students: - gain sub -gain kr organizat - gain exp - gain exp - acquire - gain ger - learn ho problems - practice - learn ap - train end	This module teaches management skills that are necessary for planning and managing complex IT or big data projects, as well as general skills in the area of management and strategic business management. The offerings include those in areas of methodological skills, action skills, social skills, and personal skills. Qualification goals The students acquire detailed knowledge of the specialist topics covered in the module.		
Partial module exams (number, form, scope)	Exam typ Paper, (at (20-45 m Written e	ufficient time before the start of the respective course. Exam types: Paper, (at least 8 pages) together with a presentation of research results 20-45 minutes) Vritten exam, 90-120 minutes Dral exam, 30-45 minutes		
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semeste r hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture (lecture or seminar)	4	-	Interim presentation (15 minutes)	-
Frequency of offer: Prerequisite:		WiSe and SoSe None		
Department:		Digital Engineering		

HPI-PSK-TC: Technology Com	nunication and Tra	ansfer	Number of (CP): 6	credit points
Module type (compulsory or compulsory elective module):	Compulsory electi	ive module		
Content and qualification goals of the module:	Content: This module teaches different types of oral and written communication skills that play a role in various professional contexts of digital engineering in science and business. The focus is always on communicating specialist knowledge verbally and in writing to different target groups. The module covers aspects of the preparation and implementation of (scientific) presentations and lectures. Students learn pitch and presentation techniques, and techniques in communication management and writing. Students also learn how written communication differs from communication in a "live" situation, and how to optimally convey content in different media. Qualification goals The students acquire detailed knowledge of the specialist topics covered in the module. Students: - gain subject-specific theoretical and methodological knowledge, - can select and apply suitable solution concepts and strategies to a given problem, - practice communication skills, - learn presentation techniques in physical and digital contexts, - practice communication skills, - learn presentation techniques in physical and digital contexts, - practice conflict management skills in a team. Depending on the language of instruction, this module is held in German or English. The teaching language will be announced in sufficient time before the start of the respective course.			
Partial module exams (number, form, scope):	Exam types: Paper, (at least 8 pages) together with a presentation of research results (20- 45 minutes) Written exam, 90-120 minutes Oral exam, 30-45 minutes			
Self-study time (in hours [h]):	120			
Courses (teaching format)	Contact time (in semester hours)	Supplementary ex (number, form, scop For completion of module		Course accompanying module (partial) exam (s) (number, form, scope)
Project seminar/seminar/ lecture	4	-	Interim presentation (15 minutes)	-
(lecture or seminar)				
		Wise and Ses	,	
(lecture or seminar) Frequency of offer: Prerequisite:		WiSe and SoSe None		