

Subdivided Module Catalogue for the Subject

Aerospace Computer Science

as a Master's with 1 major with the degree "Master of Science" (120 ECTS credits)

Examination regulations version: 2020 Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Computer Science

JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 88|f25|-|-|H|2020

UNIVERSITÄT WÜRZBURG

Learning Outcomes

German contents and learning outcome available but not translated yet.

Qualifikationsziele

Nach erfolgreichem Abschluss des Studiums verfügen die Absolventinnen und Absolventen über die folgenden Kompetenzen:

- Die Absolventinnen und Absolventen besitzen hohes Abstraktionsvermögen, die Fähigkeit zu analytischem Denken, hohe Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen verfügen über einen breiten Überblick über die Teilgebiete der Luft- und Raumfahrtinformatik und interdisziplinäre Zusammenhänge.
- Sie verfügen über vertiefte Kenntnisse der mathematischen, theoretischen und regelungstechnischen Grundlagen der Luft- und Raumfahrtinformatik sowie fundiertes Wissen über die theoretischen und praktischen Methoden zur Erlangung neuer Erkenntnisse.
- Sie sind in der Lage, ihre Fähigkeiten und Kenntnisse in Projekten umzusetzen und verfügen über Kenntnisse des aktuellen Forschungsstandes in mindestens einem Spezialgebiet der Luftund Raumfahrtinformatik.
- Sie sind in der Lage, sich anhand von Primärliteratur, insbesondere in englischer Sprache, in den aktuellen Forschungsstand eines Spezialgebiets einzuarbeiten
- Sie sind in der Lage, mathematische Methoden und Techniken der Luft- und Raumfahrtinformatik selbstständig auf konkrete praktische oder theoretische Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Sie sind in der Lage, auch bei unvollständig vorliegenden Informationen Probleme der Luft- und Raumfahrtinformatik unter Anwendung der wissenschaftlichen Arbeitsweise und unter Beachtung der Regeln guter wissenschaftlicher Praxis selbstständig zu bearbeiten und die Ergebnisse und Folgen ihrer Arbeit darzustellen, zu bewerten und zu vertreten.
- Sie sind in der Lage, mit Fachvertreterinnen und Fachvertretern auf dem aktuellen Stand der Forschung Fragestellungen der Luft- und Raumfahrtinformatik zu diskutieren und auch Nichtwissenschaftlerinnen und Nichtwissenschaftlern Zusammenhänge zu erläutern.
- Sie besitzen die Fähigkeit, als Informatikerinnen und Informatiker in interdisziplinär und international zusammengesetzten Teams aus (Natur-) Wissenschaftlerinnen und Wissenschaftlern und/oder Ingenieurinnen und Ingenieuren in Forschung, Industrie und Wirtschaft mitzuwirken oder diese zu leiten.

Wissenschaftliche Befähigung

- Die Absolventinnen und Absolventen können erweiterte mathematische, regelungstechnischen und praktischen Grundlagen der Luft- und Raumfahrtinformatik anwenden.
- Die Absolventinnen und Absolventen können tiefergehende Kenntnisse in mindestens einem Teilgebiet abrufen.
- Die Absolventinnen und Absolventen können fortgeschrittene hard- und/oder softwaregetriebene Experimente durchführen, analysieren, auswerten und die erhaltenen Ergebnisse darstellen.
- Die Absolventinnen und Absolventen sind in der Lage, sich mit Hilfe von Fachliteratur in neue Aufgabengebiete einzuarbeiten und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen besitzen Abstraktionsvermögen, analytisches Denken, Problemlösungskompetenz und die Fähigkeit, fortgeschrittene Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen sind in der Lage, fortgeschrittene Methoden der Luft- und Raumfahrtinformatik auf konkrete praktische oder theoretische Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.

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(2020)	cord Master (120 ECTS) Luft- und Raumfahrtinformatik - 2020	

- Die Absolventinnen und Absolventen setzen die erlernten theoretischen und praktischen Methoden in geschlossener Form ein, um zu zeigen, dass sie zur Anwendung der Konzepte wissenschaftlichen Arbeitens befähigt sind.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.
- Die Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in einem Team zusammenzuarbeiten und auftretende Konflikte zu lösen (Teamfähigkeit).
- Die Absolventinnen und Absolventen können ihre erworbenen Kompetenzen in unterschiedlichen interkulturellen Kontexten und in international zusammengesetzten Teams anwenden.
- Die Absolventinnen und Absolventen kennen wichtige Anforderungen und Arbeitsweisen im gewerblichen Umfeld sowie in Forschung und Entwicklung.
- Die Absolventinnen und Absolventen sind befähigt, Probleme zu analysieren und zu lösen und sich in weniger vertraute Themenkomplexe einzuarbeiten.

Persönlichkeitsentwicklung

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- Eigenverantwortlichkeit, Selbstständigkeit, Zeitmanagement, Teamfähigkeit.
- Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

Befähigung zum gesellschaftlichen Engagement

- Die Absolventinnen und Absolventen können Entwicklungen im Informationssektor kritisch reflektieren und deren Auswirkungen auf die Wirtschaft, Gesellschaft und die Umwelt in Ansätzen erfassen (Technikfolgenabschätzung).
- Die Absolventinnen und Absolventen haben ihr Wissen bezüglich wirtschaftlicher, gesellschaftlicher, kultureller etc. Fragestellungen erweitert und können in Ansätzen begründet Position beziehen.
- Die Absolventinnen und Absolventen entwickeln die Bereitschaft und Fähigkeit, ihre Kompetenzen in partizipative Prozesse einzubringen und aktiv an Entscheidungen mitzuwirken.

Abbreviations used

Course types: \mathbf{E} = field trip, \mathbf{K} = colloquium, \mathbf{O} = conversatorium, \mathbf{P} = placement/lab course, \mathbf{R} = project, \mathbf{S} = seminar, \mathbf{T} = tutorial, $\ddot{\mathbf{U}}$ = exercise, \mathbf{V} = lecture

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B**/**NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: **A** = thesis, **LV** = course(s), **PL** = assessment(s), **TN** = participants, **VL** = prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

ASPO2015

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

16-Sep-2020 (2020-83)

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.

The subject is divided into

Abbraviation Module title		ECTS	Method of	D 200	
ADDIEVIALIOII	credits	grading	page		
Electives Field (90 ECTS cr	edits)				
Seminars (5 ECTS credits)					
10-LuRI=SEM1-202-m01	Seminar 1 - Current Topics in Aerospace Computer Science	5	NUM	61	
10-LuRI=SEM2-202-m01	Seminar 2 - Current Topics in Aerospace Computer Science	5	NUM	62	
Aerospace Computer Scie	ence (20 ECTS credits)		<u>.</u>		
10-LURI=SSA-202-m01	Spacecraft System Analysis	10	NUM	66	
10-LURI=SP-202-m01	Spacecraft Propulsion	5	NUM	64	
10-LURI=GRFM-202-m01	Orbital Mechanics	10	NUM	53	
10-LURI=SD-202-m01	Space Dynamics	5	NUM	60	
10-LURI=ASS-202-m01	Advanced Sensory Systems and Sensor Data Processing	5	NUM	47	
10-LURI=IPT-202-m01	Interplanetary Trajectories	5	NUM	54	
10-LURI=FA-202-m01	Flugzeugavionik	5	NUM	49	
10-LURI=SLR-202-m01	Selected Topics in Aerospace Computing	5	NUM	63	
Robotics and Telematics	(20 ECTS credits)	•	•		
10-LURI=R01-202-m01	Robotics 1	8	NUM	57	
10-LURI=R02-202-m01	Robotics 2	8	NUM	58	
10-LURI=AA-202-m01	Advanced Automation	8	NUM	46	
10-LURI=3D-202-m01	3D Point Cloud Processing	5	NUM	45	
10-LURI=TSD-202-m01	Telecommunication System Design	10	NUM	68	
10-LURI=SRT-202-m01	Selected Topics in Robotics and Telematics	5	NUM	65	
Practica Aerospace Comp	outer Science (20 ECTS credits)	•	•		
10-LURI=RSE-202-m01	Space Systems Design	8	NUM	59	
10-LURI=EPB-202-m01	Design of Planetary Bases and Orbital Stations	8	NUM	48	
10-LURI=PRT-202-m01	Practical course - Rocket Engineering and Payloads	5	B/NB	55	
10-LURI=FZB-202-m01	Aircraft Construction	10	NUM	52	
10-LURI=FSIM-202-m01	Flight Simulator	10	NUM	51	
10-LURI=PTEL-202-m01	Practical Telematics	10	NUM	56	
10-LURI=TDP-202-m01	Team Design Project	10	NUM	67	
10-LURI=FDW-202-m01	FloatSat Design Lab	10	NUM	50	
Computer Science (15 ECTS credits)					
10-I=AG-161-m01	Computational Geometry	5	NUM	10	
10-l=DB2-161-m01	Databases 2	5	NUM	30	
10-I=ADSC-202-m01	Advanced Data Science	5	NUM	9	
10-I=APR-161-m01	Advanced Programming	5	NUM	28	
10-l=SSS-172-m01	Security of Software Systems	5	NUM	41	
10-I=AGIS-161-m01	Algorithms for Geographic Information Systems	5	NUM	12	
10-HCI=MMUI-161-m01	Multimodal User Interfaces	5	NUM	7	
10-l=ES-161-m01	Embedded Systems	8	NUM	31	
10-l=Kl1-161-m01	Artificial Intelligence 1	5	NUM	33	
10-l=Kl2-161-m01	Artificial Intelligence 2	5	NUM	35	
10-l=LVS-161-m01	Performance Evaluation of Distributed Systems	8	NUM	37	

10-I=PEB-161-m01 Performance Engineering & Benchmarking of Computer Sy- stems		5	NUM	39		
10-I=ST-161-m01	Discrete Event Simulation	8	NUM	43		
10-I=AKA-161-m01	Selected Topics in Algorithms	5	NUM	14		
10-I=AKT-161-m01	Selected Topics in Theory	5	NUM	26		
10-I=AKSE-161-m01	Selected Topics in Software Engineering	5	NUM	25		
10-I=AKITS-172-m01	Selected Topics in IT Security	5	NUM	22		
10-I=AKIT-161-m01	Selected Topics in Internet Technologies	5	NUM	20		
10-I=AKIS-161-m01	Selected Topics in Intelligent Systems	5	NUM	19		
10-I=AKES-161-m01	Selected Topics in Embedded Systems	5	NUM	16		
10-I=AKLR-161-m01	Selected Topics in Aerospace Engineering	5	NUM	23		
10-I=AKHCI-182-m01	Selected Topics in HCI	5	NUM	17		
10-I=AKII-182-m01	Selected Topics in Computer Science	5	NUM	18		
Master Project Modules (30 ECTS credits)						
10-LURI-MA-MK-202-m01	Concluding Colloquium Aerospace Computer Science	5	B/NB	70		
10-LURI-MA-202-m01	Master's Thesis Aerospace Computer Science	25	NUM	69		

Module	title			Abbreviation	
Multim	Multimodal User Interfaces 10-HCI=MMUI-161-m01				
Module	coordinator		Module offered by		
holder	of the Chair of Computer Sc	ence IX	Institute of Comput	er Science	
ECTS	Method of grading	Only after succ. cor	npl. of module(s)		
5	numerical grade				
Duratio	n Module level	Other prerequisites	i		
1 seme	ster graduate				
Conten	ts				
Ihe multimodal interaction paradigm simultaneously uses various modalities like speech, gesture, touch, or ga- ze, to communicate with computers and machines. Basically, multimodal interaction includes the analysis as well as the synthesis of multimodal utterances. This course concentrates on the analysis, i.e., the input proces- sing. Input processing has the goal to derive meaning from signal to provide a computerized description and un- derstanding of the input and to execute the desired interaction. In multimodal systems, this process is interlea- ved between various modalities and multiple interdependencies exist between simultaneous utterances neces- sary to take into account for a successful machine interpretation. In this course, students will learn about the necessary steps involved in processing unimodal as well as multimo- dal input. The course will highlight typical stages in multimodal processing. Using speech processing as a prima- ry example, they learn about: 1. A/D conversion 2. Segmentation 3. Syntactical analysis 4. Semantic analysis 5. Pragmatic analysis 6. Discourse analysis 6. Discourse analysis 7. Aspecific emphasize will be on stages like morphology and semantic analysis. Typical aspects of multimodal in- terdependencies, i.e., temporal and semantic interrelations are highlighted and consequences for an algorithmic processing are derived. Prominent multimodal integration (aka multimodal fusion) approaches are described, in-					
Intende	ed learning outcomes				
After the course, the students will be able to build their own multimodal interfaces. They will have a broad under- standing of all the necessary steps involved and will know prominent algorithmic solutions for each of them. Stu- dent will learn about available tools for reoccurring tasks and their pros and cons.					
Courses (type, number of weekly contact hours, language — if other than German)					
V (2) + Ü (2)					
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)					
presentation of project results (approx. 40 minutes) Language of assessment: German and/or English creditable for bonus					
Allocation of places					
Additio	nal information				
Focuse: HCI,GE.	s available for students of t	e Master's programme l	nformatik (Computer	r Science, 120 ECTS credits):	
Worklo	ad				
150 h					
Teachir	ng cycle				

Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 22 Nr. 3 b)
Module appears in
Master's degree (1 major) Computer Science (2016)
Master's degree (1 major) Mathematics (2016)
Master's degree (1 major) Computational Mathematics (2016)
Master's degree (1 major) Computer Science (2017)
Master's degree (1 major) Computer Science (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Aerospace Computer Science (2020)
Master's degree (1 major) Computer Science (2021)
Master's degree (1 major) Aerospace Computer Science (2021)
Master's degree (1 major) Computational Mathematics (2022)
Master's degree (1 major) Mathematics (2022)
Master's degree (1 major) Computer Science (2023)
Master's degree (1 major) Aerospace Computer Science (2023)
Master's degree (1 major) Computational Mathematics (2024)
Master's degree (1 major) Mathematics (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Master's degree (1 major) Computer Science (2025)

Module title Abbreviation					Abbreviation	
Advanced Data Science 10-I=ADSC-20				10-l=ADSC-202-m01		
Module	e coord	inator		Module offered by		
				Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Intende	ed lear	ning outcomes				
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	in)	
V (2) +	U (2)					
Method ster, in	d of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written examination (approx. 60 to 120 minutes) If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus						
Allocat	ion of p	olaces				
Additio	nal inf	ormation	·			
Workload						
150 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in					
Master	's degr	ee (1 major) Aerospace Co	omputer Science (202	20)		
Master	Master's degree (1 major) Aerospace Computer Science (2021)					

Module	Module title Abbreviation					
Compu	Computational Geometry 10-I=AG-161-m01					
Module	e coord	inator		Module offered by		
holder	of the C	Chair of Computer Scienc	el	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	its					
In man formati algorith gorithn ve.	In many areas of computer science for example robotics, computer graphics, virtual reality and geographic in- formation systems it is necessary to store, analyse, create or manipulate spatial data. This class is about the algorithmic aspects of these tasks: We will acquire techniques that are needed to plan and analyse geometric al- gorithms and data structures. Every technique will be illustrated with a problem in the practical areas listed abo- ve					
Intend	ed learr	ning outcomes				
The stu metric based	idents a probler on the o	are able to decide which n. The students are able concepts and techniques	algorithms or data st to analyse new probl acquired in the lectu	ructures are suitable ems and to come up ure.	for the solution of a with their own effici	given geo- ent solutions
Course	s (type,	, number of weekly conta	ict hours, language –	- if other than Germa	n)	
V (2) +	Ü (2)					
Methoo ster, in written If anno examir prox. 19 Langua credita	d of ass formati examin unced l nation o 5 minut age of a ble for	essment (type, scope, la on on whether module ca nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	inguage — if other tha an be chosen to earn minutes). inning of the course, oprox. 20 minutes) or /or English	an German, examina a bonus) the written examina an oral examination	tion offered — if not tion may be replaced in groups of 2 cand	every seme- d by an oral idates (ap-
Allocat	ion of r	laces				
	•					
Additio	onal info	ormation				
Focuse AT,HCI,	s availa ,GE	able for students of the M	laster's programme l	nformatik (Computer	Science, 120 ECTS o	credits):
Worklo	ad					
150 h						
Teachi	ng cycl	9				
	<u> </u>					
Referre	ed to in	LPO I (examination regu	lations for teaching-	degree programmes)		
			0			
Module	e appea	rs in				
Master	's degre	e (1 maior) Computer Sc	ience (2016)			
Master	's degr	e (1 major) Mathematics	s (2016)			
Master	's degre	ee (1 major) Computation	al Mathematics (201	6)		
Master	's teach	ning degree Gymnasium I	MINT Teacher Educat	ion PLUS, Elite Netwo	ork Bavaria (ENB) (20	016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
Master	's degre	ee (1 major) Computer Sc	ience (2017)			
Master	's degre	ee (1 major) Computer Sc	ience (2018)			
Master	's degre	ee (1 major) Computation	al Mathematics (201	9)		
Master's w (2020)	ith 1 major	Aerospace Computer Science	JMU Würzburg ● g cord Master (120 E	enerated 19-Apr-2025 • exam CTS) Luft- und Raumfahrtinfo	. reg. data re- rmatik - 2020	page 10 / 70

Master's degree (1 major) Mathematics (2019) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021) Master's degree (1 major) Aerospace Computer Science (2021) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022) Master's degree (1 major) Aerospace Computer Science (2023)

Module title					Abbreviation	
Algorit	Algorithms for Geographic Information Systems 10-I=AGIS-161-m01					
Modul	e coord	inator		Module offered by		
holder	of the (Chair of Computer Scie	nce l	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)		
5	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	1 semester graduate					
Conter	Contents					
Algorit sition, misatio tial pla	Algorithmic foundations of geographic information systems and their application in selected problems of acqui- sition, processing, analysis and presentation of spatial information. Processes of discrete and continuous opti- misation. Applications such as the creation of digital height models, working with GPS trajectories, tasks of spa- tial planning as well as cartographic generalisation.					
Intend	ed lear	ning outcomes				
The stu to sele	udents a ct and i	are able to formalise al mprove suitable appro	gorithmic problems in aches to solving these	the field of geograph problems.	ic information syste	ms as well as
Course	es (type	, number of weekly cor	ntact hours, language –	- if other than Germa	in)	
V (2) +	Ü (2)					
Metho ster, in	d of ass Iformati	essment (type, scope, on on whether module	language — if other th can be chosen to earn	an German, examina a bonus)	ition offered — if not	every seme-
prox. 1 Langua credita	5 minut age of a able for	es per candidate). ssessment: German ar bonus	nd/or English			
Alloca		Diaces				
		49				
Focuse	es availa	able for students of the	Master's programme I	nformatik (Compute	r Science, 120 ECTS (credits):
AT,IS,HCI						
Workload						
150 h						
Teaching cycle						
-						
Referre	ed to in	LPO I (examination re	gulations for teaching-	degree programmes)		
Modul	e appea	irs in				
Master	r's degr	ee (1 major) Computer	Science (2016)			
Master	Master's degree (1 major) Mathematics (2016) Master's degree (1 major) Computational Mathematics (2016)					
Master's degree (1 major) Computational Mathematics (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
Supplementary course MINT Teacher Education PLUS. Elite Network Bavaria (ENB) (2016)						
Master's degree (1 major) Computer Science (2017)						
Master's degree (1 major) Computer Science (2018)						
Master	r's degr	ee (1 major) Computati	onal Mathematics (201	9)		
Master	r's degr	ee (1 major) Mathemat	ics (2019)			
Master's w (2020)	vith 1 majo	Aerospace Computer Science	JMU Würzburg • g cord Master (120	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	n. reg. data re- ormatik - 2020	page 12 / 70

Master's degree (1 major) Information Systems (2019)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020)

Module title			Abbreviation			
Select	Selected Topics in Algorithms 10-I=AKA-161-m01					
Modul	e coordinator		Module offered by			
holder	of the Chair of Computer Scie	ence l	Institute of Comput	er Science		
ECTS	Method of grading	Only after succ. cor	npl. of module(s)			
5	numerical grade					
Duratio	on Module level	Other prerequisites	;			
1 seme	ester graduate					
Conter	nts					
Selecte	ed topics in algorithmics.					
Intend	ed learning outcomes					
The stu	udents understand the basic	approach of algorithmic	computer science. T	hey are able to unde	erstand the	
Course	(type, number of weekly co	ntact hours language -	- if other than Germa			
		illact nours, language -		ui <i>)</i>		
V (2) +	U (2)					
ster, in	d of assessment (type, scope formation on whether modul	, language — if other th e can be chosen to earr	an German, examina 1 a bonus)	ition offered — if not	every seme-	
written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English						
credita	ible for bonus					
Allocation of places						
Additio	onal information					
Focuse AT	es available for students of th	e Master's programme	nformatik (Compute	r Science, 120 ECTS (credits):	
Worklo	bad					
150 h						
Referre	ed to in LPO I (examination re	egulations for teaching-	degree programmes)			
Modul	e appears in					
Master	r's degree (1 major) Computer	Science (2016)				
Master	r's degree (1 major) Mathema	tics (2016)				
Master	r's degree (1 major) Computat	ional Mathematics (201	.6)			
Master	r's degree (1 major) Computer	Science (2017)				
Master	Master's degree (1 major) Computational Mathematics (2018)					
Master's degree (1 major) Computational Mathematics (2019)						
Master's teaching degree Sympasium MINT Teacher Education DLUS, Elite Network Pavaria (ENP) (2020)						
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)						
Supplementary course Mini Leacher Education PLOS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020)						
master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021)						
Master	's degree (1 major) Computer	Computer Science (20	21)			
	e acore (i major) Acrospic		/			
Master's w (2020)	ith 1 major Aerospace Computer Science	JMU Würzburg • g cord Master (120	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	n. reg. data re- ormatik - 2020	page 14 / 70	



Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022)

Module title				Abbreviation		
Selecte	Selected Topics in Embedded Systems 10-I=AKES-161-m01					
Module	e coordi	inator		Module offered by		
Dean o	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	numer	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Selecte	ed topic	s in embedded systems.				
Intende	ed learr	ning outcomes				
The stu lutions	idents p to com	oossess specialised knov plex problems in this are	vledge in the area of a and to transfer the	embedded systems. m to related questio	They are able to understand so- ns.	
Course	s (type,	number of weekly conta	ct hours, language –	- if other than Germa	n)	
V (2) +	Ü (2)	· · · · · · · · · · · · · · · · · · ·	, <u> </u>		,	
Metho ster, in	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus						
Allocat	ion of p	olaces				
Additio	onal info	ormation				
Focuse	s availa	able for students of the M	laster's programme l	nformatik (Computer	Science, 120 ECTS credits): ES.	
Worklo	ad			· ·	· · · ·	
150 h						
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Deferred to in LDO L (even institution regulations for target in a degree area area and a second						
Referred to in LPOT (examination regulations for teaching-degree programmes)						
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Module	e appea	irs in	· · · · · · (- · · · ()			
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computer Science (2017) Master's degree (1 major) Computer Science (2018)						
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Selected Topics in HCI 10-I=AKHCI-182-m01 Module offered by Institute of Computer Science Institute of Computer Science Institute of Computer Science Module for grading grade Only after succ. compl. of module(s) 5 Institute of Computer Science Buration Module level Other prerequisites Selected topics in HCI. Interdet rearring outcomes Interdet rearring outcomes Selected topics in HCI. Interdet rearring outcomes Interdet rearring outcomes In	Module title				Abbreviation	
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holder of the Chair of Computer Science IX Institute of Computer Science ECTS Method of grading Only after succ. compl. of module(s) 5 numerical grade Duration Module level Other prerequisites 1 semester graduate Contents	Module	coord	inator		Module offered by	
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Method of assessment (type, scope, language — if other than German, examination offered — if not every seter, information on whether module can be chosen to earn a bonus) written examination (60 to 120 minutes) If announced by the lecturer at the beginning of the course, the written examination may be replaced by an examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): Workload 150 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in	V (2) + Ü	Ü/S (2)				
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Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): Workload 150 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in						
Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): Workload 150 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in	Additional information					
Workload 150 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in	Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): HCI.					
150 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in	Workload					
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in	150 h					
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in	Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in						
	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
Master's degree (1 major) Computer Science (2018) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021) Master's degree (1 major) Aerospace Computer Science (2021)						

Module title				Abbreviation	
Selected Topics in Computer Science				10-I=AKII-182-m01	
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
Selecte	d topic	s in computer science.			
Intende	ed learı	ning outcomes			
The stu them to	dents a prelate	are able to understand th d questions.	e solutions to comple	ex problems in comp	outer science and to transfer
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) +	Ü/S (2)				
Methoo ster, in	d of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus					
Allocal		Jlaces			
 Additional information					
Additio					
Worklo	ad				
150 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master Master Supple Master Master	's degro 's teach mentar 's degro 's degro	ee (1 major) Computer Sc ning degree Gymnasium I y course MINT Teacher Ec ee (1 major) Aerospace Co ee (1 major) eXtended Art ee (1 major) Computer Sc	ience (2018) MINT Teacher Educati ducation PLUS, Elite N omputer Science (202 ificial Intelligence (xt ience (2021)	on PLUS, Elite Netwo Network Bavaria (ENI 20) Al) (2020)	ork Bavaria (ENB) (2020) B) (2020)

Module	e title				Abbreviation
Selecte	ed Topi	cs in Intelligent Systems			10-I=AKIS-161-m01
Module	e coord	inator		Module offered by	
holder	of the (Chair of Computer Scienc	e VI	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
Selecte	d topic	s in intelligent systems.			
Intende	ed lear	ning outcomes			
The stu lutions	dents to com	possess an advanced kno plex problems in this are	owledge in the area o a and to transfer the	f intelligent systems m to related questio	. They are able to understand so- ns.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) +	Ü (2)	,			
Methoo ster, inf	d of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
If annou examin prox. 15 Langua credital	examination control of the second sec	nation (approx. 60 to 120 by the lecturer at the beg of one candidate each (ap res per candidate). ssessment: German and, bonus	minutes). inning of the course, prox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Focuse	s availa	able for students of the N	laster's programme Ir	nformatik (Computer	Science, 120 ECTS credits): IS.
Worklo	ad				
150 h					
Teachir	ng cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
Module	e appea	ars in			
Master Master Supple Master Master	's degr 's teach mentai 's degr 's degr	ee (1 major) Computer Sc ning degree Gymnasium I y course MINT Teacher Ec ee (1 major) Computer Sc ee (1 major) Computer Sc	ience (2016) WINT Teacher Educati ducation PLUS, Elite N ience (2017) ience (2018)	on PLUS, Elite Netwo Network Bavaria (EN	ork Bavaria (ENB) (2016) B) (2016)
Master Supple Master	's teacl mentai 's degro	ning degree Gymnasium I y course MINT Teacher Eo ee (1 major) Aerospace Co	MINT Teacher Educati ducation PLUS, Elite N omputer Science (202	on PLUS, Elite Netwo Network Bavaria (EN 20)	ork Bavaria (ENB) (2020) B) (2020)

(2020)

Modu	e title			Abbreviation		
Select	ed Topi	cs in Internet Technologi	ies		10-I=AKIT-161-m01	
Modu	e coord	inator		Module offered by	<u> </u>	
holder	r of the (Chair of Computer Scienc	e III	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Durati	on	Module level	Other prerequisites	;		
1 seme	ester	graduate				
Conte	nts					
Select and cc works, chann MO), r planni revers ment (ment r visual ves, oi Intend The st and w Course V (2) + Metho ster, ir writter If anno exami prox. 2 Langu credita	ed topic ontrol sti , control , or ne el codin nac laye ng and ne e engine (IETF traf mechani isation, r other udents h ireless c es (type, U (2) od of ass nformati nation o 15 minut age of a able for	is in computer communic ructures of the internet, r mechanisms for redund w concepts and technolo g, modern transmission r, mobileIP, routing in ac management methods in eering), network manage fic engineering, ITU-T TM isms, network design, mo- result handling, simulati current topics. hing outcomes nave a knowledge of adv ommunication systems. , number of weekly conta eessment (type, scope, la on on whether module con- nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and bonus	ation, for example d nulticast protocols, p ant and real-time cor- ogies in mobile comm technologies (adapti l-hoc networks, vertice telecommunication ment paradigms (cer N, OSI management) easurement, acquisit on and analysis of ne- anced and current to act hours, language – inguage — if other th an be chosen to earn o minutes). inning of the course, oprox. 20 minutes) of /or English	esign aspects of futu protocols for multime mmunication networ nunication: digital m ve modulation and c cal handover, UMTS networks: planning ntral and decentral), planning and mana- cion and evaluation of etworks), manageme pics in the manageme - if other than Germa an German, examina- a bonus) the written examination	are internet structure edia communication, ks, p2p networks, ac odulation, signal pro oding, hybrid ARQ, C IP multimedia subsy methods (forward en framework for netwo agement methods (IF of traffic and perform ent tools, outlook and nent and design of m an) tion offered — if not	s: setup optical net- l-hoc net- opagation, DFDM, MI- stem, or gineering, rk manage- ance data, d perspecti- odern wired every seme- d by an oral idates (ap-
Alloca	tion of p	Diaces				
	onalinf	ormation				
Focus		olination	lactor's programme	nformatik (Compute	r Science 420 ECTS	crodits). IT
Work	es availa		iaster s programme i	mormatik (Compute	i Science, 120 ECIS (Lieuits): II.
150 h	Jau					
Teach		a				
	ing cycli					
Reform	ed to in	IPOL (examination regu	lations for teaching	degree programmes		
Modul	e annes	urs in				
Maste	r's degr	ee (1 major) Computer Sc	ience (2016)			
Maste	r's teach	ning degree Gymnasium	MINT Teacher Educat	ion PLUS, Elite Netw	ork Bavaria (ENB) (20	016)
Supple	ementar	y course MINT Teacher E	ducation PLUS, Elite	Network Bavaria (EN	B) (2016)	
Master's v (2020)	vith 1 major	Aerospace Computer Science	JMU Würzburg • g cord Master (120	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	n. reg. data re- ormatik - 2020	page 20 / 70

Master's degree (1 major) Computer Science (2017) Master's degree (1 major) Computer Science (2018) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021) Master's degree (1 major) Aerospace Computer Science (2021)

Module	title				Abbreviation
Selecte	d Topi	cs in IT Security			10-I=AKITS-172-m01
Module	coord	inator		Module offered by	
holder	of the C	Chair of Computer Scienc	e ll	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Conten	ts .	·			
Selecte	d topic	is in II security.			
Intende	ed learn	ning outcomes		<u> </u>	
The stu comple	dents p x probl	bossess an advanced kno lems in this area and to t	owledge in the area o ransfer them to relate	f II security. They are ed questions.	e able to understand solutions to
Courses	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) + Í Module	Ü (2) taugh	t in: English			
Method ster, inf written If annou examin prox. 15 Langua credital Allocati Focuses IS, LR, H	Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE,				
Worklo	ad				
150 h					
Teachir	ng cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
		· · · · · · · · · · · · · · · · · · ·			
Module	appea	irs in			
Master' Master' Master' Supple	s degre s degre s teach mentar	ee (1 major) Computer Sc ee (1 major) Computer Sc ning degree Gymnasium I y course MINT Teacher Ec	ience (2017) ience (2018) MINT Teacher Educati ducation PLUS, Elite N	on PLUS, Elite Netwo Network Bavaria (ENI	ork Bavaria (ENB) (2020) B) (2020)

Master's degree (1 major) Aerospace Computer Science (2020)

Module	e title				Abbreviation	
Selecte	ed Topi	cs in Aerospace Engineer	ing		10-I=AKLR-161-m01	
Module	e coord	inator		Module offered by		
holder	of the (Chair of Computer Science	e VII	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Selecters, stems, and do tions, p cial are stems, ment, s traffic o	Selected topics in aerospace engineering, for example: satellite communication, rocket science, propulsion sy- stems, sensors and actuators for orientation control, perturbation of orbits, interplanetary orbits, rendezvous and docking, design of space ships, design of planetary bases, life support systems, special aspects of opera- tions, payloads, optical systems, RADAR, earth monitoring, thermo management, structure of space ships, spe- cial areas of navigation, space environment, environment simulation, verification and test of space faring sy- stems, space astronomy and planet missions, space medicine and biology, material science, quality manage- ment, space law, aeroflight topics, avionics for airplanes, air traffic control, areal navigation, pilot interfaces, air					
Intend	od loarı	ning outcomes				
The stu consid	idents er these	possess an advanced kno e foundations in their fut	owledge about the re ure plans of air or spa	spective topic of the aceborne systems.	selected area and are	e able to
Course	s (type	, number of weekly conta	ct hours, language –	· if other than Germa	n)	
V (2) +	Ü (2)	· · · · · · · · · · · · · · · · · · ·				
Metho ster, in	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other than be chosen to earn	an German, examina a bonus)	tion offered — if not e	very seme-
lf anno examir prox. 1 Separa Langua credita	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Separate written examination for Master's students. Language of assessment: German and/or English creditable for bonus					by an oral lates (ap-
Allocat	ion of p	olaces				
Additio	onal info	ormation				
Focuse	s availa	able for students of the M	laster's programme l	nformatik (Computer	Science. 120 ECTS cr	edits): LR.
Worklo	ad			(,	,
150 h						
Teeshi		-				
		e				
Referre	ed to in	LPOI (examination regu	lations for teaching-	legree programmes)		
Module	e appea	rs in				
Master	's degr	ee (1 major) Computer Sc	ience (2016)			
Master	's teach	ning degree Gymnasium I	WINT Teacher Educat	ion PLUS, Elite Netwo	ork Bavaria (ENB) (201	16)
Supple	mentar	y course MINT Teacher Eo	ducation PLUS, Elite	Network Bavaria (ENI	B) (2016)	
Master	's degr	ee (1 major) Computer Sc	ience (2017)			
Master	's degr	ee (1 major) Computer Sc	ience (2018)			
Master	's teacl	ning degree Gymnasium I	WINT Teacher Educat	ion PLUS, Elite Netwo	ork Bavaria (ENB) (202	20)
Master's w (2020)	ith 1 majoi	Aerospace Computer Science	JMU Würzburg • g cord Master (120 F	enerated 19-Apr-2025 • exam CTS) Luft- und Raumfahrtinfo	. reg. data re-	page 23 / 70

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021) Master's degree (1 major) Aerospace Computer Science (2021)

Module	title				Abbreviation
Selecte	d Topi	cs in Software Engineerir	ıg		10-I=AKSE-161-m01
Module	e coord	inator		Module offered by	
holder	of the (Chair of Computer Scienc	e ll	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade	-		
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
Selecte	d topic	s in software engineering	<u>y</u> .		
Intende	ed leari	ning outcomes			
The stu	dents p	possess an advanced kno	owledge about select	ed aspects of softwa	are engineering.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) +	Ü (2)				
Methoo ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus					
Allocat	ion of r	olaces			
Additio	nal inf	ormation			
Focuse	s availa	able for students of the N	laster's programme lr	nformatik (Computer	Science 120 FCTS credits): SF
Worklo	ad				
150 h	<u>au</u>				
150 H					
Teachir	ig cycl	e			
 Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
 Module	annea	nrs in			
Master'	's degr	ee (1 major) Computer Sc	ience (2016)		
Master's degree (1 major) computer Science (2016) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Master's degree (1 major) Computer Science (2017)					
Master' Master' Supple Master' Master'	Master's degree (1 major) Computer Science (2017) Master's degree (1 major) Computer Science (2018) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021)				
Master'	's degre	ee (1 major) Aerospace Co	omputer Science (202	21)	

Module	e title				Abbreviation	
Selecte	ed Topio	cs in Theory			10-I=AKT-161-m01	
Module	e coord	inator		Module offered by	ļ	
holder	of the (hair of Computer Scie	ncel	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	numer	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	nts					
Selecte	ed topic	s in theory.				
Intend	ed learr	ning outcomes				
The stu	udents ι	understand the basic a	pproach of theoretical	computer science. T	hey are able to unde	rstand the
solutio	ns of co	omplex problems in thi	is area and apply them	to similar questions	•	
Course	s (type,	number of weekly cor	ntact hours, language –	- if other than Germa	ın)	
V (2) +	Ü (2)					
Metho	d of ass	essment (type, scope,	language — if other th	an German, examina	ition offered — if not	every seme-
ster, in	formati	on on whether module	e can be chosen to earn	a bonus)		
written	examir	nation (approx. 60 to 1	20 minutes).			
lf anno	ounced l	by the lecturer at the b	eginning of the course,	the written examina	tion may be replace	d by an oral
prox. 1	5 minut	es per candidate).	approx. 20 minutes) of		i ili gloups ol 2 callu	iuales (ap-
Langua	age of a	ssessment: German ar	nd/or English			
credita	ble for	bonus				
Allocat	tion of p	olaces				
Additio	onal info	ormation				
Focuse	es availa	able for students of the	e Master's programme I	nformatik (Compute	r Science, 120 ECTS	credits):
Worklo						
150 h	au					
Teachi	ng cycl	a				
Teacini	ing cycli	5				
Deferre	d to in	IDOL (avamination to	gulations for toaching	dagraa pragrammac)		
Relefte				degree programmes)		
		ve in				
Module	e appea	ITS IN	Science (cost)			
Master	's degre	ee (1 major) Computer	Science (2016)			
Master	s uegie 's degra	ee (1 major) Mathemat	onal Mathematics (201	6)		
Master	's degre	e (1 major) Computer	Science (2017)	0)		
Master	's degre	ee (1 major) Computer	Science (2018)			
Master	's degre	ee (1 major) Computati	onal Mathematics (201	9)		
Master	's degre	ee (1 major) Mathemat	ics (2019)	~		
Master	's teach	ning degree Gymnasiu	n MINT Teacher Educat	ion PLUS, Elite Netw	ork Bavaria (ENB) (2	020)
Supple	ementar	y course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2020)	
Master	's degre	ee (1 major) Aerospace	Computer Science (20	20)		
Master	's degre	ee (1 major) Computer	Science (2021)	`		
Master	's degre	ee (1 major) Aerospace	Computer Science (20	21)		
Master's w (2020)	vith 1 major	Aerospace Computer Science	JMU Würzburg • g cord Master (120 l	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	n. reg. data re- ormatik - 2020	page 26 / 70



Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022)

Module title			Abbreviation			
Advand	ced Pro	gramming			10-I=APR-161-m01	
Module	e coord	inator		Module offered by	<u> </u>	
holder	of the (hair of Computer Scien	-م اا	Institute of Comput	er Science	
FCTS	Mothe	d of grading		nl of module(s)		
	nume	rical grade				
) Durati	munic		044			
Duratio	on	Module level	Other prerequisites	i		
Conton	tc	glauuale				
Conten	<u></u>					
with th	ie know	ledge of basic program	ning, taught in introdi	uctory lectures, it is primal recults like long	oossible to realize si	mpler pro-
giallis.	de dun	licates occur. In this lect	ure further knowledg	inial results like long	, incompletiensible	rams and co-
de a se	ensible	structure. Also, further to	opics in the areas of s	oftware security and	parallel programmi	ng are dis-
cussed	l.	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	ha and had	0
Intend	ed learı	ning outcomes				
Studen	nts learr	n advanced programmin	g paradigms especial	ly suited for space a	oplications. Differen	t patterns are
then in	npleme	nted in multiple languag	es and their efficienc	y measured using sta	andard metrics. In a	ddition, par-
allel pr	rocessir	ng concepts are introduc	ed culminating in the	use of GPU architect	tures for extremely q	uick proces-
sing.						
Course	s (type	, number of weekly cont	act hours, language –	- if other than Germa	n)	
V (2) +	Ü (2)					
Metho	d of ass	essment (type, scope, l	anguage — if other tha	an German, examina	tion offered — if not	every seme-
ster, in	formati	on on whether module o	an be chosen to earn	a bonus)		
written	exami	nation (approx. 60 to 120	o minutes).			
lf anno	unced	by the lecturer at the beg	ginning of the course,	the written examina	tion may be replace	d by an oral
examir	nation o	f one candidate each (a	pprox. 20 minutes) or	an oral examination	in groups of 2 cand	idates (ap-
	5 minut	es per canuluale). ssessment: German and	/or English			
credita	ble for	bonus				
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Focuse	s availa	able for students of the I	Aaster's programme l	nformatik (Computer	Science, 120 ECTS (credits):
SE,IS,L	R, HCI,	ES,GE			,	, -
Worklo	bad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination reg	ulations for teaching-o	degree programmes)		
Module	e appea	irs in				
Master	's degr	ee (1 major) Computer S	cience (2016)			
Master	's degr	ee (1 major) Mathematic	s (2016)			
Master	's degr	ee (1 major) Computatio	nal Mathematics (201	6)		
Master	's degr	ee (1 major) Computer S	cience (2017)			
Master	's degr	ee (1 major) Computer S	cience (2018)			
Master	's degr	ee (1 major) Computatio	nal Mathematics (201	9)		
Master	's degr	ee (1 major) Mathematic	s (2019)			
Master's w	rith 1 major	Aerospace Computer Science	JMU Würzburg ● g cord Master (120 F	enerated 19-Apr-2025 • exam	. reg. data re-	page 28 / 70
()			5514 master (120 L	, , and haamamamama		

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020)

Module	e title				Abbreviation
Databa	ses 2				10-l=DB2-161-m01
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	on .	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
Data wa	arehou	ses and data mining; wel	o databases; introduc	ction to Datalog.	
Intende	ed leari	ning outcomes			
The stu	dents l	nave advanced knowledg	e about relational da	tabases, XML and da	ata mining.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) +	Ü (2)				
Methoo ster, in	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	in German, examina a bonus)	tion offered — if not every seme-
lf anno examin prox. 19 Langua credita	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English				
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Focuse IS, HCI.	s availa	able for students of the M	laster's programme Ir	nformatik (Computer	Science, 120 ECTS credits): SE,
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)	
Module	e appea	nrs in			
Master	's degr	ee (1 major) Computer Sc	ience (2016)		
Master	's degre	ee (1 major) Business Info	ormation Systems (20	016)	
Master	s degri 's degri	ee (1 major) Computer Sc ee (1 major) Computer Sc	ience (2017)		
Master	's degri	ee (1 major) Information 9	Systems (2010)		
Master Supple	's teach mentar	ning degree Gymnasium I y course MINT Teacher Ec	MINT Teacher Educati ducation PLUS, Elite N	on PLUS, Elite Netwo Network Bavaria (EN	ork Bavaria (ENB) (2020) B) (2020)
Master	's degr	ee (1 major) Aerospace Co	omputer Science (202	20)	
Master	's degr	ee (1 major) eXtended Art	ificial Intelligence (xt	Al) (2020)	

Modul	e title				Abbreviation	
Embed	lded Sy	stems			10-l=ES-161-m01	
Modul	e coord	inator		Module offered by	<u> </u>	
Dean c	of Studi	es Informatik (Compute	r Science)	Institute of Comput	er Science	
FCTS	Meth	od of grading	Only after succ. con	nnl. of module(s)		
8	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conter	nts		I			
Model system re synt	s of em ns, impl hesis.	bedded systems, imple ementation planning st	mentation methods (A atic, periodic and dyn	SIC, AISIP, micro cor amic, binding proble	ntroller), verification ms, hardware synth	of embedded esis, softwa-
Intend	ed lear	ning outcomes				
The stu most in softwa	udents a mportai ire.	are familiar with the tec nt techniques for the m	hnical possibilities for odelling, verification a	the design of embe nd optimisation of s	dded systems and m uch systems in hardv	aster the ware and
Course	es (type	, number of weekly con	tact hours, language –	- if other than Germa	ın)	
V (4) +	Ü (2)					
Metho	d of ass formati	sessment (type, scope,	language — if other th	an German, examina a bonus)	ition offered — if not	every seme-
examir prox. 1 Langua credita	nation o 5 minut age of a able for	of one candidate each (tes per candidate). ssessment: German an bonus	approx. 20 minutes) or d/or English	r an oral examinatior	n in groups of 2 cand	idates (ap-
Alloca	tion of _l	olaces				
Additio	onal inf	ormation				
Focuse AT,SE,	es availa ES,LR,G	able for students of the E	Master's programme I	nformatik (Compute	r Science, 120 ECTS (credits):
Worklo	bad					
240 h	-					
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination res		degree programmes)		
Modul	e appea	ars in				
Master	r's degr	ee (1 major) Computer S	Science (2016)			
Master	r's degr	ee (1 major) Mathemati	cs (2016)			
Master	r's degr	ee (1 major) Computatio	onal Mathematics (201	6)		
Master	r's teacl	ning degree Gymnasiun	n MINT Teacher Educat	ion PLUS, Elite Netw	ork Bavaria (ENB) (20	016)
Supple	ementai	y course MINT Teacher	Education PLUS, Elite	ivetwork Bavaria (EN	в) (2016)	
Master	r's degr	ee (1 major) Computer 3	Science (2017)			
Master	r's degr	ee (1 major) Computatio	onal Mathematics (201	9)		
Master	r's degr	ee (1 major) Mathemati	cs (2019)	~~		
Masta				an available of the second		1
waster's w (2020)	ntn 1 majo	Aerospace Computer Science	JMU Würzburg • g cord Master (120 l	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	n reg. data re- ormatik - 2020	page 31 / 70

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021) Master's degree (1 major) Aerospace Computer Science (2022) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022) Master's degree (1 major) Aerospace Computer Science (2023)

Modul	Module title Abbreviation				
Artifici	ial Intelligence 1			10-l=Kl1-161-m01	
Modul	e coordinator		Module offered by	<u> </u>	
holder	of the Chair of Computer Scie	nce VI	Institute of Comput	er Science	
FCTS	Method of grading	Only after succ. con	nl of module(s)		
5	numerical grade				
Durati	on Module level	Other prerequisites			
1 Seme	ester graduate				
Conter	nts				
Intellig	gent agents, uninformed and h sitional and predicate logic an	euristic search, constra d inference, knowledge	aint problem solving	, search with partial	information,
Intend	ed learning outcomes				
The stu	udents possess theoretical an	d practical knowledge a	about artificial intelli	gence in the area of	agents.
search	and logic and are able to ass	ess possible applicatio	ns.	Sellee III the area of	ugento,
Course	es (type, number of weekly cor	ntact hours, language –	- if other than Germa	ın)	
V (2) +	Ü (2)				
Metho	d of assessment (type, scope,	language — if other th	an German, examina	tion offered — if not	every seme-
ster, in	formation on whether module	e can be chosen to earn	a bonus)		
written	n examination (approx. 60 to 1	20 minutes).	4h		م المرب م
If anno	Dunced by the lecturer at the b	eginning of the course,	the written examination	tion may be replace	a by an oral idates (an-
prox. 1	5 minutes per candidate).				luates (ap
Langua	age of assessment: German ar	nd/or English			
credita	able for bonus				
Alloca	tion of places				
Additio	onal information				
Focuse AT,SE,	es available for students of the IS,HCI	e Master's programme I	nformatik (Compute	r Science, 120 ECTS (credits):
Worklo	pad				
150 h					
Teachi	ing cycle				
Referre	ed to in IPOI (examination re	gulations for teaching-	degree programmes)		
		<u>au</u> latione for todoning (
Modul	e appears in				
Master	r's degree (1 major) Computer	Science (2016)			
Master	r's degree (1 major) Mathemat	ics (2016)			
Master	r's degree (1 major) Physics (2	016)			
Master	Master's degree (1 major) Nanostructure Technology (2016)				
Master	Master's degree (1 major) Computational Mathematics (2016)				
Master	r's teaching degree Gymnasiu	n MINT Teacher Educat	ion PLUS, Elite Netw	ork Bavaria (ENB) (2	016)
Supple	ementary course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2016)	
Master	r's degree (1 major) Computer	Science (2017)			
Master	r's degree (1 major) Computer	Science (2018)	``````````````````````````````````````		
Master	r's degree (1 major) Computati	onal Mathematics (201	9)		
Imaster	r s degree (1 major) Mathemat	ics (2019)			
Master's w (2020)	vith 1 major Aerospace Computer Science	JMU Würzburg • g cord Master (120 E	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	1. reg. data re- ormatik - 2020	page 33 / 70

Master's degree (1 major) Information Systems (2019)

Master's degree (1 major) Nanostructure Technology (2020)

Master's degree (1 major) Physics (2020)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Master's degree (1 major) Aerospace Computer Science (2020)

Master's degree (1 major) Physics International (2020)

Master's degree (1 major) Quantum Engineering (2020)

Master's degree (1 major) Quantum Technology (2021)

Module title Abbreviation						
Artifici	al Intel	ligence 2			10-l=Kl2-161-m01	
Module	e coord	inator		Module offered by		
holdor	of the (Thair of Computer Scier		Institute of Comput	or Science	
FCTS	Mothe	d of grading		nl of module(s)		
	nume	rical grade				
Duratia	munic	Madula laval	Other prerequisites			
	on estor	graduato	Other prerequisites			
Conton		graduate				
Conten			· , , , , , , , , , , , , , , , , , , ,		1.11.	
Plannir	ng, pror	babilistic closure and B	ayesian networks, utili	ty theory and decida	a mothods, roinforce	rning from
ning, p	rocessi	ng of natural language.			g methous, remoice	ement lear-
Intend	ed learı	ning outcomes				
The stu	idents i	possess theoretical and	l practical knowledge a	about artificial intelli	gence in the area of	probabilistic
closure	e, learni	ing and language proce	essing and are able to a	assess possible appl	lications.	P
Course	s (type	, number of weekly con	tact hours, language –	- if other than Germa	ın)	
V (2) +	Ü (2)					
Metho	d of ass	sessment (type, scope,	language — if other th	an German, examina	ition offered — if not	every seme-
ster, in	formati	on on whether module	can be chosen to earn	a bonus)		
written	examiı	nation (approx. 60 to 12	20 minutes).			
lf anno	unced	by the lecturer at the be	eginning of the course,	the written examina	tion may be replace	d by an oral
examin	nation o	of one candidate each (approx. 20 minutes) or	an oral examination	i in groups of 2 cand	idates (ap-
l angua	5 minut age of a	es per canuluale). ssessment: German an	d/or English			
credita	ble for	bonus				
Allocat	ion of p	olaces				
Additio	onal info	ormation				
Focuse	s availa	able for students of the	Master's programme I	nformatik (Computer	r Science, 120 ECTS	credits):
AT,SE,I	S,HCI,G	iΕ			· · · · , · · · ·	
Worklo	ad					
150 h						
Teachi	ng cvcl	9				
	0.7	-				
Referre	ad to in	IPOL (examination reg	ulations for teaching.	degree programmes)		
Referre						
Modula	0 20002	are in				
Mactor	e appea	as (a major) Computer (Science (2016)			
Master	's degr	ee (1 major) Computer . ee (1 major) Mathemati	cs(2016)			
Master	's degri	ee (1 major) Mathemati	onal Mathematics (201	6)		
Master	Master's teaching degree Gymnasium MINT Teacher Education PHIS Elite Network Ravaria (ENR) (2016)					016)
Supple	ementar	y course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2016)	- /
Master	's degr	ee (1 major) Computer S	Science (2017)	× ×		
Master	's degr	ee (1 major) Computer S	Science (2018)			
Master	's degr	ee (1 major) Computatio	onal Mathematics (201	9)		
Master	's degr	ee (1 major) Mathemati	cs (2019)			
Master	's degr	ee (1 major) Information	n Systems (2019)			
Master's w	ith 1 majoi	Aerospace Computer Science	JMU Würzburg ● g	enerated 19-Apr-2025 • exam	n. reg. data re-	page 35 / 70
(2020)			cord Master (120 I	ECTS) Luft- und Raumfahrtinfo	ormatik - 2020	

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020)

Modul	e title				Abbreviation	
Perfor	mance l	Evaluation of Distribute	ed Systems		10-I=LVS-161-m01	
Modul	e coord	inator		Module offered by		
holder	ofthe	Chair of Computer Scier	nce III	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)		
8	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conter	nts					
Traffic proces non-M	Traffic theoretic models, fundamental concepts of theory of probability, transformation techniques, stochastic processes, methods for performance analysis of technical systems, queue-/traffic theory, analysis of Markov, non-Markov and time critical systems, matrix analytical method, practical examples for performance analysis of					
compu	iter syst	ems and networks: thr	ougnput and goodput	analysis and other cr	naracteristics.	
Intend	ed lear	ning outcomes				
The stu means	udents of the	possess the methodic l theory of probability an	knowledge and the pra	ctical skills necessai ics.	ry to model technica	l systems by
Course	es (type	, number of weekly con	tact hours, language –	- if other than Germa	ın)	
V (4) +	Ü (2)					
Metho ster, ir	d of ass formati	sessment (type, scope, ion on whether module	language — if other th can be chosen to earn	an German, examina a bonus)	ition offered — if not	every seme-
prox. 1 Langua credita	5 minut age of a able for	tes per candidate each (ssessment: German an bonus	d/or English			
Alloca	tion of j	olaces				
Additio	onal inf	ormation				
Focuse AT,IT,G	es availa E	able for students of the	Master's programme I	nformatik (Compute	r Science, 120 ECTS (credits):
Worklo	bad					
240 h						
Teachi	ng cycl	e				
Referr	ed to in	LPOI (examination reg	gulations for teaching-	degree programmes)	I	
			<u> </u>	<u> </u>		
Modul	e appea	ars in				
Maste	r's degr	ee (1 major) Computer S	Science (2016)			
Maste	r's degr	ee (1 major) Mathemati	cs (2016)			
Master	Master's degree (1 major) Computational Mathematics (2016)					
Maste	r's teacl	ning degree Gymnasiun	n MINT Teacher Educat	ion PLUS, Elite Netw	ork Bavaria (ENB) (2	016)
Supple	ementai	ry course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2016)	
Master	r s degr r's dogr	ee (1 major) Computer S	Science (2017)			
Master	r's degr	ee (1 major) Computer .	onal Mathematics (201	a)		
Master	r's degr	ee (1 major) Mathemati	cs (2019)			
Master's w (2020)	/ith 1 majo	r Aerospace Computer Science	JMU Würzburg • g cord Master (120 l	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	n. reg. data re- ormatik - 2020	page 37 / 70

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Computer Science (2021) Master's degree (1 major) Aerospace Computer Science (2022) Master's degree (1 major) Computational Mathematics (2022) Master's degree (1 major) Mathematics (2022)

Module title			Abbreviation			
Performance Engineering & Benchmarking of Computer Systems 10-I=PEB-161-m01						
Modul	e coordi	inator		Module offered by	ļ	
holder	of the C	hair of Computer Scie	nce ll	Institute of Comput	er Science	
ECTS	Metho	d of grading	Only after succ. con	npl. of module(s)		
5	numer	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conter	nts					
Introdu	uction to benchm	performance enginee	ring of commercial soft	ware systems, perfo	rmance measureme	nt techni- tudies
Intend	ed learr	ing outcomes			, called a local de la	
The stu	udents r	occoss a fundamenta		adge in the areas of	nerformance metrics	measure-
ment to queue	echniqu networl	ies, multi-factorial vari ks, modelling methods	ance analysis, data ana , resource demand app	alysis with R, benchr proximation, petri ne	nark approaches, mo	odelling with
Course	es (type,	number of weekly cor	ntact hours, language –	- if other than Germa	ın)	
V (2) +	Ü (2)	· · · ·				
Metho ster, in	d of ass formati	essment (type, scope, on on whether module	language — if other the can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
If anno examir prox. 1 Langua	ounced b nation o 5 minut age of as	by the lecturer at the b f one candidate each (es per candidate). ssessment: German ar	eginning of the course, approx. 20 minutes) or nd/or English	the written examina an oral examinatior	tion may be replace in groups of 2 cand	d by an oral idates (ap-
Allocat	tion of n	laces				
Additio	onal info	ormation				
Focuse SE,IT,E	es availa ES,HCI,G	ble for students of the	Master's programme I	nformatik (Compute	r Science, 120 ECTS (credits):
Worklo	oad					
150 h						
Teachi	ing cycle	•				
reactin	ing cycu	-				
Referre		LPUT (examination re	gulations for teaching-	uegree programmes)		
		•				
Module appears in						
Master's degree (1 major) Computer Science (2016)						
Master's degree (1 major) Mathematics (2016)						
Master's degree (1 major) Computational Mathematics (2016) Master's teaching degree Cympasium MINT Teacher Education DLUS, Elite Natural, Deveria (END) (co. ()						
Master's teaching degree Gymnasium MINT leacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
Supple	Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)					
Master's degree (1 major) Computer Science (2017)						
Mactor	Master's degree (1 major) Computer Science (2018) Master's degree (1 major) Computational Mathematics (2010)					
Mactor	r's dear	e (1 major) Mathemati	irs (2010)	<i>71</i>		
Master	r's degre	ee (1 major) Informatio	n Systems (2019)			
Masta				en evete d e c. A		
waster's w (2020)	vitn 1 major	Aerospace Computer Science	JMU Würzburg • g cord Master (120 E	enerated 19-Apr-2025 • exam ECTS) Luft- und Raumfahrtinfo	n reg. data re- ormatik - 2020	page 39 / 70

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020)

Module title				Abbreviation		
Security of Software Systems 10-I=SSS-172-m01						
Module coordinator Module offered by						
holder of the Chair of Computer Science II			Institute of Comput	er Science		
ECTS	Method of grading	Only after succ. con	pl. of module(s)			
5	numerical grade					
Durati	on Module level	Other prerequisites				
1 seme	ester graduate					
Conter	nts					
The led dern co the fol • F • F • F • F • F • F • F • F • F • F	The lecture provides an overview of common software vulnerabilities, state-of-the-art attack techniques on mo- dern computer systems, as well as the measures implemented to protect against these attacks. In the course, the following topics are discussed: • x86-64 instruction set architecture and assembly language • Runtime attacks (code injection, code reuse, defenses) • Web security • Blockchains and smart contracts • Side-channel attacks • Hardware security Intended learning outcomes Students gain a deep understanding of software security, from hardware and low-level attacks to modern con-					
ses all tive.	ow students to gain hands-on ex	perience with attack	s and analysis of sys	tems from an attacker's perspec-		
Course	es (type, number of weekly conta	ct hours, language –	- if other than Germa	n)		
V (2) + Modul	Ü (2) e taught in: English					
Metho ster, in	d of assessment (type, scope, la Iformation on whether module ca	nguage — if other than an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-		
written If anno examin prox. 1 Langua credita	n examination (approx. 60 to 120 ounced by the lecturer at the beg nation of one candidate each (ap 5 minutes per candidate). age of assessment: English able for bonus	minutes). inning of the course, pprox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-		
Alloca	tion of places					
Additio	onal information					
Focuse IS, LR, Basic p	Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE, IS, LR, HCI, ES. Basic programming knowledge in C is required.					
Worklo	Workload					
150 h						
Teachi	ng cycle					
Referre	ed to in LPO I (examination regu	lations for teaching-	degree programmes)			
Modul	e appears in					
Master's degree (1 major) Computer Science (2017)						

Master's degree (1 major) Computer Science (2018) Master's degree (1 major) Computational Mathematics (2019) Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Information Systems (2019) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) eXtended Artificial Intelligence (xtAI) (2020)

Discrete Event Simulation 10-I=ST-161-m01 Module correlinator Module offered by holder of the Chair of Computer Science III Institute of Computer Science B numerical grade Duration Module level Other prerequisites Issemester graduate Contents Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects. Intended learing outcomes Courses (type, number of weekly contact hours, language — if other than German) V (4) + 0 (2) Method of assessment (type, scope, language — if other than German, examination of fine candidate each (approx. 20 minutes). If announced by the lecturer at the beginning of the course, the written examination in groups of 2 candidates (approx. 20 minutes). If announced by the lecturer at the beginning of the course, the written examination in groups of 2 candidates (approx. 20 minutes). If announced by the lecturer at the beginning of the	Module title				Abbreviation		
Module coordinator Module offered by holder of the Chair of Computer Science III Institute of Computer Science ECTS Method of grading Only after succ. compl. of module(s) 8 numerical grade Duration Module level Other prerequisites 1 semester graduate Contents Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects. Intended learning outcomes The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) written examination (approx. 6o to 120 minutes). If anounced by the lecturer at the beginning of the course, the written examination in groups of 2 candidates (approx. 15 minu	Discrete Even	Discrete Event Simulation 10-I=ST-161-m01					
holder of the Chair of Computer Science III Institute of Computer Science ECTS Method of grading Only after succ. compl. of module(s) 8 numerical grade Duration Modue level Other prerequisites 1 semester graduate Contents Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects. Intended learning outcomes The students posses the methodic knowledge and the practical skills necessary for the stochastic simulation of freechical systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language – if other than German) V (a) + Ü (z) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus) If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 20 minutes) or an oral	Module coord	linator		Module offered by			
ECTS Method of grading Only after succ. compl. of module(s) 8 numerical grade Duration Module level Other prerequisites 1 semester graduate Contents Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation of projects. Intended learning outcomes The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language — if other than German) V (4) + 0 (2) Method of assessment (type, scope, language — if other than German, examination of ore candidate each (approx. 20 minutes). Intendel Learnia du/or English creditable for bonus Allocation of places	holder of the Chair of Computer Science III			Institute of Comput	Institute of Computer Science		
Bit of the second sec	ECTS Meth	od of grading	Only after succ. con	npl. of module(s)			
Duration Module level Other prerequisites 1 semester graduate Contents Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects. Intended learning outcomes The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation on whether module can be chosen to earn a bonus) V (4) + Û (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). Intendue data each (approx. 20 minutes). I announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes). I anguage of assessment: German and/or English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informa	8 nume	rical grade					
Data tool Product event Other prerequisites Issemester graduate Contents Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects. Intended learning outcomes The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language — if other than German) V (a) + i) (z) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) written examination (approx. 6o to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 35 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places	Duration	Module level	Other prorequisites				
Contents Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects. Intended learning outcomes Intended learning outcomes The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language — if other than German) V (a) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) written examination (approx. 6o to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places Motkload 240 h	1 semester	graduate					
Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects. Intended learning outcomes The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language — if other than German) V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places	Contents	3	<u> </u>				
Intended learning outcomes The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language — if other than German) V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) written examination (approx. 6o to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h The student of the data data data data data data data dat	Introduction t bles, random measured dat limits of mode projects.	o simulation techniques, sample theory and estim a, planning and evaluation el creation and simulation	statistical groundwo ation techniques, sta on of simulation expe n, advanced concepts	rk, creation of rando tistical analysis of si riments, special ran s and techniques, pra	m numbers and rand imulation values, ins dom processes, pos actical execution of	lom varia- spection of sibilities and simulation	
The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods. Courses (type, number of weekly contact hours, language — if other than German) V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places	Intended lear	ning outcomes					
Courses (type, number of weekly contact hours, language — if other than German) V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h Toaching curle	The students (technical) system lation method	possess the methodic kn stems, the evaluation of I ls.	owledge and the prace results and the correc	ctical skills necessar t assessment of the	y for the stochastic possibilities and lin	simulation of nits of simu-	
V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h Teaching cycle	Courses (type	, number of weekly conta	ict hours, language –	· if other than Germa	n)		
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h Teaching curcle	V (4) + Ü (2)						
prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h	Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral even institute of one constitute on the formation of the course, the written examination in groups of a condidates (approximation of the course) of one condidates (approximation of the course) of one condidates (approximation of the course).						
Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h Teaching cycle	prox. 15 minu Language of a	tes per candidate). ssessment: German and	/or English				
Allocation of places Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h Teaching cycle	creditable for	bonus					
Additional information Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h Teaching cycle	Allocation of	places					
Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE Workload 240 h	 Additional inf	ormation					
Workload 240 h Teaching cycle	Focuses avail IT,IS,ES,GE	able for students of the N	laster's programme l	nformatik (Computer	Science, 120 ECTS (credits):	
240 h	Workload						
	240 h						
	Teaching cycl	P					
Referred to in LPO L (examination regulations for teaching-degree programmes)	Referred to in	IPOI (examination regu	lations for teaching.	legree programmec)			
Module appears in							
Master's degree (1 major) Computer Science (2016)							
Master's degree (1 major) Mathematics (2016)							
Master's degree (1 major) Computational Mathematics (2016)	Master's degr	ee (1 major) Computation	al Mathematics (201	6)			
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)							
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)							
Master's degree (1 major) Computer Science (2017)	Master's degr	ee (1 major) Computer Sc	ience (2017)				
Master's degree (1 major) Computer Science (2018)	Master's degr	ree (1 major) Computer Sc	ience (2018)				
Master's degree (1 major) Computational Mathematics (2019)	Master's degr	ee (1 major) Computation	al Mathematics (201	9)			
Master's with 1 major Aerospace Computer Science JMU Würzburg • generated 19-Apr-2025 • exam. reg. data re-	Master's with 1 majo	r Aerospace Computer Science	JMU Würzburg • g	enerated 19-Apr-2025 • exam	. reg. data re-	page 43 / 70	

Master's degree (1 major) Mathematics (2019) Master's degree (1 major) Information Systems (2019) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) eXtended Artificial Intelligence (xtAl) (2020)

Module title					Abbreviation	
3D Poi	3D Point Cloud Processing 10-LURI=3D-202-m01					
Modul	e coord	inator		Module offered by		
holder	ofthe	Chair of Computer Scienc	e XVII	Institute of Comput	er Science	
ECTS	Methe	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conter	nts					
Laser s d trees mappi	scannin 5, regist ng.	g, Kinect and camera mor ration, features, segment	dels, basic data struc ation, tracking, appli	ctures (lists, arrays, c cations for airborne	oc-trees), calculating normals, k- mapping, applications to mobile	
Intend	ed lear	ning outcomes				
Studer munica data p require	nts und ate with rocessi ements,	erstand the fundamental engineers / surveyors / ng and have experienced , in terms of memory requ	principles of all aspe CV people / etc. Stud that real application irements and in term	ects of 3D point cloud lents are able to solv scenarios are challe as of implementation	d processing and are able to com- ve problems of modern sensor enging in terms of computational issues.	
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)	
V (2) + Modul	Ú (2) e taugh	t in: German and/or Engl	ish			
Metho ster, ir	d of ass format	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
writter If anno examin prox. 1 Langua credita	exami ounced nation c 5 minut age of a oble for	nation (approx. 60 to 120 by the lecturer at the beg of one candidate each (ap tes per candidate). ssessment: German and, bonus	minutes) inning of the course, prox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Alloca	tion of _l	places				
Additi	onal inf	ormation				
Workle	bad					
150 h						
Teachi	Teaching cycle					
Referred to in IPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master	's degr	ee (1 major) Aerospace Co	omputer Science (20)	20)		
Maste	Master's degree (1 major) eXtended Artificial Intelligence (xtAl) (2020)					
Maste	's degr	ee (1 major) Aerospace Co	omputer Science (20)	21)		
Maste	's degr	ee (1 major) Aerospace Co	omputer Science (20)	23)		
Master's degree (1 major) Artificial Intelligence & Extended Reality (2024)						

Module title Abbreviation					Abbreviation	
Advanced Automation					10-LURI=AA-202-m01	
Module coordinator				Module offered by		
holder	of the C	Chair of Computer Scienc	e VII	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
8	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	graduate				
Conten	ts					
Advanc the field	ed topi d of sei	ics in automation system nsor data processing, act	s as well as instrume uators, cooperating s	ntation and control systems, mission an	engineering, for example from d trajectory planning.	
Intende	ed learr	ning outcomes				
The stu ment ac	dents l dvance	nave an advanced knowle d automation systems.	edge of selected topic	cs in automation sys	stems. They are able to imple-	
Courses	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	in)	
V (4) + Í Module	Ü (2) e taugh	t in: German and/or Engli	ish			
Method ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written If annou examin prox. 15 Langua credital	examir unced l ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and/ bonus	minutes) inning of the course, prox. 20 minutes) or ′or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
240 h						
Teaching cycle						
Referred to in IPO I (examination regulations for teaching-degree programmes)						
Module						
Master'	s degre	ee (1 major) Aerospace Co	omputer Science (202	20)		
Master'	Master's degree (1 major) Actospace Computer Science (2020) Master's degree (1 major) eXtended Artificial Intelligence (xtAl) (2020)					

Module ti	tle	Abbreviation				
Advanced	Sensory Systems and Senso	10-LURI=ASS-202-m01				
Module coordinator			Module offered by			
holder of	the Chair of Computer Science	e XVII	Institute of Comput	er Science		
ECTS M	lethod of grading	Only after succ. com	npl. of module(s)			
5 n	umerical grade					
Duration	Module level	Other prerequisites				
1 semeste	er graduate					
Contents						
Advanced The sense stems and liable fasl sor data p	l automation systems need in ors can be active or passive ar d clever sensor data processir hion. After discussing in detai processing for in orbit and for	strumentation conce nd may be enclosed i ng procedures ensure I state-of-the-art sen planetary applicatior	pts with propriocept into an embedded sy e the tasks of satellit sors and sensor syst ns.	ive and exteroceptive sensors. Astem. Only complex sensor sy- e systems are performed in a re- tems, the course focuses on sen-		
Intended	learning outcomes					
Students data proc within loc ded Kalm vel resear and shou	will master modern sensor da essing concepts, like sensor o calization and mapping and st an filter, Unscented Kalman F rch strands in this area like ma ld be aware about the advant	ita acquisition syster data interpretation. A udents will have to d ilter, Particle filter, et achine learning conc ages and disadvanta	ns with embedded p dvanced state estim leal with linear, non- tc.). Furthermore, stu epts into a scientific ges.	rocessing and several advanced ation methods will be discussed linear filters (Kalman filter, exten- dents should be able to put no- and technological perspective		
Courses (type, number of weekly conta	ct hours, language —	- if other than Germa	n)		
V (2) + Ü (Module ta	(2) aught in: German and/or Engli	ish				
Method o ster, infor	f assessment (type, scope, la mation on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-		
written ex If announ examinati prox. 15 m Language creditable	camination (approx. 90 to 120 ced by the lecturer at the beg ion of one candidate each (ap ninutes per candidate). e of assessment: German and/ e for bonus	minutes) inning of the course, prox. 20 minutes) or for English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-		
Allocation	n of places					
Additiona	l information					
Workload						
150 h	150 h					
Teaching	Teaching cycle					
Referred	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
Master's	degree (1 major) Aerospace Co	omputer Science (20:	20)			
Master's	degree (1 major) Aerospace Co	omputer Science (20:	21)			
Master's	Master's degree (1 major) Aerospace Computer Science (2023)					

Module title					Abbreviation		
Design of Planetary Bases and Orbital Stations					10-LURI=EPB-202-m01		
Module	e coord	inator		Module offered by			
holder	of the C	Chair of Computer Scienc	e VIII	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
8	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	ts						
In light plannir compor se etc) constru produc ly layec	In light of future human settlements across the solar system, this lecture will focus on the special aspects of planning of planetary bases. This will train the planning of a very complex spacecraft apart from its individual components like satellites. The content will be decided upon each semester (for example lunar base, mars base etc) The most important aspects like motivation, goals, prerequisites, constraints, environment, localization, construction and operation scenarios, planning of modules and structures, lifesupport, energy, communication, production, transport between earth and moon as well as mobility on the surface of the moon will be conceptually layed out and analyzed						
Intende	ed learn	ning outcomes					
le to an suppor the plan planeta	dents g alyse t t of the nning in ary base	he elementary aspects of acquired knowledge of r n the area of planetary ba es and orbital stations wi	f planning, pose requine nethods they are able ases and orbital stational ll be trained.	irements and consice to create dedicated	ler the system design. With the d tools and processes to support nagement for the development of		
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)		
R (6)							
ster, in	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-		
project Langua Assess	report ge of a ment o	(10 to 15 pages) and pres ssessment: German and, ffered: In the semester in	sentation of project (1 /or English which the course is a	5 to 30 minutes) offered			
Allocat	ion of p	olaces					
Additio	nal info	ormation					
Worklo	ad						
240 h							
Teaching cycle							
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)			
Module	e appea	ars in					
Master	Master's degree (1 major) Aerospace Computer Science (2020)						

Module title	Abbreviation					
Flugzeugavionik			10-LURI=FA-202-m01			
Module coordinator		Module offered by				
holder of the Chair of Computer S	cience VIII	Institute of Comput	er Science			
ECTS Method of grading	Only after succ. con	npl. of module(s)				
5 numerical grade						
Duration Module level	Other prerequisites					
1 semester graduate						
Contents						
The course <i>Avionik-Systeme</i> (<i>Avio</i> communication of airplanes and s control, 4. sensors and actuators,	<i>nics Systems</i>) offers an ov satellites: 1. software mod 5. sensor fusion, 6. reliab	erview of software, h ule and the software ility	nardware, sensors, actuators and structure 2. control 3. ground			
Intended learning outcomes						
At the end of the course, the stud and airplanes. They should be ab	ents should be familiar wi le to design these. They sh	th typical structures hould be able to prog	of avionic systems for satellites gram simple controls.			
Courses (type, number of weekly of	contact hours, language –	- if other than Germa	n)			
V (2) + Ü (2)						
Method of assessment (type, sco ster, information on whether mod	pe, language — if other tha ule can be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-			
written examination (approx. 60 to If announced by the lecturer at the examination of one candidate eac prox. 15 minutes per candidate). Language of assessment: German creditable for bonus	o 120 minutes) e beginning of the course, h (approx. 20 minutes) or and/or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-			
Allocation of places						
Additional information						
Workload						
150 h						
Referred to in LPUT (examination regulations for teaching-degree programmes)						
Mactor's dograp (1 major) Across	co Computor Science (ac	20)				
Master's degree (1 major) Aerospa	ace Computer Science (20)	20) 21)				

Module title				Abbreviation			
FloatSat Design Lab				10-LURI=FDW-202-m01			
Module	e coord	inator		Module offered by			
holder	of the (Chair of Computer Scienc	e VIII	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
10	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	ts						
CanSat Master mechan ry proje al platfo segmer commu structio	CanSat (now known as FloatSat) is an interdisciplinary project designed - not only - for Aerospace Engineering Master students. It is designed for students with different backgrounds, e. g. in computer science, electronics, mechanical engineering, aerospace technology, physics, mathematics. A satellite project is an interdisciplina- ry project that requires knowledge and skills in this as well as in numerous other fields. CanSat is thus an ide- al platform to combine all available skills in a single project. It covers the design and development of the space segment control software and the ground segment control software: telemetry and telecommanding in wireless communication: space segment - ground segment, electrical subsystem (energy, batteries), mechanical con-						
Intende	ed lear	ning outcomes					
The stu payload CanSat ged cor process mands	dents a d (cam "satel mmanc sing an and to	are able to build and interera) and attitude control of lite" includes a real-time of ls), telemetry (real time a d radio links communica get and (graphically) disp	grate into the inside of devices: Gyros and re operating system (pro nd history data), attit tion. The ground sego play the telemetry.	of the sphere the po- eaction wheel of a pie ovided by us), comm ude control, power of ment ought to be abl	wer unit, a control computer, a co satellite. The software of a nanding (immediate and time-tag- control, payload control, image le to generate and send telecom-		
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)		
R (8) Module	e taugh	t in: English					
Methoo ster, inf	l of ass formati	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-		
Practica on (app Langua	al proje prox. 20 ge of a	ect: development, constru o pages) with presentatio ssessment: English	uction and presentati n (30 to 45 minutes)	on of a satellite cont and subsequent dis	rol system (project documentati- cussion on the topic)		
Allocat	ion of _l	olaces					
Additio	nal inf	ormation					
Worklo	ad						
300 h	300 h						
Teaching cycle							
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)			
				<u></u>			
Module	e appea	ars in					
Master	's degr	ee (1 major) Aerospace Co	omputer Science (202	20)			
Master	Master's degree (1 major) Aerospace Computer Science (2021)						

Module title					Abbreviation	
Flight Simulator					10-LURI=FSIM-202-m01	
Module	e coord	inator		Module offered by		
holder	of the (Chair of Computer Scienc	e VIII	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
2 seme	ester	graduate				
Conten	ts					
Layout route e	of A32 ntry, fli	o cockpit, instruments in ght execution, taxing, tak	a a320 cockpit, fligh ke-off, flight, landing,	t preparations, cold taxing, anomalies a	and dark start of an a320, flight nd emergencies	
Intend	ed lear	ning outcomes				
The stu Import	ıdents ant: thi	possess the technical, th s is no licence to fly and i	eoretical and practica t's not a pilote trainin	al knowledge and sk ng.	ills to do a flight with an a320.	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
R (6)						
Metho ster, in	d of ass formati	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
project Langua credita	report age of a ble for	(10 to 15 pages) and pres ssessment: German and, bonus	sentation of project (1 /or English	5 to 30 minutes)		
Allocat	ion of _l	olaces				
Additio	onal inf	ormation				
Worklo	ad					
300 h						
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
Master	's degr	ee (1 major) Aerospace Co	omputer Science (202	20)		
Master	Master's degree (1 major) Aerospace Computer Science (2021)					

Module title				Abbreviation			
Aircraft Construction			10-LURI=FZB-202-m01				
Module	coord	inator		Module offered by			
holder	of the C	hair of Computer Scienc	e VIII	Institute of Compute	er Science		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
10	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
2 seme	ster	graduate					
Conten	ts						
 A e S Ta Q D B N Intende Student 	 Assembly of a RV12 small airplane elements of the RV12 (aluminum processing) Setting up a project team Tasks and allocation of responsibilities Quality assurance Documentation of the work Building some elements of the RV12 Marketing and PR activities Intended learning outcomes Students have the processory soft skills, project management knowledge and experience for the execution of						
comple aircraft stems a	x and s constru and alu	afety-critical projects. St uction. Students practice minum processing.	udents have technica manual skills in relev	I, theoretical and pr vant areas of aircraft	actical knowledge concerning t construction e.g. electrical sy-		
Courses	s (type,	number of weekly conta	ct hours, language —	if other than Germa	n)		
R (6)							
Method ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	n German, examina a bonus)	tion offered — if not every seme-		
project Langua credital	report ge of a ble for	(10 to 15 pages) and pres ssessment: German and/ bonus	entation of project (1 'or English	5 to 30 minutes)			
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Worklo	ad						
300 h							
Teachir	ng cycl	9					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	appea	rs in					
Master' Master'	s degre s degre	ee (1 major) Aerospace Co ee (1 major) Aerospace Co	omputer Science (202 omputer Science (202	20) 21)			

Module title					Abbreviation	
Orbital Mechanics					10-LURI=GRFM-202-m01	
Module	coord	inator		Module offered by		
holder	of the (Chair of Computer Scienc	e VIII	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	graduate				
Conten	ts					
Founda body pr through	tions o roblem 1 obser	of orbital dynamics and o , identification of classica vation (Laplace method),	rientation dynamics o al orbit elements fron , identification of orie	of air and space vehi n initial conditions, i entation data, rocket	cles, spherical trigonometry, two- dentification of orbit elements lift-off trajectory.	
Intende	ed leari	ning outcomes				
Unders in air ar tion sys	tanding nd spac stems.	g of fundamental method ce travel. Skills to apply t	s for acquisition, pro he acquired knowled	cessing and control ge in development a	of orbit and orientation systems and analysis of orbit and orienta-	
Courses	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (4) + l	Ü (2)					
Method ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written If annou examin prox. 15 Langua credital	examin unced ation o minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg of one candidate each (ap res per candidate). ssessment: German and, bonus	minutes) inning of the course, prox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Workload						
300 h						
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	appea	urs in				
Master'	s degr	ee (1 major) Aerospace Co	omputer Science (202	20)		

Module title				Abbreviation			
Interplanetary Trajectories 10-LURI=IPT-202-m01							
Module coordinat	or		Module offered by				
Dean of Studies In	formatik (Computer S	Science)	Institute of Comput	er Science			
ECTS Method of	f grading	Only after succ. com	pl. of module(s)				
5 numerical	grade						
Duration Mo	dule level	Other prerequisites					
1 semester gra	duate						
Contents							
Aircraft trajectory control history and function for a give ons as well as pat noise minimal app on distribution as	optimization belongs d the optimal state hi n dynamic system ne h equality and inequa proach and departure well as any procedur	to the mathematical story (and maybe oth ed to be calculated. ality constraints need trajectories for a give al requirements.	field of optimal con ner additional param Thereby, all given ini I to be fulfilled. This en aircraft at a given	trol. This means that the optimal eters) that minimize a given cost itial and final boundary conditi- enables e.g. the calculation of airport considering the populati-			
Intended learning	outcomes						
In this lecture the ling of the required de theoretical opti- ques for the soluti sparse parameter introduced.	students should lear d dynamic system as imality conditions are ion of realistic proble optimization problen mber of weekly conta	n how to solve such o well as the cost and e derived for simple e ms are introduced. A n are presented. Fina ct hours language –	optimal control prob constraint functions examples and on the fterwards, methods lly, other aspects rel	lems beginning with the mode- . In the next steps on the one si- other side discretization techni- for the solution of the resulting ated to the implementation are			
Courses (type, nut		ci nouis, language –		1)			
Module taught in:	Fnglish						
Method of assess	ment (type, scope, la	nguage — if other tha	an German, examina a bonus)	tion offered — if not every seme-			
written examination of announced by the examination of on prox. 15 minutes p Language of assest creditable for bon	on (approx. 90 to 120 ne lecturer at the beg e candidate each (ap per candidate). ssment: English us	minutes) inning of the course, prox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-			
Allocation of place	es						
Additional information	ation						
Workload	Workload						
150 h							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in	n						
Master's degree (1	u major) Aerospace Co	omputer Science (202	20)				
Master's degree (1	Master's degree (1 major) Aerospace Computer Science (2021)						

Module title			Abbreviation		
Practica	al cour	se - Rocket Engineering a	and Payloads		10-LURI=PRT-202-m01
Module	coord	inator		Module offered by	
holder	of the C	Chair of Computer Scienc	e VIII	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Conten	ts				
In this i analysis perimer	nterns s of roc nts anc	hip, students are suppos ket experiments (includi I their payloads.	ed to acquire practica ng their payload). The	al experience in the e e goal is the design,	design, building, execution and building and testing of rocket ex-
Intende	ed learn	ning outcomes			
The stu ge abou mentan the aid jects.	dents g ut rocke y desig of the a	gain fundamental knowle et science, including laur n aspects of rocket paylo acquired methodic know	dge about the desigr ach preparations as w bads, pose according ledge, they are able t	n of spacecraft exper vell as the execution requirements and re o apply dedicated to	iments, fundamental knowled- . They are able to analyse the ele- espects those in the design. With ools and method in bigger pro-
Courses	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
P (6)					
Method ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
placem Langua	ent rep ge of a	ort (4 to 5 pages) and prosent of the second s	esentation of results /or English	(15 to 30 minutes)	
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teaching cycle					
-					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master'	s degre	ee (1 major) Aerospace C	omputer Science (202	20)	

Practical Telematics 10-LURI=PTEL-202-m01 Module corritator Module offered by holder of the Chair of Computer Science XVII Institute of Computer Science ECTS Method of grading Only after succ. compl. of module(s) Dumerical grade - Duration Module tevel Other prerequisites Is semester graduate - Contents Institute of computer science. The great advancements in the fields of telecommunication and information processing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilites arise to acquire data remotely from a distance and to react accordingly. Possible focus topics: - automation, industry 4.0 - mobile systems, sensor data processing - space flight Intended learning outcomes Intended learning outcomes Intended learning outcomes Intended learning outcomes Report on practical course (approx. 20 pages) with presentation (so to 45 minutes) and subusequent discussion on whether module can be chosen to eam a bonus) Report on practical course (approx. 20 pages) with presentation (so to 45 minutes) and subusequent discussion on the topic Additional information on whether module can be chosen to eam a bonus) Report on practical course (approx. 20 pages) with presentation (so to 45 minutes) and subsequent discussion on the topic </th <th colspan="3">Module title</th> <th>Abbreviation</th>	Module title			Abbreviation			
Module correction Module offered by holder = T+be Chair of Computer Science XVII Institute of Computer Science ECTS Metion of grading Only after succ. compl. of module(s) o numerical grade Duration Module level Other prerequisites I semester graduate Contents Enversion Braduate In this internship, students develop interdisciplinary solutions from the fields telecommunication, automation and computer science. The great advancements in the fields of telecommunication and information processing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from a distances and to react accordingly. Possible focus topics: - automation, industry 4,-o - mobile systems, sensor data processing - space fight Intents Intent accordingly. They learn argaming close to the hardware and master common libraries, for example the Robot Operating System (ROS). Courses (type, number of weekly contact hours, language — if other than German) P P (G) Intent and durine module can be chosen to earn a bonus) Intent every semester, information on whether module can be chosen to earn a bonus) Report on practical course (approx. 20 pages) with presentation (30 to 45 minutes) and	Practical Telematics					10-LURI=PTEL-202-m01	
holder of the Chair of Computer Science XVII Institute of Computer Science ECTS Methed of grading Only after succ. compl. of module(s) 10 numerical grade 11 graduate 12 graduate 13 graduate 14 graduate 15 graduate 16 hitis internship, students develop interdisciplinary solutions from the fields telecommunication, automation and computer science. The great advancements in the fields of telecommunication and informationprocessing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from a distance and to react accordingly. Possible focus topics: - automation, industry 4, o- mobile systems, sensor data processing - space flight Intende learning outcomes Intender stance and to react accordingly. Possible focus topics: - automation, industry 4, o- mobile systems, sensor data and evaluate it online (in realtime) and react with actions accordingly. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with actions accordingly. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with actions on whether module can be chosen to earn a bonus) Course (type, number of weekly contact hours, language – if other than German) Poster sto to whether modu	Module	coord	inator		Module offered by		
Intermentation Indumentation Only after succ. compl. of module(s) 10 numentation is graduate 1 semiation Module level Other prerequisites 1 semiation graduate Contentation Contentation Contentation Contentation Contentation Contentation and information processing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from a distance and to rear at cordingly. Possible focus topics: - automation, industry 4, o - mobile systems, sensor data processing - space flight Intentementation systems or mobile robots. They learn acquiring fitting sensor data and evaluate it online (in realtime) and reax with actions accordingly. They learn programming close to the hardware and master common libraries, for example the Robot Operating System (ROS). Curuse Summa Course (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) Report on practical course (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic language = if other than German (so to 45	holder	of the C	Chair of Computer Science	e XVII	Institute of Comput	er Science	
10 numerical grade Duration Module level Other prerequisites 1 semester graduate Contents In this internship, students develop interdisciplinary solutions from the fields telecommunication, automation and computer science. The great advancements in the fields of telecommunication and information processing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from a distance and to react accordingly. Possible focus topics: - automation, industry 4, o - mobile systems, sensor data processing - space fight Intended learning outcomes Intended learning outcomes In this internship, students gather and deepen their skills in developing telecommunication solutions for automation systems or mobile robots. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with action accordingly. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with actions accordingly. They learn acquiring fitting sensor data and evaluate it online (in realtime) and set, information on whether module can be chosen to earn a borus) Courses	ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
Duration Module level Other prerequisites 1 semester graduate Contents Contents In this internship, students develop interdisciplinary solutions from the fields telecommunication, automation and computer science. The great advarcents over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from adiato the toch iques in the field of telematics, new possibilities arise to acquire data remotely from adia stance and to react accordingly. Possible focus topics: - automation, industry 4, o - mobile systems, sensor data processing - space flight Intende learning outcomes	10	nume	rical grade				
1 semester graduate Contents In this internship, students develop interdisciplinary solutions from the fields telecommunication, automation and computer science. The great advancements in the fields of telecommunication and informationprocessing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from a distance and to react accordingly. Possible focus topics: - automation, industry 4.0 - mobile systems, sensor data processing - space flight Intended learning outcomes In this internship, students gather and deepen their skills in developing telecommunication solutions for automation systems or mobile robots. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with actions accordingly. They learn programming close to the hardware and master common libraries, for example the Robot Operating System (ROS). Courses (type, number of weekly contact hours, language — if other than German) P (6) Method of assessment (type, scope, language — if other than German) P (6) Method of places <tr< td=""><td>Duratio</td><td>n</td><td>Module level</td><td>Other prerequisites</td><td></td><td></td></tr<>	Duratio	n	Module level	Other prerequisites			
Contents In this internship, students develop interdisciplinary solutions from the fields telecommunication, automation and computer science. The great advancements in the fields of telecommunication and informationprocessing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from a di- stance and to react accordingly. Possible focus topics: - automation, industry 4.0 - mobile systems, sensor data processing - space flight Intended learning outcomes In this internship, students gather and deepen their skills in developing telecommunication solutions for auto- mation systems or mobile robots. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with actions accordingly. They learn programming close to the hardware and master common libraries, for example the Robot Operating System (ROS). Courses (type, number of weekly contact hours, language — if other than German) P (6) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) Report on practical course (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic Language of assessment: German and/or English Allocation of places Additional information Workload 300 h Teaching cycle Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	1 semes	ster	graduate				
In this internship, students develop interdisciplinary solutions from the fields telecommunication, automation and computer science. The great advancements in the fields of telecommunication and information processing allow to offer ever more sophisticated services over long distances. By combining these disciplines with control and automation techniques in the field of telematics, new possibilities arise to acquire data remotely from a di- stance and to react accordingly. Possible focus topics: - automation, industry 4.0 - mobile systems, sensor data processing - space flight Intended learning outcomes In this internship, students gather and deepen their skills in developing telecommunication solutions for auto- mation systems or mobile robots. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with actions accordingly. They learn programming close to the hardware and master common libraries, for example the Robot Operating System (ROS). Courses (type, number of weekly contact hours, language — if other than German) P (6) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) Report on practical course (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic Language of assessment: German and/or English Allocation of places 	Conten	ts					
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In this internship, students gather and deepen their skills in developing telecommunication solutions for auto- mation systems or mobile robots. They learn acquiring fitting sensor data and evaluate it online (in realtime) and react with actions accordingly. They learn programming close to the hardware and master common libraries, for example the Robot Operating System (ROS). Courses (type, number of weekly contact hours, language — if other than German) P (6) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) Report on practical course (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic Language of assessment: German and/or English Allocation of places Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Intende	ed learn	ning outcomes				
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Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus) Report on practical course (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic Language of assessment: German and/or English Allocation of places Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	P (6)						
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Allocation of places Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Report on the t Langua	on prac topic ge of a	tical course (approx. 20 ssessment: German and/	pages) with presenta 'or English	tion (30 to 45 minut	es) and subsequent discussion	
Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Allocati	ion of p	olaces				
Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)							
 Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Additio	nal inf	ormation				
Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)							
300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Worklo	ad					
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	300 h	300 h					
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)							
Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)							
Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)	Module	Module appears in					
	Master' Master'	s degre s degre	ee (1 major) Aerospace Co ee (1 major) Aerospace Co	omputer Science (202 omputer Science (202	20) 21)		

Module title				Abbreviation		
Robotics 1			10-LURI=R01-202-m01			
Module	e coord	linator		Module offered by		
holder	of the	Chair of Computer Scienc	e XVII	Institute of Comput	er Science	
ECTS	Meth	od of grading	Only after succ. com	pl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
History homog tor con Worksp se dyna lonome Movem Sensor	r, appli enous figurat bace ar amics. es and tent co rs: posi	cations and properties of coordinates, axis coordin ion, numerical and analyt nalysis and trajectory plar Mobile robots: direct and non-holonome restriction ntrol and path planning: n tion sensors, speed sens	robots, direct kinema ates, arm equation. I ical approaches, exa ining, dynamics of m inverse kinematics, s, kinematic classific oadmap methods, co ors, distance sensors	atics of manipulators nverse kinematics: s mples of different ro anipulators: Lagrans propulsion system, s ation of mobile robo ell decomposition m	s: coordinate systems, rotations, solution properties, end effec- bots for analytical approaches. ge-Euler model, direct and inver- tricycle, Ackermann steering, ho- ots, posture kinematic model. ethods, potential field methods.	
Intend	ed lear	ning outcomes				
The stu their ki	idents nemat	master the fundamentals ics and dynamics as well	of robot manipulator as the planning of pa	rs and vehicles and a ths and task execut	are, in particular, familiar with ion.	
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)	
V (4) +	Ü (2)					
Module	e taugh	t in: German and/or Engl	ish			
Metho ster, in	d of as format	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written If anno examir prox. 19 Langua credita	exami unced nation o 5 minu age of a ble for	nation (approx. 60 to 90 by the lecturer at the beg of one candidate each (ap tes per candidate). assessment: German and, bonus	minutes) inning of the course, prox. 20 minutes) or ′or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of	places				
Additio	onal inf	ormation				
Workload						
240 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in					
Master	's degr	ee (1 major) Aerospace Co	omputer Science (202	20)		
Master's degree (1 major) Aerospace Computer Science (2021)						

Module title				Abbreviation	
Robotics 2					10-LURI=R02-202-m01
Module	e coordi	inator		Module offered by	
holder	of the C	hair of Computer Scienc	e XVII	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
8	numei	rical grade			
Duratio	on (Module level	Other prerequisites		
1 semes	ster	graduate			
Founda feedbac stems: itialisin	tions o ck and founda	f dynamic systems, contr feed-forward, state obse tions of stochastics, rand ication examples, proble	rollability and observ rver, feedback with s dom processes, stoch ms of Kalman filters,	ability, controller de tate observer, time c nastic dynamic syste extended Kalman fi	sign through pole assignment: liscrete systems, stochastic sy- ems, Kalman filter: derivation, in- lter.
Intende	ed learr	ning outcomes			
The stu tions of se the o design.	dents r f roboti connect They a s (type,	naster all fundamentals t cs. The students possess tions between the dual p lso recognise the relation number of weekly conta	that are necessary to a knowledge of adva airs controllability - o nship between the Ka ct hours, language —	understand Kalman anced controller and bservability as well alman filter as a state if other than Germa	filters and their use in applica- observer methods and recogni- as controller design and observer e estimator and an observer. n)
V (4) + I Module	Ü (2) e taught	t in: German and/or Engli	ish		
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annou examin prox. 15 Langua credital	examir unced l ation o 5 minut ge of a ble for	nation (approx. 60 to 90 i by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and/ bonus	minutes) inning of the course, prox. 20 minutes) or or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
240 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	rs in			
Master's degree (1 major) Aerospace Computer Science (2020) Master's degree (1 major) Aerospace Computer Science (2021)					

Module title			Abbreviation		
Space Systems Design				10-LURI=RSE-202-m01	
Module	coord	inator		Module offered by	
holder	of the Q	Chair of Computer Science	e VIII	Institute of Compute	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
8	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Conten	ts				
In the c craftsys from the lunar pl	ourse o stem is e area henom	of a semesterproject, a sp done anew each semest of microsatellites, like "d enons (TLP)".	bacecraft system will er and draws inspirat esign of a nanosatell	be designed in a tea ion from current tren itemission for detect	m. The selection of the space- nds and concrete research, often tion and observation of transient
Intende	ed learn	ning outcomes			
The stu elemen help of design will be t	dents g tary de the acc in the a trained	gain fundamental knowle sign aspects, create requ quired knowledge of met area of spacecraft system	dge about the desigr lirements accordingly hods they are able to s. Also projectmanag	o of spacecraft system and consider them create dedicated too gement for the develo	ms. They are able to analyse the in their system design. With the ols and methods to support the opment of spacecraft systems
Courses	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
R (6)					
Method ster, inf	l of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Langua Assessi	report ge of a ment o	(10 to 15 pages) and pres ssessment: German and/ ffered: In the semester in	entation of project (1 ′or English which the course is (5 to 30 minutes) offered	
Allocati	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
240 h					
Teaching cycle					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module	appea	ars in			
Master'	s degre	ee (1 major) Aerospace Co	omputer Science (202	20)	

Module title				Abbreviation	
Space Dynamics					10-LURI=SD-202-m01
Module	coord	inator		Module offered by	
holder	of the O	Chair of Computer Scienc	e VII	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Conten	ts				
Fundam exampl	nental e realis	principles of astrodynam sations, spin-stabilised s	ics, orientation contro atellites, 3-axis stabi	ol of satellites, sense lised satellites.	ors, actuators, control software,
Intende	ed leari	ning outcomes			
The stu essenti	dents ı al sens	master the fundamentals sors and actuators as wel	of dynamic aspects of as their areas of use	of the design of space in spaceflight.	cecraft and are familiar with the
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2) + I Module	Ü (2) taugh	t in: English			
Method ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written If annou examin prox. 15 Langua credital	examin unced ation o ; minut ge of a ble for	nation (approx. 90 to 120 by the lecturer at the beg of one candidate each (ap res per candidate). ssessment: English bonus	minutes) inning of the course, pprox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master'	s degr	ee (1 major) Aerospace Co	omputer Science (202	20)	
Master'	s degr	ee (1 major) Aerospace Co	omputer Science (202	21)	
Master'	Master's degree (1 major) Aerospace Computer Science (2023)				

Module title				Abbreviation		
Seminar 1 - Current Topics in Aerospace Computer Science					10-LuRI=SEM1-202-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Indepe softwar from di	ndent r re with fferent	review of a current topic i written and oral presenta areas (this usually mean	n aerospace enginee ition. The topics in m s that they are assigr	ring on the basis of l odules 10-LURI-SEM ned by different lectu	iterature and, where applicable, 1 and 10-LURI-SEM2 must come urers).	
Intende	ed lear	ning outcomes				
The stu aspects	dents a s in wri	are able to independently tten form and to orally pr	v review a current top esent these in an app	ic in aerospace engi propriate way.	neering, to summarise the main	
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)	
S (2)						
Methoo ster, in	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
term pa semina	aper (10 Ir	o to 15 pages) and presen	tation (30 to 45 minu	ites) with subsequer	nt discussion on the topic of the	
Langua	ge of a	ssessment: German and,	or English			
Allocat	ion of p	Diaces				
 Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master	's degr	ee (1 major) Aerospace Co	omputer Science (20:	20)		
Master	's degr	ee (1 major) Aerospace Co	omputer Science (20:	21)		

Module title				Abbreviation	
Seminar 2 - Current Topics in Aerospace Computer Science					10-LuRI=SEM2-202-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
Indepe softwaı from di	ndent r re with fferent	eview of a current topic i written and oral presenta areas (this usually mean	n aerospace enginee ition. The topics in m s that they are assigr	ring on the basis of l odules 10-LURI-SEM ned by different lectu	iterature and, where applicable, 1 and 10-LURI-SEM2 must come urers).
Intende	ed lear	ning outcomes			
The stu aspects	idents a s in wri	are able to independently tten form and to orally pr	v review a current top esent these in an app	ic in aerospace engi propriate way.	neering, to summarise the main
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)
S (2)					
Methoo ster, in	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
term pa semina	aper (10 ar	o to 15 pages) and presen	tation (30 to 45 minu	ites) with subsequer	nt discussion on the topic of the
Langua	ige of a	ssessment: German and	orEnglish		
Allocat		Diaces			
 Additio	nal inf	ormation			
Auditio					
Worklo	ad				
150 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master	's degr	ee (1 major) Aerospace Co	omputer Science (20:	20)	
Master	's degr	ee (1 major) Aerospace Co	omputer Science (20:	21)	

Module title				Abbreviation		
Selected Topics in Aerospace Computing					10-LURI=SLR-202-m01	
Module	coord	inator		Module offered by		
Dean o	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	numei	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Selecte	d topic	s in aerospace engineeri	ng.			
Intende	ed learr	ning outcomes				
The stu ons of o	dents ι comple	understand the basic app x problems in this area a	proach of aerospace e nd apply them to sim	engineering. They are ilar questions.	e able to understand the soluti-	
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) +	Ü (2)					
Method ster, inf a) writte b) proje the top c) oral e d) oral e Langua credital	l of ass formati en exar ect worl ic) or examin examin ge of a ble for	essment (type, scope, la on on whether module ca nination (approx. 60 to 9 k (report (approx. 20 pag ation of one candidate ea ation in groups of up to 3 ssessment: German and/ bonus	nguage — if other tha an be chosen to earn to minutes) or es) with presentation ach (approx. 20 minu 3 candidates (approx. /or English	an German, examina a bonus) (30 to 45 minutes) a tes) or 15 minutes per cano	tion offered — if not every seme- and subsequent discussion on didate)	
Allocat	ion or p	Diaces				
		4 9				
Additio	nat info	ormation				
Worklo	ad					
150 h						
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
Master	s degre	ee (1 major) Aerospace Co	omputer Science (202	20)		
Master	Master's degree (1 major) Aerospace Computer Science (2021)					

Module title					Abbreviation		
Spacecraft Propulsion					10-LURI=SP-202-m01		
Module	e coord	inator		Module offered by			
holder	of the C	Chair of Computer Scienc	e VII	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	<u>ts</u>						
Basic fi	unction	alities and basic elemen	ts of the operation of ds and systems tran	air and space vehic	les, ground station, structure of the transmission and operating		
standa	rds, pla	inning systems, operating	g procedures, flight n	nanuals, telemetry a	nd telecommando systems.		
Intende	ed learn	ning outcomes					
The stu system new sys space v	dents p s in air stems a vehicles	possess the theoretical a and space vehicles, ider and develop the complete s in the ground segment.	nd practical knowled htify the most importa e system as well as ir	ge necessary to corr int system relationsh ndividual system ele	ectly classify systems to operate nips, formulate requirements for ments for the operation of air and		
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)		
V (2) +	Ü (2)						
Method ster, in	d of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-		
written If anno examin prox. 19 Langua credita	examin unced l ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	minutes) inning of the course, prox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-		
Allocat	ion of p	olaces					
Additio	nal info	ormation					
Worklo	ad						
150 h							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Master	's degre	ee (1 major) Aerospace Co	omputer Science (202	20)			
Master	Master's degree (1 major) Aerospace Computer Science (2021)						

Module title				Abbreviation		
Selecte	d Topi	cs in Robotics and Telem	atics		10-LURI=SRT-202-m01	
Module	coord	inator		Module offered by		
holder	of the C	Chair of Computer Science	e XVII	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Selecte	d topic	s in robotics and telemat	tics			
Intende	ed learr	ning outcomes				
The stu ons of o	dents ı comple	understand the basic app x problems in this area a	proach of robotics and nd apply them to sim	d telematics. They ar ilar questions.	re able to understand the soluti-	
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) +	Ü (2)					
Methoc ster, inf a) writte b) proje the top c) oral e d) oral o Langua credita	formati formati en exar ect work ic) or examin ge of a ble for	essment (type, scope, la on on whether module ca nination (approx. 60 to 9 k (report (approx. 20 pag ation of one candidate ea ation in groups of up to 3 ssessment: German and/ bonus	nguage — if other tha an be chosen to earn o minutes) or es) with presentation ach (approx. 20 minu 3 candidates (approx. for English	an German, examina a bonus) (30 to 45 minutes) a tes) or 15 minutes per can	tion offered — if not every seme- and subsequent discussion on didate)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master	s degre	ee (1 major) Aerospace Co	omputer Science (202	20)		
Master	s degre	ee (1 major) Aerospace Co	omputer Science (202	21)		

Module title					Abbreviation	
Spacecraft System Analysis					10-LURI=SSA-202-m01	
Module coordinator				Module offered by		
holder of the Chair of Computer Scienc			e VIII Institute of Computer Science			
ECTS Method of grading		Only after succ. compl. of module(s)				
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	-			
Conten	ts					
Introdu orbits, angle o on of th lemetry generat of spac	Introduction: history of space flight, system design of spacecraft. Space dynamics: two-body dynamics, Kepler orbits, disturbance forces, transfer orbits. Mission analysis: earth and sun-synchronous orbits, shadows, solar angle of incidence. Thermal control of satellites: thermal analysis, thermal design and technologies, verificati- on of thermal designs. Telecommunication: ground contact analysis, data transmission, satellite monitoring (te- lemetry, telecommando). Structure and mechanisms. Energy systems: primary, secondary, management, power generation: solar cells. On-board data processing. Propulsion systems. Tests (mechanical, electrical). Operation of spacecraft. Ground segment.					
Intende	ed lear	ning outcomes				
The stu jor sub:	dents ı system	master system aspects of s and their integration in	the layouting of tech to a working whole a	nical systems. Using re being analysed.	g the example of spacecraft, ma-	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (4) + Module	Ü (2) e taugh	t in: English				
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)						
written examination (approx. 60 to 120 minutes) If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: English creditable for bonus						
Allocation of places						
Additional information						
Workload						
300 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master	Master's degree (1 major) Aerospace Computer Science (2020)					
Master'	Master's degree (1 major) Aerospace Computer Science (2021)					

Module title				Abbreviation		
Team Design Project					10-LURI=TDP-202-m01	
Module coordinator				Module offered by		
holder of the Chair of Computer Science VIII			e VIII	Institute of Comput	er Science	
ECTS	CTS Method of grading Only after succ. compl. of module(s)					
10	nume	rical grade				
Duration Module level Other prerequisi			Other prerequisites	S		
1 seme	ster	graduate				
Conten	ts					
Multi-d and sof	isciplir Tware.	hary project in the area of In this context, current a	aerospace that cove nd relevant topics fro	rs areas such as mee m research are revie	chanical components, electronics wed.	
Intende	ed learı	ning outcomes				
Studen and che	ts will eck the	practise reviewing compleir ir work. At the end of the	ex topics in interdisc course, they will hav	plinary teams. They e created a complete	will be required to plan, execute ely functional system.	
Course	s (type	, number of weekly conta	ct hours, language –	if other than Germa	n)	
R (8) Module taught in: English						
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)						
project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic)						
Language of assessment: English						
Allocation of places						
Additional information						
Workload						
300 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Aerospace Computer Science (2020)						
Master's degree (1 major) Aerospace Computer Science (2021)						

Module title					Abbreviation	
Telecommunication System Design					10-LURI=TSD-202-m01	
Module coordinator				Module offered by		
holder of the Chair of Computer Scienc		e VII	Institute of Comput	er Science		
ECTS Method of grading		Only after succ. compl. of module(s)				
10	numerio	cal grade				
Duration Module level		Other prerequisites				
1 seme	ester g	graduate				
Conten	nts					
The guidance and control of spacecraft depend on reliable communication. Scientific data returned to earth are irreplaceable, or replaceable only at the cost of another mission. In deep space, communications propagation is good, relative to terrestrial communications, and there is an opportunity to press toward the mathematical limit of microwave communication with reliability as well as channel capacity in mind. Further, the effects of small changes in the earth's atmosphere and the interplanetary plasma have small but important effects on propagation time and hence on the measurement of distance. This course presents a top-down approach to communications system design. The course will cover communication theory, algorithms and implementation architectures for essential blocks in modern physical-layer communication systems (antenna, coders and decoders, filters,						
Intend	ed learni	ng outcomes				
At the end of the course, students will have gone through the complete process of designing a telecommunicati- ons system for a spacecraft including the subsystems described in the table of contents. All systems involved in end-to-end telecommunication chain including principal components for implementation will be discussed du- ring the course.						
Courses (type, number of weekly contact hours, language — if other than German)						
V (4) + U (2) Module taught in: English						
Metho ster, in	d of asse formatio	ssment (type, scope, la n on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
written examination (approx. 90 to 120 minutes) If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: English creditable for bonus						
Allocation of places						
Additional information						
Workload						
300 h						
Peferred to in LDO L (evamination regulations for teaching degree programmed)						
Referred to m LFOT (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Aerospace Computer Science (2020)						

Module title				Abbreviation	
Master's Thesis Aerospace Computer Science					10-LURI-MA-202-m01
Module coordinator				Module offered by	
Dean of Studies Informatik (Computer			Science)	Institute of Comput	er Science
ECTS	ECTS Method of grading Only after succ. o			pl. of module(s)	
25	nume	rical grade	-		
Duratio	on	Module level	Other prerequisites		
1 semester graduate					
Conten	Its				
Resear to the p	ching a principl	nd writing on a complex es of good scientific prac	problem in aerospace tice.	e informatics within	a given time frame and adhering
Intend	ed lear	ning outcomes			
The stu les of g	idents a good sc	are able to research and v ientific practice.	write on a complex to	pic in aerospace info	ormatics, adhering to the princip-
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)
No cou	rses as	signed to module			
Metho ster, in	d of ass formati	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
Master's thesis (50 to 100 pages) Language of assessment: German and/or English					
Allocation of places					
Additional information					
Time to complete: 6 months					
Workload					
750 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master's degree (1 major) Aerospace Computer Science (2020)					
Master	Master's degree (1 major) Aerospace Computer Science (2021)				
Master's degree (1 major) Aerospace Computer Science (2023)					

Module title				Abbreviation		
Concluding Colloquium Aerospace Computer Science			nputer Science		10-LURI-MA-MK-202-m01	
Module coordinator				Module offered by		
Dean of Studies Informatik (Computer S		Science)	Institute of Computer Science			
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	(not) successfully completed					
Duration Module level		Other prerequisites				
1 semester graduate						
Conten	ts					
Present	tation a	and defence of the result	s of the Master's thes	is in an open discus	sion.	
Intende	ed learr	ning outcomes				
The stu	dents a	are able to present the re	sults of their Master's	s theses and defend	them in a discussion.	
Course	s (type,	, number of weekly conta	ct hours, language —	· if other than Germa	n)	
К (о)	К (о)					
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)						
final colloquium (approx. 60 minutes) Language of assessment: German and/or English						
Allocation of places						
Additional information						
Workload						
150 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Aerospace Computer Science (2020)						