

Module Catalogue

for the Subject

Computational Mathematics

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

> Examination regulations version: 2012 Responsible: Institute of Mathematics

JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record 88|f24|-|-|H|2012



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	(2012)	cord Master (120 ECTS) Computational Mathematics - 2012	

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The subject is divided into

section / sub-section	ECTS credits	starting page
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Applied Mathematics		10
Mathematics		27
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Application-oriented Subject		69
Application-oriented Subject Biology		70
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Content and Objectives of the Programme

The Master programme Computational Mathematics is offered by the Department of Mathematics, with a total of currently (as of March 2014) 11 chairs.

The Master study programme in Computational Mathematics is intended to provide the students with the following qualifications:

• capacity of abstraction,

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WÜRZBURG

- rigour in analytic reasoning,
- excellent capacity to realize the structure of complex interrelations,
- sound qualification in applying mathematical methods to specific problems,
- insight into the intrinsic mathematical interdependence of different mathematical fields, in particular in Applied Mathematics, as well as into interdisciplinary relations in computer science, medicine, natural and engineering sciences,
- high capacity in problem solving,
- ability to carry out scientific work independently and on a high level,
- ability to cooperate responsibly within an interdisciplinary team of mathematicians, computer scientists, medical and natural scientists and engineers,
- ability to apply mathematical methods and algorithms, in particular from modelling, optimisation, simulation and scientific computing, in the context of life science, natural science or engineering,
- insight into and overview over current research in at least one field of contemporary mathematics,
- qualification for meeting the standards of a Ph.D. programme in mathematics (if applicable).

For the Master thesis the student works independently on a topic in Applied Mathematics and solves a problem within a limited time frame, following scientific criteria and applying established methods or modifying them if necessary.

The Master exam ascertains that the candidate has a good overview in the field of Computational Mathematics and possesses the ability to use the corresponding scientific methods independently. The degree Master of Science in Computational Mathematics constitutes a further professional and scientific qualification.

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:

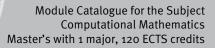
ASP02009

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

12-Jul-2012 (2012-106)

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.





Compulsory Electives

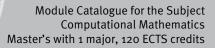
(90 ECTS credits)



Compulsory Electives Mathematics

(ECTS credits)





Applied Mathematics

(ECTS credits)

Module	title				Abbreviation	
Mather	natical	Continuum Mechanics			 10-M=VKOM-122-m01	
Module		inctor.		Madula offered by		
			atics)	Module offered by		
-		es Mathematik (Mathem	F	Institute of Mathem	Idlics	_
ECTS		od of grading	Only after succ. com	ipl. of module(s)		
5	1	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	sessment. The lectu at the beginning of t sidered a declaratio dents have obtained the course of the set sessment into effect ted to assessment in	rer will inform stude he course. Registrat n of will to seek adm I the qualification fo mester, the lecturer Students who mee n the current or in th date, students will h	alify for admission to as- nts about the respective detail ion for the course will be con- nission to assessment. If stu- or admission to assessment ove will put their registration for as et all prerequisites will be admi e subsequent semester. For as ave to obtain the qualification	er 5- it- 5-
Conten	ts					
		ntial equations and/or va	ariational methods in	the context of contin	nuum mechanics	
Equation Intended The sturmain file Courses V + Ü (n Methoor Methoor At the b examin nation in Assess semest Langua	ed learn dent m elds of s (type, n no infor l of ass creditab beginni ation (i in grou ment o er, cou ge of a	recommended, as well a ning outcomes asters the mathematica application. umber of weekly contact hours, mation on SWS (weekly ressment (type, scope, langua le for bonus) ng of the course, the lec 60 to 90 minutes), b) ora ps (groups of 2, approx. ffered: Assessment offer rse offered on demand of ssessment: German, Eng	s basic knowledge of methods in mathema language — if other than Ger contact hours) and co age — if other than German, of turer will choose one al examination of one 20 minutes) red in the semester in or every four semester	functional analysis. atical continuum me man) ourse language avail examination offered — if no of the following met candidate each (app which the course is	chanics and knows about thei	er 1 i-
Allocati	ion of p	olaces				
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Teachir	ng cycl	9				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module	appea	in and a second s				
Master's wi (2012)	th 1 major	Computational Mathematics		nerated 26-Aug-2024 • exan ECTS) Computational Mather) 9

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Module	title				Abbreviation
Applied	I Analy	sis			10-M=AAAN-102-m01
Module	coord	inator		Module offered by	
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate	ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by the ration deadlines. Cer sion to assessment (of exercises). The lect ls at the beginning of sidered a declaration ts have obtained the e course of the seme sment into effect. Stu assessment in the cu	de via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites urrent or in the subsequent seme- dents will have to obtain the qua- new.
Conten In-dept		<i>r</i> of functional analysis a	nd operator theory, S	obolev spaces and p	partial differential equations,
particul theory of Recomm	lar FEM of ellip [.] mende	methods), principles of	functional analysis, f oolic partial differenti	unction spaces, emb al equations with me	hanics, numerical methods (in bedding theorems, compactness, ethods from functional analysis.
		ning outcomes		lysis is strongly rect	Jiiiiieiided.
The stu to estal	dent is olish a	acquainted with the fun	/her acquired skills a		f higher analysis. He/She is able f mathematics and questions in
Course	S (type, n	umber of weekly contact hours, I	language — if other than Gei	rman)	
V + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
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Allocat	ion of p	olaces	-		
Additio	nal inf	ormation			
 Worklo	ad				
WUIKIU	au				

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Nanostructure Technology (2011)

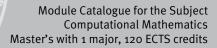
Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) Economathematics (2011)

Master's degree (1 major) Mathematical Physics (2012)

Master's degree (1 major) Computational Mathematics (2012)

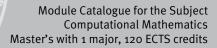
	e title				Abbreviation
Numer	ic of laı	ge Systems of Equations	5		10-M=ANGG-102-m01
Modul	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio		Module level	Other prerequisites	i	
1 seme	ster	graduate	ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over th gistration for assess will be admitted to a ster. For assessment	r as announced by t ration deadlines. Ce sion to assessment of exercises). The lea ils at the beginning of sidered a declaratio ts have obtained the e course of the seme sment into effect. St assessment in the co t at a later date, stu	ade via SB@home at the begin- he lecturer in accordance with rtain prerequisites must be met (e. g. successful completion of a cturer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re udents who meet all prerequisite urrent or in the subsequent seme dents will have to obtain the qua
			lification for admiss	ion to assessment a	anew.
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Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Module	e title				Abbreviation	
Basics	of Opti	mization			10-M=AOPT-102-m	01
Module	e coord	inator		Module offered by		
Dean o	of Studio	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by t ation deadlines. Cen sion to assessment of of exercises). The lead ls at the beginning of sidered a declaratio ts have obtained the e course of the seme sment into effect. Stra assessment in the cu t at a later date, stra	ade via SB@home at the lecturer in accord tain prerequisites m (e. g. successful com turer will inform stud of the course. Registr n of will to seek adm e qualification for ad ester, the lecturer wil udents who meet all urrent or in the subse dents will have to ob	ance with ust be met pletion of a dents about ation for the ission to as- mission to l put their re prerequisite equent seme
Conten Fundar		methods and techniques		ion to assessment a		tions for opt
		ted optimization, examp				
Intend	ed lear	ning outcomes				
		nows the fundamental m ecide which method is th			dge their strengths a	nd weaknes
Course	S (type, r	number of weekly contact hours,	language — if other than Gei	rman)		
V + Ü (ı	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
examir nation Assess semest	nation (in grou sment o ter, cou	ng of the course, the lect 90 to 120 minutes), b) or ps (groups of 2, approx. ffered: Assessment offer rse offered on demand o ssessment: German, Eng	al examination of one 30 minutes) red in the semester in or every four semester	e candidate each (ap which the course is	oprox. 20 minutes), c	:) oral exami
-	ion of p					
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	A				
	ing cycl	•				
Referre	d to in	LPO I (examination regulation	s for teaching dogree progre	mmes)		
			is for leaching-degree progra			
Aaster's w	ith 1 majo	r Computational Mathematics	JMU Würzburg • ge	enerated 26-Aug-2024 • exar	n. reg. data re-	page 17 / 199
2012)			cord Master (120	ECTS) Computational Mathe	matics - 2012	



Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Nume	le title				Abbreviation
numer	ric of Pa	artial Differential Equ	lations		10-M=VNPE-102-m01
Modu	le coord	linator		Module offered by	1
Dean (of Studi	ies Mathematik (Mat	hematics)	Institute of Mathen	natics
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	erical grade			
Durati	ion	Module level	Other prerequisites	5	
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			lification for admiss	sion to assessment a	inew.
Racom	mondo	ad previous knowledge	70 .		ume methods).
We reo red in	commei the mo	dules "Introduction t		-	equations, such as can be acqui
We red red in Intend	commen the mo led lear	nd basic knowledge dules "Introduction t ning outcomes	of functional analysis and o Functional Analysis" an	d "Applied Analysis"	equations, such as can be acqui
We red red in Intend The st	comment the mo led lear udent is	nd basic knowledge dules "Introduction t ning outcomes s acquainted with ad	of functional analysis and o Functional Analysis" an vanced methods for discr	d "Applied Analysis" retising partial differ	equations, such as can be acqui
We red red in Intend The st Course	commen the mo led lear udent is es (type,	nd basic knowledge dules "Introduction t ning outcomes s acquainted with ad number of weekly contact h	of functional analysis and o Functional Analysis" an vanced methods for discu ours, language — if other than Ge	d "Applied Analysis" retising partial differ	equations, such as can be acqui ential equations.
We red red in Intend The str Course V + Ü (Metho	comment the mo led lear udent is es (type, (no info od of as	nd basic knowledge dules "Introduction t ning outcomes s acquainted with ad number of weekly contact h rmation on SWS (we	of functional analysis and o Functional Analysis" an vanced methods for discr ours, language — if other than Ge ekly contact hours) and co	d "Applied Analysis" retising partial differ rman) ourse language avail	equations, such as can be acqui ential equations.
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Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Module	e title				Abbreviation
Selecte	ed Topi	cs in Optimization			10-M=VOPT-102-m01
Module	e coord	inator		Module offered by	<u>.</u>
Dean o	fStudi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10		rical grade		• • • •	
Duratio	·	Module level	Other prerequisites		
1 seme	ster	graduate	ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be cons sessment. If studen assessment over the gistration for assess will be admitted to a	r as announced by th ation deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning o sidered a declaration ts have obtained the e course of the seme sment into effect. Stu assessment in the cu t at a later date, stud	de via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met (e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites urrent or in the subsequent seme- dents will have to obtain the qua- new.
Conton					new.
	ed topic	s in optimization, e.g. ir timization with differenti		emidefinite program	ns, non-smooth optimization, ga-
Intend	ed learı	ning outcomes			
		acquainted with advanc research questions in co			He gains the ability to work on
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		e ssment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
examin nation	nation (in grou	-	al examination of one 30 minutes)	-	hods of assessment: a) written pprox. 20 minutes), c) oral exami-
Allocat	ion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	9			
 Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	mmes)	
		vo in			
	's degr	i rs in ee (1 major) Mathematics ee (1 major) Mathematics			
Master's w (2012)	ith 1 majoı	Computational Mathematics		nerated 26-Aug-2024 • exan ECTS) Computational Mather	



Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Computational Mathematics (2012)

- ·	e title				Abbreviation
Select	ed Topi	ics in Mathematical Phy	sics		10-M=VMPH-102-m01
Modul	e coord	linator		Module offered by	
Dean o	of Studi	es Mathematik (Mathen	natics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade		-	
Durati		Module level	Other prerequisites	j	
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Conte			lification for admiss	sion to assessment a	new.
Recorr	nmende	d previous knowledge:			
Depen doubt, Intend	iding or , it is re l ed lear udent is	commended to consult t ning outcomes 5 acquainted with advar	the lecturer.	n mathematical phys	of analysis is required. In case of sics. He/She knows mathematica
Depen doubt, Intend The str metho	iding or , it is re l ed lear udent is ids in m	n the content, basic and commended to consult t ning outcomes	the lecturer. Inced results in a field i d can apply them to so	n mathematical physolve problems in phy	sics. He/She knows mathematica
Depen doubt, Intend The str metho Course	iding or , it is re l ed lear udent is ods in m es (type,	n the content, basic and commended to consult ning outcomes s acquainted with advar athematical physics an number of weekly contact hours	the lecturer. Iced results in a field i d can apply them to so , language — if other than Ge	n mathematical phys olve problems in phy rman)	sics. He/She knows mathematica sics.
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Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Mathematical Physics (2012)

Master's degree (1 major) Computational Mathematics (2012)

ECTSMe5nurDuration1 semester1 semesterBasics in of optimality,RecommenWe recommenuired in the the content	ordinator udies Mathematik (Mathema ethod of grading merical grade Module level graduate ptimal control of ordinary an methods for numerical solut nded previous knowledge: nend basic knowledge of fun he modules "Introduction to	Only after succ. com Other prerequisites Registration for the ning of the course o the specified registr to qualify for admiss certain percentage of the respective detai exercise will be cons sessment. If student assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss ad partial differential tion.	exercise must be ma r as announced by th ration deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning o sidered a declaratior ts have obtained the e course of the seme sment into effect. Stu assessment in the cu t at a later date, stuc ion to assessment a equations, theory of	de via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites urrent or in the subsequent seme- dents will have to obtain the qua-			
Dean of Stu ECTS Me 5 nur Duration 1 semester 1 semester Basics in o optimality, Recommen We recommen We recommen the content	And a second sec	Only after succ. com Other prerequisites Registration for the ning of the course o the specified registr to qualify for admiss certain percentage of the respective detai exercise will be cons sessment. If student assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss ad partial differential tion.	Institute of Mathem npl. of module(s) exercise must be ma r as announced by the ration deadlines. Cer- sion to assessment (of exercises). The lecond ls at the beginning on sidered a declaration ts have obtained the e course of the seme sment into effect. Stuck assessment in the cur- t at a later date, stuck ion to assessment a equations, theory of	de via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites irrent or in the subsequent seme- dents will have to obtain the qua- new.			
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5 nur Duration 1 semester 1 semester Sasics in o optimality, Recommen We recomm quired in th the content	merical grade Module level graduate graduate ptimal control of ordinary an methods for numerical solution inded previous knowledge: nend basic knowledge of fun he modules "Introduction to	 Other prerequisites Registration for the ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be cons sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss	exercise must be ma r as announced by th ration deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning o sidered a declaratior ts have obtained the e course of the seme sment into effect. Stu assessment in the cu t at a later date, stuc ion to assessment a equations, theory of	ne lecturer in accordance with tain prerequisites must be met e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites irrent or in the subsequent seme- dents will have to obtain the qua- new.			
Duration 1 semester 1 semester 2 semester 2 semester 3 semester 3 semester 3 semester 4 semester 3 semester 4 semester 4 semester 5 sementer 5 sement	Module level graduate graduate ptimal control of ordinary an methods for numerical solution ded previous knowledge: nend basic knowledge of fun he modules "Introduction to	Registration for the ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con- sessment. If student assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss	exercise must be ma r as announced by the ration deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning of sidered a declaration ts have obtained the e course of the seme sment into effect. Stu assessment in the cu t at a later date, stuct ion to assessment a equations, theory of	ne lecturer in accordance with tain prerequisites must be met e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites irrent or in the subsequent seme- dents will have to obtain the qua- new.			
1 semester Contents Basics in o optimality, Recommen We recomm quired in th the content	ptimal control of ordinary an methods for numerical solut nded previous knowledge: nend basic knowledge of fun he modules "Introduction to	Registration for the ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con- sessment. If student assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss	exercise must be ma r as announced by the ration deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning of sidered a declaration ts have obtained the e course of the seme sment into effect. Stu assessment in the cu t at a later date, stuct ion to assessment a equations, theory of	ne lecturer in accordance with tain prerequisites must be met e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites irrent or in the subsequent seme- dents will have to obtain the qua- new.			
Contents Basics in o optimality, Recommen We recomm quired in th the content	ptimal control of ordinary an methods for numerical solut nded previous knowledge: nend basic knowledge of fun he modules "Introduction to	ning of the course o the specified registr to qualify for admiss certain percentage of the respective detai exercise will be con- sessment. If student assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss ad partial differential tion.	r as announced by the ration deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning o sidered a declaration ts have obtained the e course of the seme sment into effect. Stu assessment in the cu t at a later date, stuc- ion to assessment a equations, theory of	ne lecturer in accordance with tain prerequisites must be met e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites irrent or in the subsequent seme- dents will have to obtain the qua- new.			
Basics in o optimality, Recommen We recomm quired in th the content	methods for numerical solution ided previous knowledge: nend basic knowledge of fun ne modules "Introduction to	tion. nctional analysis and		^f optimal control, conditions for			
We recomm quired in th the content	nend basic knowledge of fun he modules "Introduction to						
	ts of the module "Basics in C	Functional Analysis" Optimization" may als	and "Ordinary Differ	equations, such as can be ac- rential Equations". Knowledge of			
	earning outcomes						
The studen			al control. He gains t	the ability to work on contempo-			
Courses (typ	pe, number of weekly contact hours, la	anguage — if other than Ger	rman)				
V + Ü (no ir	nformation on SWS (weekly c	contact hours) and co	ourse language avail	able)			
	assessment (type, scope, languaş litable for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
examinatio nation in gr		l examination of one 20 minutes)		hods of assessment: a) written prox. 15 minutes), c) oral exami-			
Allocation	of places						
Additional	information						
Workload							
Teaching cy	ycle						

Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)





Mathematics

(ECTS credits)

Module	e title		Abbreviation					
Selecte	ed Topi	cs in Analysis			10-M=VANA-122-m	01		
Module	e coord	inator		Module offered by				
Dean of Studies Mathematik (Mathema			natics)					
ECTS	Metho	od of grading	Only after succ. com	Only after succ. compl. of module(s)				
10		rical grade						
Duration Module level			Other prerequisites	Other prerequisites				
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification fo admission to assessment anew.			tive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-			
Conten	Its		·					
with ot Recom	In-depth discussion of a specialised topic in analysis taking into account recent developments and interrelation with other mathematical concepts. Recommended previous knowledge: Depending on the content, basic and advanced knowledge from different areas of analysis is required. In case o doubt, it is recommended to consult the lecturer.							
		ning outcomes						
	ıdent is	acquainted with advar	nced results in a select	ed topic in analysis,	and is able to apply	these to		
Course	S (type, n	umber of weekly contact hours	, language — if other than Ger	man)				
V + Ü (r	no infor	mation on SWS (weekly	/ contact hours) and cc	ourse language avail	able)			
		essment (type, scope, lang le for bonus)	uage — if other than German, e	examination offered — if no	t every semester, informati	ion on whether		
examin minute Assess semest	nation (s), c) of ment o ter, cou	ng of the course, the le approx. 90 to 120 minu ral examination in grou ffered: Assessment offe rse offered on demand ssessment: German, Er	tes; usually chosen), b ps of 2 candidates (app ered in the semester in or every four semester) oral examination o prox. 30 minutes tota which the course is	f one candidate eacl al)	h (approx. 20		
Allocat	ion of p	olaces						
Additio	onal inf	ormation						
Worklo	ad							
Teachi	ng cycl	e						
Referre	ed to in	LPOI (examination regulation	ons for teaching-degree progra	mmes)				
Master's w (2012)	ith 1 majoı	Computational Mathematics		nerated 26-Aug-2024 • exam ECTS) Computational Mather	-	page 28 / 199		

Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Module	e title				Abbreviation			
Giovan	ni-Proc	li Lecture Selected Topic	s (Master)		10-M=VGPC-122-m	01		
Module	e coord	inator		Module offered by				
Dean of Studies Mathematik (Mathemat			atics)					
ECTS	Metho	od of grading	Only after succ. compl. of module(s)					
10	nume	rical grade						
Duratio	Duration Module level C		Other prerequisites)ther prerequisites				
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification fo admission to assessment anew.			tive details Il be con- nt. If stu- ssment over ition for as- ill be admit- ster. For as-			
Conten	ts		•					
Introdu	ction to	o a specialised topic in n	nathematics by an int	ernational expert.				
Intende	ed learı	ning outcomes						
themat Course V + Ü (r Method module is At the k examin minute Assess semest Langua	ics and s (type, r no infor d of ass s creditab peginni ation (a s), c) o ment o cer, cou gge of a	/She is able to establish applications in other su number of weekly contact hours, mation on SWS (weekly cessment (type, scope, langua le for bonus) ng of the course, the lect approx. 90 to 120 minute ral examination in group ffered: Assessment offer rse offered on demand of ssessment: English, Ger	bjects. language — if other than Ger contact hours) and co age — if other than German, e turer will choose one es; usually chosen), b s of 2 candidates (app red in the semester in or every four semester	man) ourse language avail examination offered — if no of the following met) oral examination o prox. 30 minutes tot which the course is s.	able) ^{It every semester, informati hods of assessment: f one candidate eacl al)}	on on whether : a) written h (approx. 20		
Allocat	ion of p	olaces						
 ۱۰:۱۰ م		ormation						
Adultio								
Worklo								
Teachi	ng cycl	e	-					
		•						
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)				
Module	e appea	irs in						
Master	's degr	ee (1 major) Mathematics ee (1 major) Mathematics						
Master	's degr	ee (1 major) Computatior	nal Mathematics (2012	2)				
Master's wi (2012)	ith 1 majoı	Computational Mathematics		nerated 26-Aug-2024 • exan ECTS) Computational Mather	-	page 30 / 199		

Module	e title				Abbreviation	
Learnir	ig by T	eaching Computational I	Mathematics		10-M=ELTCM-122-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Mathematik (Mathem	atics)	Institute of Mathematics		
ECTS	Method of grading Only after succ.		Only after succ. con	. compl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Superv respect	-	,	n applied mathematic	s in the Bachelor's p	programme under guidance of the	
Intende	ed lear	ning outcomes				
		ains his/her first experie can apply them in praction		rsity mathematics. I	le/She knows basic didactical	
Course	S (type, r	number of weekly contact hours,	language — if other than Gei	man)		
Ü (no ir	nforma	tion on SWS (weekly con	tact hours) and cours	e language availabl	e)	
		s essment (type, scope, langua ole for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
•		nination (approx. 90 min Issessment: German, Eng				
Allocat	ion of	places	-			
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)		
Module	appea	ars in				
Master	's degr	ee (1 major) Computatior	nal Mathematics (201	2)		

Module	title				Abbreviation	
		o Control Theory			10-M=ARTH-102-m	01
				Madula offered by	[
	Module coordinator Dean of Studies Mathematik (Mathematics)			Module offered by		
ECTS		F				
				fter succ. compl. of module(s)		
10 Duratio		rical grade	 Other prorequisites			
bility, b Recomi Basic k Intende	ts ts action to basics i mende nowled ed learn ident is	Module level graduate praduate o mathematical systems n optimal control. d previous knowledge: lge of the contents of the hing outcomes acquainted with the function between these resu	ning of the course o the specified registr to qualify for admiss certain percentage of the respective detai exercise will be con- sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss theory: stability, cont e module "Ordinary D	exercise must be ma r as announced by t ration deadlines. Cen- sion to assessment to of exercises). The lead is at the beginning of sidered a declaration ts have obtained the e course of the seme sment into effect. Str assessment in the cu- t at a later date, stru- ion to assessment a trollability and obser	rvability, state feedb " is useful. I theory. He/She is a	ance with pust be met ppletion of a dents about ration for the ission to as- mission to all put their re prerequisite equent seme otain the qua back and sta-
_		ls of mathematics. umber of weekly contact hours,	if other than Co	rman)		
	-	mation on SWS (weekly			ahle)	
Method	d of ass	essment (type, scope, langua le for bonus)	· · · · · · · · · · · · · · · · · · ·			ion on whether
replace (groups Assess semest Langua	ed by an s of 2, a ment o cer, cou ge of a	nation (approx. 90 to 120 n oral examination of on opprox. 30 minutes) ffered: Assessment offer rse offered on demand o ssessment: German or E	e candidate each (app red in the semester in or every four semester	orox. 20 minutes) or which the course is	an oral examination	in groups
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	9				
Master's wi (2012)	ith 1 majo	Computational Mathematics		enerated 26-Aug-2024 • exar ECTS) Computational Mathe	-	page 32 / 199

Module appears in

Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

	e title				Abbreviation	
Topics	in Alge	ebra			10-M=AALG-102-m01	
Modul	e coord	inator		Module offered by		
Dean of Studies Mathematik (Mathematics)			natics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	c. compl. of module(s)		
10	nume	rical grade				
Durati	uration Module level Other prerequisites					
1 semester graduate		Registration for the exercise must be made via SB@home at the begin- ning of the course or as announced by the lecturer in accordance with the specified registration deadlines. Certain prerequisites must be met to qualify for admission to assessment (e.g. successful completion of a certain percentage of exercises). The lecturer will inform students about the respective details at the beginning of the course. Registration for the exercise will be considered a declaration of will to seek admission to as- sessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their re gistration for assessment into effect. Students who meet all prerequisite will be admitted to assessment in the current or in the subsequent seme ster. For assessment at a later date, students will have to obtain the qua				
			lification for admiss	sion to assessment a	new.	
Poco~						
Basic I "Applic Intend The stu	knowleo ed Alge ed lear udent is	bra". ning outcomes acquainted with funda	mental concepts and I		s "Introduction to Algebra" and porary field of algebra, and is al	
Basic "Appli Intend The stu le to a	knowled ed Alge I ed lear udent is pply the	dge of algebra is assume bra". ning outcomes s acquainted with funda ese skills to complex qu	mental concepts and i estions.	methods in a conter		
Basic I "Applie Intend The stu le to a Course	knowled ed Alge ed lear udent is pply the es (type, r	dge of algebra is assume bra". ning outcomes s acquainted with funda	mental concepts and i estions. , language — if other than Ge	methods in a conter	porary field of algebra, and is al	
Basic I "Applie Intend The stu le to a Course V + Ü (Metho	knowled ed Alge udent is pply the es (type, r (no info od of ass	dge of algebra is assume bra". ning outcomes acquainted with funda ese skills to complex qu number of weekly contact hours rmation on SWS (weekly	mental concepts and i estions. , language — if other than Ge r contact hours) and co	methods in a conterr rman) ourse language avail	porary field of algebra, and is al	
Basic I "Applight Intend The stu- le to a Course V + Ü (Metho module i At the examin nation Assess semes	knowled ed Alge led lear udent is pply the es (type, r no info is creditat beginn nation (in grou sment o ter, cou	dge of algebra is assume bra". ning outcomes a acquainted with funda ese skills to complex que number of weekly contact hours rmation on SWS (weekly sessment (type, scope, langu- ble for bonus) ing of the course, the leave go to 120 minutes), b) course (groups of 2, approx	mental concepts and i estions. , language — if other than Ge r contact hours) and co lage — if other than German, cturer will choose one ral examination of on- . 30 minutes) red in the semester in or every four semester	methods in a contem ^{rman)} ourse language avail examination offered — if no of the following met e candidate each (ap	porary field of algebra, and is al able)	
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Basic I "Applid Intend The stu le to a Course V + Ü (Metho module i At the examin nation Assess semes Langua	knowled ed Alge ed lear udent is pply the es (type, i fno info d of ass is creditab beginni nation (in grou sment o ter, cou age of a	dge of algebra is assume bra". ning outcomes acquainted with funda ese skills to complex que number of weekly contact hours rmation on SWS (weekly sessment (type, scope, langu- ble for bonus) ing of the course, the leave go to 120 minutes), b) of the sessment offered on demand assessment: German, En	mental concepts and i estions. , language — if other than Ge r contact hours) and co lage — if other than German, cturer will choose one ral examination of on- . 30 minutes) red in the semester in or every four semester	methods in a contem ^{rman)} ourse language avail examination offered — if no of the following met e candidate each (ap	aporary field of algebra, and is al able) at every semester, information on whether hods of assessment: a) written oprox. 20 minutes), c) oral exami	
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Basic I "Applie Intend The stu- le to a Course V + Ü (Metho module i At the examin nation Assess semes Langua Alloca Additie	knowled ed Alge ed lear udent is pply the es (type, r no info id of ass is creditat beginni nation (in grou sment o ter, cou age of a tion of onal inf	dge of algebra is assume bra". ning outcomes a acquainted with funda ese skills to complex que number of weekly contact hours rmation on SWS (weekly sessment (type, scope, langu- ble for bonus) ing of the course, the lea 90 to 120 minutes), b) of ps (groups of 2, approx offered: Assessment offer urse offered on demand ussessment: German, En places	mental concepts and i estions. , language — if other than Ge r contact hours) and co lage — if other than German, cturer will choose one ral examination of on- . 30 minutes) red in the semester in or every four semester	methods in a contem ^{rman)} ourse language avail examination offered — if no of the following met e candidate each (ap	aporary field of algebra, and is al able) at every semester, information on whether hods of assessment: a) written oprox. 20 minutes), c) oral exami	
Basic I "Applight Intend The stu- le to a Course V + Ü (Metho module i At the examin nation Assess semes Langua Alloca Workle	knowled ed Alge ed lear udent is pply the es (type, r no info is creditat beginni nation (in grou sment o ter, cou age of a tion of p	dge of algebra is assume bra". ning outcomes a acquainted with funda ese skills to complex que number of weekly contact hours rmation on SWS (weekly sessment (type, scope, langu- ble for bonus) ing of the course, the lee go to 120 minutes), b) of ups (groups of 2, approx. offered: Assessment offer urse offered on demand assessment: German, En places formation	mental concepts and i estions. , language — if other than Ge r contact hours) and co lage — if other than German, cturer will choose one rral examination of on- . 30 minutes) rred in the semester in or every four semester	methods in a contem ^{rman)} ourse language avail examination offered — if no of the following met e candidate each (ap	aporary field of algebra, and is al able) at every semester, information on whether hods of assessment: a) written oprox. 20 minutes), c) oral exami	
Basic I "Applight Intend The stu- le to a Course V + Ü (Metho module i At the examin nation Assess semes Langua Alloca Workle	knowled ed Alge ed lear udent is pply the es (type, r no info id of ass is creditat beginni nation (in grou sment o ter, cou age of a tion of onal inf	dge of algebra is assume bra". ning outcomes a acquainted with funda ese skills to complex que number of weekly contact hours rmation on SWS (weekly sessment (type, scope, langu- ble for bonus) ing of the course, the lee go to 120 minutes), b) of ups (groups of 2, approx. offered: Assessment offer urse offered on demand assessment: German, En places formation	mental concepts and i estions. , language — if other than Ge r contact hours) and co lage — if other than German, cturer will choose one rral examination of on- . 30 minutes) rred in the semester in or every four semester	methods in a contem ^{rman)} ourse language avail examination offered — if no of the following met e candidate each (ap	aporary field of algebra, and is al able) at every semester, information on whether hods of assessment: a) written oprox. 20 minutes), c) oral exami	
Basic I "Applid Intend The stu- le to a Course V + Ü (Metho module i At the examin nation Assess semes Langua Alloca Morkle Teachi	knowled ed Alge ed Alge ed lear udent is pply the es (type, i fno info d of ass is creditab beginni nation (in grou sment o ter, cou age of a tion of p onal inf oad	dge of algebra is assume bra". ning outcomes a acquainted with funda ese skills to complex que number of weekly contact hours rmation on SWS (weekly sessment (type, scope, langu- ble for bonus) ing of the course, the lee go to 120 minutes), b) of ups (groups of 2, approx. offered: Assessment offer urse offered on demand assessment: German, En places formation	mental concepts and i estions. , language — if other than Ge r contact hours) and co uage — if other than German, cturer will choose one oral examination of one . 30 minutes) rred in the semester in or every four semester glish	methods in a contem ^{rman)} ourse language avail examination offered — if no of the following met e candidate each (ap	able) able) of every semester, information on whether hods of assessment: a) written oprox. 20 minutes), c) oral exami offered and in the subsequent	

Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Modul	e title				Abbreviation		
Differe	ential G	eometry			10-M=ADGM-102-n	101	
Module coordinator				Module offered by			
Dean of Studies Mathematik (Mathematics)			natics)	Institute of Mathematics			
ECTS	Meth	od of grading	Only after succ. con	cc. compl. of module(s)			
10		rical grade					
Duratio		Module level	Other prerequisites	isites			
1 semester graduate		Registration for the exercise must be made via SB@home at the begin- ning of the course or as announced by the lecturer in accordance with the specified registration deadlines. Certain prerequisites must be met to qualify for admission to assessment (e.g. successful completion of a certain percentage of exercises). The lecturer will inform students about the respective details at the beginning of the course. Registration for the exercise will be considered a declaration of will to seek admission to as sessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their re gistration for assessment into effect. Students who meet all prerequisite will be admitted to assessment in the current or in the subsequent seme ster. For assessment at a later date, students will have to obtain the qua- lification for admission to assessment anew.					
Conter	nts	1	incation for dumos				
metric Intend The stu able to	Analys ed lear udent is	dge from the modules "I is" is recommended. ning outcomes acquainted with conce these methods and kno	pts and methods for d	ifferentiable manifo	lds or Riemannian m	nanifolds, is	
try.	S (typo)	number of weekly contact hours.	if other than Go	rman)			
		rmation on SWS (weekly			ahle)		
Metho	d of as	sessment (type, scope, langu				ion on whether	
At the l examir nation Assess semes Langua	beginn nation (in grou sment c ter, cou age of a	ing of the course, the lea go to 120 minutes), b) o ups (groups of 2, approx offered: Assessment offe urse offered on demand assessment: German, En	ral examination of one 30 minutes) red in the semester in or every four semester	e candidate each (ap which the course is	oprox. 20 minutes), (c) oral exami	
Allocat	tion of	places					
Additio	onal inf	ormation					
Worklo	bad						
Aaster's w	/ith 1 majo	r Computational Mathematics	JMU Würzburg ● ge	enerated 26-Aug-2024 • exar	n. reg. data re-	page 36 / 199	
2012)			cord Master (120	ECTS) Computational Mathe	matics - 2012		

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Mathematical Physics (2012)

Modul	le title			Abbreviation			
Compl	lex Ana	lysis			10-M=AFTH-102-m01		
Module coordinator			Module offered by		<u> </u>		
Dean of Studies Mathematik (Mathema		atics) Institute of Mathematics		natics			
ECTS			Only after succ. cor	Only after succ. compl. of module(s)			
10	nume	erical grade		-			
Duratio	on	Module level	Other prerequisites	5			
1 seme	1 semester graduate		ning of the course of the specified regist to qualify for admis certain percentage the respective deta exercise will be con sessment. If studer assessment over th gistration for asses will be admitted to ster. For assessment	or as announced by the ration deadlines. Cer sion to assessment (of exercises). The lect ils at the beginning of sidered a declaration the have obtained the se course of the seme sment into effect. Stu assessment in the cu that a later date, stud	de via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met (e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites urrent or in the subsequent seme dents will have to obtain the qua-		
			lification for admiss	sion to assessment a	new.		
Basic I Intend The stu ticular betwee	knowle led lear udent is the (ge en his/	eometric) mapping prop her acquired skills and	indamental notions, m erties of holomorphic other branches of mat	nethods and results of functions. He/She is hematics and applica	is" is recommended. If higher complex analysis, in par able to establish a connection ations in other subjects.		
		number of weekly contact hour					
		rmation on SWS (weekl					
		sessment (type, scope, lang ole for bonus)	uage — if other than German,	examination offered — if no	ot every semester, information on whether		
At the examir	beginn nation i in grou	ing of the course, the le (90 to 120 minutes), b) (ps (groups of 2, appro)	oral examination of on x. 30 minutes)	e candidate each (ap	hods of assessment: a) written oprox. 20 minutes), c) oral exami-		
Assess semes	ster, cou	urse offered on demand assessment: German, El			offered and in the subsequent		
Assess semes Langua	ster, cou	urse offered on demand assessment: German, Ei			offered and in the subsequent		
Assess semes Langua	ster, cou age of a	urse offered on demand assessment: German, Ei			offered and in the subsequent		
Assess semes Langua Allocat	ster, cou age of a tion of	urse offered on demand assessment: German, Ei			offered and in the subsequent		
Assess semes Langua Allocat	ster, cou age of a tion of	urse offered on demand assessment: German, Er places			offered and in the subsequent		
Assess semes Langua Allocat	age of a tion of onal inf	urse offered on demand assessment: German, Er places			offered and in the subsequent		
Assess semes Langua Allocat Additic	age of a tion of onal inf	urse offered on demand assessment: German, Er places			offered and in the subsequent		
Assess semes Langua Allocat Additio	age of a tion of onal inf	urse offered on demand assessment: German, Er places			offered and in the subsequent		
Assess semes Langua Allocat Additio Worklo	ster, cou age of a tion of onal inf oad	urse offered on demand assessment: German, Er places	nglish				

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) Mathematical Physics (2012)

Modul	e title				Abbreviation
Geome	etric Str	uctures			10-M=AGMS-102-m01
Module coordinator				Module offered by	
Dean o	of Studi	es Mathematik (Mathe	matics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 semester graduate		ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by the ration deadlines. Cer sion to assessment (of exercises). The lect ls at the beginning of sidered a declaration ts have obtained the e course of the seme sment into effect. Stu assessment in the cu	Ide via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met (e.g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re udents who meet all prerequisite urrent or in the subsequent seme dents will have to obtain the qua	
ang co Recom Basic k	ndition mende	s, classification results d previous knowledge:	5.		isms, BN pairs in groups, Mouf- "Introduction to Topology" is re-
comme Intend		ning outcomes			
The stu structu	udent is Ire. He/	acquainted with the fu She is able to establis		n these results and b	oncerning a type of geometric roader theories, and learns
			rs, language — if other than Ger		
			ly contact hours) and co		able)
Metho	d of ass	· · · · · · · · · · · · · · · · · · ·			t every semester, information on whether
examir nation	nation (in grou		oral examination of one x. 30 minutes)		hods of assessment: a) written pprox. 20 minutes), c) oral exami-
Allocat	tion of p	olaces			
Additic	onal inf	ormation			
			5 		
Worklo	ad				
Teachi	ng cvcl	e			
Teachi	ng cycl	e			

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Module title				Abbreviation	
Lie Theory				10-M=ALTH-102-r	n01
Module coordinator			Module offered by		
Dean of Stud	lies Mathematik (Mathem	natics)	Institute of Mathem	natics	
ECTS Meth	nod of grading	Only after succ. con	npl. of module(s)		
	erical grade		•		
Duration	Module level	Other prerequisites			
1 semester	graduate	Registration for the ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by the ation deadlines. Cension to assessment (of exercises). The leads at the beginning of sidered a declaration to have obtained the sement into effect. Strassessment in the constant of the sement in the sement of	he lecturer in acco tain prerequisites (e.g. successful co turer will inform st of the course. Regis n of will to seek ad e qualification for a ester, the lecturer w udents who meet a urrent or in the sub	rdance with must be met ompletion of a tudents about stration for the lmission to as- admission to will put their re all prerequisite osequent seme
		lification for admiss	ion to assessment a	new.	
Contents					
The student i	rning outcomes is acquainted with the fu to common problems, an				
_	number of weekly contact hours	language — if other than Ger	rman)		
	ormation on SWS (weekly			ahle)	
	ssessment (type, scope, langu				ation on whathar
module is credita				semester, mom	lation on whether
examination nation in gro Assessment semester, co	ning of the course, the lea (90 to 120 minutes), b) o ups (groups of 2, approx offered: Assessment offe urse offered on demand assessment: German, En	oral examination of one . 30 minutes) ered in the semester in or every four semester	e candidate each (ap which the course is	oprox. 20 minutes)	, c) oral exami
Allocation of	places				
Additional in	formation				
Workload					
Naster's with 1 mai	or Computational Mathematics	JMU Würzburg ● ge	enerated 26-Aug-2024 • exan	n. reg. data re-	page 42 / 199

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Master's degree (1 major) Mathematics (2012)

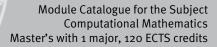
Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Mathematical Physics (2012)

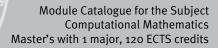
Module title					Abbreviation
Stocha	stical F	Processes			10-M=ASTP-102-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathem	atics)	Institute of Mathematics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 semester graduate		ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con- sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by the ation deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning of sidered a declaration ts have obtained the e course of the seme sment into effect. Stru- assessment in the cu t at a later date, strue	de via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met (e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re udents who meet all prerequisite urrent or in the subsequent seme dents will have to obtain the qua	
			lification for admiss	ion to assessment a	new.
Conten	Its				
Intende The stu them to Course V + Ü (r Methoo module is At the l	ed learn ident is o practi is (type, r no infor d of ass s creditab beginni nation (cal problems. number of weekly contact hours, rmation on SWS (weekly sessment (type, scope, langua le for bonus) ng of the course, the lect 90 to 120 minutes), b) or	damental notions and language — if other than Ger contact hours) and co age — if other than German, o turer will choose one ral examination of one	d methods of stocha man) ourse language avail examination offered — if no of the following met	astical processes and can apply able) at every semester, information on whether hods of assessment: a) written oprox. 20 minutes), c) oral exami-
		ps (groups of 2, approx. ssessment: German, Eng			
nation Langua					
nation	ion of _l	olaces			
nation Langua	ion of _l	olaces			
nation Langua Allocat		olaces ormation			
nation Langua Allocat					
nation Langua Allocat	onal inf				
nation Langua Allocat Additio	onal inf				
nation Langua Allocat Additio	onal inf oad	ormation			
nation Langua Allocat Additio Worklo 	onal inf oad	ormation			
nation Langua Allocat Additio Worklo Teachin 	onal inf oad ng cycl	ormation	s for teaching-degree progra	mmes)	
nation Langua Allocat Additio Worklo Teachin 	onal inf oad ng cycl	ormation e	s for teaching-degree progra	mmes)	
nation Langua Allocat Additio Worklo Teachin 	onal inf oad ng cycl	ormation e	s for teaching-degree progra	mmes)	



Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Module title					Abbreviation
Topolo	gy				10-M=ATOP-102-m01
Module coordinator				Module offered by	
	an of Studies Mathematik (Mathematics)			Institute of Mathematics	
ECTS	1	od of grading	Only after succ. com	pl. of module(s)	
10		rical grade			
Duratio		Module level	Other prerequisites		
1 semester graduate		ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be cons sessment. If student assessment over the gistration for assess will be admitted to a ster. For assessment	r as announced by th ation deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning of sidered a declaration ts have obtained the e course of the seme sment into effect. Stu assessment in the cu t at a later date, stud	ade via SB@home at the begin- he lecturer in accordance with tain prerequisites must be met (e. g. successful completion of a sturer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re- udents who meet all prerequisites urrent or in the subsequent seme dents will have to obtain the qua-	
			lification for admiss	ion to assessment a	new.
Conten					
		opology, topological inv ing spaces.	variants (e. g. fundame	ental group, connect	ion), construction of topological
•		ning outcomes	_		
	-			orems and methods	in topology and is able to apply
		non problems.		orems and methods	s in topology and is able to apply
Course	S (type, n	umber of weekly contact hours,	, language — if other than Ger	man)	
V + Ü (I	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		s essment (type, scope, langu le for bonus)	age — if other than German, e	examination offered — if no	ot every semester, information on whether
examir nation Assess semest Langua	nation (in grou ment o ter, cou	90 to 120 minutes), b) o ps (groups of 2, approx. ffered: Assessment offe rse offered on demand ssessment: German, En	ral examination of one 30 minutes) red in the semester in or every four semester	e candidate each (ap which the course is	hods of assessment: a) written oprox. 20 minutes), c) oral exami- offered and in the subsequent
Additic	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulatio	ns for teaching-degree progra	mmes)	
	o 20002	rc in			
Module appears in Master's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- page 46 / 195					



Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

Modul	e title				Abbreviation
Numbe	er Theo	У			10-M=AZTH-102-m01
Module coordinator				Module offered by	
Dean c	of Studi	es Mathematik (Mather	natics)	Institute of Mathematics	
ECTS	Metho	od of grading	Only after succ. com	Only after succ. compl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	1 semester graduate		ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be cons sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by th ation deadlines. Cer sion to assessment (of exercises). The lec ls at the beginning o sidered a declaration ts have obtained the e course of the seme ment into effect. Stu assessment in the cu t at a later date, stud	Inde via SB@home at the begin- ne lecturer in accordance with tain prerequisites must be met (e. g. successful completion of a turer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re udents who meet all prerequisite urrent or in the subsequent seme dents will have to obtain the qua
	_		lification for admiss	ion to assessment a	new.
Basic k on to A Intend	knowled Algebra' ed lear udent is	, "Introduction to Num ning outcomes acquainted with the fu	ber Theory" and "Appli ndamental methods of	ed Algebra". f analytics number th	uired in the modules "Introducti- neory, can deal with algebraic equations. He/She has insight
		evelopments in numbe			
		umber of weekly contact hours			
		mation on SWS (weekly			
		Sessment (type, scope, lang le for bonus)	uage — if other than German, e	examination offered — if no	ot every semester, information on whether
examir nation Assess semes	nation (in grou sment o ter, cou	90 to 120 minutes), b) o ps (groups of 2, approx ffered: Assessment offor rse offered on demand	oral examination of one . 30 minutes) ered in the semester in or every four semester	e candidate each (ap which the course is	hods of assessment: a) written oprox. 20 minutes), c) oral exami- offered and in the subsequent
Language of assessment: German, English Allocation of places					
Allocat		olaces			
Allocat		blaces			
	tion of _l	ormation			
	tion of _l				
	tion of _l onal inf				
 Additic	tion of _l onal inf				
 Additic	tion of _l onal inf				

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Mathematics (2010)

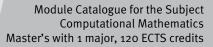
Master's degree (1 major) Physics (2010)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Mathematical Physics (2012)

Module	e title				Abbreviation	
Giovan	ni-Proc	li Lecture (Master)			10-M=AGPC-102-m	01
Module	e coord	inator		Module offered by	<u>I</u>	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathematics		
ECTS	Meth	od of grading	Only after succ. com	pl. of module(s)		
5		rical grade		•		
Duratio		Module level	Other prerequisites			
1 seme	1 semester graduate Registra ning of the spe to qual certain the res exercis sessme assess gistrati will be		ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be cons sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by t ation deadlines. Cen sion to assessment of exercises). The lead is at the beginning of sidered a declaratio is have obtained the e course of the seme ment into effect. Stru- assessment in the co t at a later date, stru-	ade via SB@home at he lecturer in accord rtain prerequisites m (e. g. successful com cturer will inform stu- of the course. Registr n of will to seek adm e qualification for ad ester, the lecturer will udents who meet all urrent or in the subse dents will have to ob	ance with oust be met opletion of a dents about ration for the ission to as- mission to all put their re- prerequisites equent seme-
C			lification for admiss	ion to assessment a	inew.	
Conten		a a chasialized tonic in r	- mathematics by an int	ornational ovnart		
		o a specialised topic in r ning outcomes		emational expert.		
themat Course V + Ü (r Method module is At the b examin nation	tics and s (type, r no infor d of ass s creditab beginni nation (in grou	/She is able to establish applications in other sumber of weekly contact hours, rmation on SWS (weekly cessment (type, scope, langu- ble for bonus) ing of the course, the lec 60 to 90 minutes), b) or ps (groups of 2, approx. ssessment: English, Ger	ubjects. language — if other than Ger contact hours) and co age — if other than German, o turer will choose one al examination of one 20 minutes)	man) ourse language avail examination offered — if no of the following met candidate each (ap	able) ot every semester, informat hods of assessment	ion on whether : a) written
Allocat	<u> </u>					
Additio	onal inf	ormation				
Worklo	ad					
 Teachi	ng cycl	e				
 Module	e appea			mmes)		
	-	ee (1 major) Mathematic ee (1 major) Mathematic				
		r Computational Mathematics		nerated 26-Aug-2024 • exar		page 50 / 199





Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012) exchange program Mathematics (2023)

Module	e title				Abbreviation
Groups	s and tl	neir Representations			10-M=VGDS-102-m01
Module	e coord	linator		Module offered by	
Dean o	of Studi	es Mathematik (Math	nematics)	Institute of Mathe	ematics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites	i	
1 semester graduate Registration for ning of the couther specified respective of qualify for a certain percenter the respective exercise will be sessment. If sets assessment or gistration for a will be admitter ster. For assess lification for a set of the se			the specified registre to qualify for admission certain percentage the respective detail exercise will be con sessment. If studen assessment over th gistration for assess will be admitted to a ster. For assessment	ration deadlines. Ć sion to assessmen of exercises). The la ls at the beginning sidered a declarati ts have obtained t e course of the sen sment into effect. S assessment in the t at a later date, st	the lecturer in accordance with ertain prerequisites must be met t (e. g. successful completion of a ecturer will inform students about of the course. Registration for the on of will to seek admission to as- ne qualification for admission to nester, the lecturer will put their re students who meet all prerequisite current or in the subsequent seme udents will have to obtain the qua anew.
Finite p the S-ri Recom	permutatings of	Schur. d previous knowledg	racter theory of finite gro	ups, interrelations	and special techniques such as
Finite p the S-ri Recom Basic k "Applie	oermuta ings of mende knowlee ed Alge	Schur. d previous knowledg dge of algebra is assu bra".	racter theory of finite gro	ups, interrelations	
Finite p the S-ri Recom Basic k "Applie Intende The stu	oermuta ings of mende knowlee ed Alge ed lear udent n search	Schur. d previous knowledg dge of algebra is assu bra". ning outcomes nasters advanced alg	racter theory of finite gro ge: umed, such as can be acc ebraic concepts and met	ups, interrelations quired in the modu hods. He/She gain	and special techniques such as
Finite p the S-ri Recom Basic k "Applie Intendo The stu rary res blems.	oermuta ings of mende knowled ed Alge ed lear udent n search	Schur. d previous knowledg dge of algebra is assu bra". ning outcomes nasters advanced alg questions in group th	racter theory of finite gro ge: umed, such as can be acc ebraic concepts and met	ups, interrelations quired in the modu hods. He/She gain theory and can ap	and special techniques such as les "Introduction to Algebra" and s the ability to work on contempo-
Finite p the S-ri Basic k "Applie Intendo The stu rary res blems. Course	oermuta ings of mende (nowled ed Alge ed lear udent n search	Schur. d previous knowledg dge of algebra is assu bra". ning outcomes nasters advanced alg questions in group th	racter theory of finite gro ge: umed, such as can be acc ebraic concepts and met neory and representation	ups, interrelations quired in the modu hods. He/She gain theory and can ap	and special techniques such as les "Introduction to Algebra" and s the ability to work on contempo- ply his/her skills to complex pro-
Finite p the S-ri Recom Basic k "Applie Intendo The stu rary res blems. Course V + Ü (1 Methoo	ed Alge ed Alge ed Alge ed search udent n search es (type, 1 no info	Schur. d previous knowledg dge of algebra is assu bra". ning outcomes nasters advanced alg questions in group th number of weekly contact ho rmation on SWS (wee	racter theory of finite gro re: umed, such as can be acc ebraic concepts and met neory and representation purs, language — if other than Ge	ups, interrelations quired in the modu hods. He/She gain theory and can ap rman) purse language ava	and special techniques such as les "Introduction to Algebra" and s the ability to work on contempo- ply his/her skills to complex pro-
Finite p the S-ri Recom Basic k "Applie Intendo The stu rary res blems. Course V + Ü (1 Methoo module is At the I examir minute Assess semest	permuta ings of mende (nowled ed Alge ed lear udent n search es (type, n no info d of as s creditat beginn nation (es), c) o sment c ter, cou	Schur. d previous knowledg dge of algebra is assu- bra". ning outcomes nasters advanced alg questions in group th number of weekly contact ho rmation on SWS (wee sessment (type, scope, la ble for bonus) ing of the course, the (approx. 90 to 120 mi rral examination in group for the course, the	racter theory of finite gro re: umed, such as can be acc ebraic concepts and met neory and representation purs, language — if other than Ge ekly contact hours) and co anguage — if other than German, e lecturer will choose one nutes; usually chosen), b oups of 2 candidates (ap offered in the semester in nd or every four semester	ups, interrelations quired in the modu hods. He/She gain theory and can ap man) ourse language ava examination offered — if of the following ma o) oral examination prox. 30 minutes to which the course	and special techniques such as les "Introduction to Algebra" and s the ability to work on contempo- oly his/her skills to complex pro- lilable) not every semester, information on whether ethods of assessment: a) written of one candidate each (approx. 20
Finite p the S-ri Recom Basic k "Applie Intende The stu rary res blems. Course V + Ü (I Method module is At the I examir minute Assess semest Langua	permuta ings of mende (nowled ed Alge ed lear udent n search es (type, n no info d of as s creditat beginn nation (es), c) o sment c ter, cou	Schur. d previous knowledg dge of algebra is assu- bra". ning outcomes nasters advanced alg questions in group the number of weekly contact he rmation on SWS (week sessment (type, scope, la ble for bonus) ing of the course, the (approx. 90 to 120 mi oral examination in group offered: Assessment of assessment: German,	racter theory of finite gro re: umed, such as can be acc ebraic concepts and met neory and representation purs, language — if other than Ge ekly contact hours) and co anguage — if other than German, e lecturer will choose one nutes; usually chosen), b oups of 2 candidates (ap offered in the semester in nd or every four semester	ups, interrelations quired in the modu hods. He/She gain theory and can ap man) ourse language ava examination offered — if of the following ma o) oral examination prox. 30 minutes to which the course	and special techniques such as les "Introduction to Algebra" and s the ability to work on contempo- oly his/her skills to complex pro- aliable) not every semester, information on whether ethods of assessment: a) written of one candidate each (approx. 20 otal)
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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Nanostructure Technology (2011)

Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) Mathematical Physics (2012)

D	e title				Abbreviation
Jynam	ical Sy	stems and Control			10-M=VDSR-102-m01
Module coordinator				Module offered by	
Dean c	of Studi	es Mathematik (Mathem	atics)	Institute of Mathematics	
ECTS	Methe	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Durati	on	Module level	Other prerequisites	i	
1 semester graduate		graduate	ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over th gistration for assess will be admitted to a ster. For assessment	r as announced by t ration deadlines. Cer sion to assessment of exercises). The lea ls at the beginning of sidered a declaratio ts have obtained the e course of the seme sment into effect. St assessment in the co t at a later date, stu	ade via SB@home at the begin- he lecturer in accordance with rtain prerequisites must be met (e. g. successful completion of a cturer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re udents who meet all prerequisite urrent or in the subsequent seme dents will have to obtain the qua
Conter			lification for admiss	ion to assessment a	anew.
		amical systems and cont	rol· non-linear dynam	ics stability theory	ergodic theory, Hamiltonian sy-
			ical systems.		
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Basic Intend The stu analys	ed lear udent m e their	dge of the contents of the ning outcomes nasters the mathematical quality.	e module "Ordinary D I methods in the theo	ry of dynamic syster	
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Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

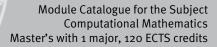
Module	e title				Abbreviation	
Mather	matical	Imaging			10-M=VMBV-102-r	n01
Module coordinator			Module offered by			
Dean o	ean of Studies Mathematik (Mathematics)			Institute of Mathematics		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
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	ident m	asters the mathematica	al methods in the theo	ry of image processi	ng and knows abou	ıt their main
Course	S (type, r	number of weekly contact hours	, language — if other than Ge	rman)		
V + Ü (r	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
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examin nation	ation (in grou	ng of the course, the led 60 to 90 minutes), b) or ps (groups of 2, approx ssessment: German, En	al examination of one . 20 minutes)			
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Worklo	ad					
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Teachi	ng cycl	e	_			
Master's wi 2012)	ith 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mather		page 56 / 199

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)

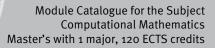
	e title				Abbreviation	
Non-Li	near Ar	alysis			10-M=VNAN-102-m01	
Module coordinator				Module offered by	odule offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathematics		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio		Module level	Other prerequisites			
1 semester graduate		graduate	ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen	r as announced by t ration deadlines. Cer sion to assessment of exercises). The lea ls at the beginning of sidered a declaratio ts have obtained the e course of the seme sment into effect. St assessment in the co t at a later date, stu	ade via SB@home at the begin- he lecturer in accordance with rtain prerequisites must be met (e. g. successful completion of a cturer will inform students about of the course. Registration for the n of will to seek admission to as- e qualification for admission to ester, the lecturer will put their re udents who meet all prerequisite urrent or in the subsequent seme dents will have to obtain the qua	
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Intende The stu bility o Course V + Ü (1 Method module is At the I examir nation Langua Allocat Additic	ed learn ident is n pract s (type, r no infor d of ass s creditab beginni hation (in grou age of a tion of p	ning outcomes acquainted with the cor ical problems. number of weekly contact hours, rmation on SWS (weekly sessment (type, scope, langua le for bonus) ng of the course, the lect 60 to 90 minutes), b) ora ps (groups of 2, approx. ssessment: German, Eng blaces	acepts of non-linear a language — if other than Gen contact hours) and co age — if other than German, curer will choose one al examination of one 20 minutes)	d "Applied Analysis" nalysis, can compar man) Durse language avai examination offered — if n of the following met	re them and assess their applica- lable) ot every semester, information on whether chods of assessment: a) written	
Intende The stu bility o Course V + Ü (1 Methoo module is At the I examir nation Langua Allocat	ed learn ident is n pract s (type, r no infor d of ass s creditab beginni hation (in grou age of a tion of p onal inf	ning outcomes acquainted with the cor ical problems. number of weekly contact hours, rmation on SWS (weekly sessment (type, scope, langua- le for bonus) ng of the course, the lect 60 to 90 minutes), b) ora ps (groups of 2, approx. ssessment: German, Eng olaces	acepts of non-linear a language — if other than Gen contact hours) and co age — if other than German, curer will choose one al examination of one 20 minutes)	d "Applied Analysis" nalysis, can compar man) Durse language avai examination offered — if n of the following met	re them and assess their applica- lable) ot every semester, information on whether chods of assessment: a) written	
Intende The stu bility o Course V + Ü (I Method module is At the I examir nation Langua Allocat Additic Worklo	ed learn ident is n pract s (type, r no infor d of ass s creditab beginni hation (in grou age of a tion of p onal inf	ning outcomes acquainted with the cor ical problems. number of weekly contact hours, rmation on SWS (weekly sessment (type, scope, langua- le for bonus) ng of the course, the lect 60 to 90 minutes), b) ora ps (groups of 2, approx. ssessment: German, Eng olaces	acepts of non-linear a language — if other than Gen contact hours) and co age — if other than German, curer will choose one al examination of one 20 minutes)	d "Applied Analysis" nalysis, can compar man) Durse language avai examination offered — if n of the following met	re them and assess their applica- lable) ot every semester, information on whether chods of assessment: a) written	
Intende The stu bility o Course V + Ü (I Method module is At the I examir nation Langua Allocat Additio Worklo	ed learn ident is n pract s (type, r no infor d of ass s creditab beginni hation (in grou age of a tion of p onal inf	ning outcomes acquainted with the cor ical problems. number of weekly contact hours, rmation on SWS (weekly sessment (type, scope, langua le for bonus) ng of the course, the lect 60 to 90 minutes), b) ora ps (groups of 2, approx. ssessment: German, Eng places ormation	acepts of non-linear a language — if other than Gen contact hours) and co age — if other than German, curer will choose one il examination of one 20 minutes) glish	d "Applied Analysis" nalysis, can compar man) purse language avai examination offered — if no of the following met candidate each (ap	re them and assess their applica- lable) ot every semester, information on whether chods of assessment: a) written	
Intende The stu bility o Course V + Ü (I Method module is At the I examir nation Langua Allocat Additio Worklo	ed learn ident is n pract s (type, r no infor d of ass s creditab beginni hation (in grou age of a tion of p onal inf	ning outcomes acquainted with the cor ical problems. number of weekly contact hours, rmation on SWS (weekly sessment (type, scope, langua- le for bonus) ng of the course, the lect 60 to 90 minutes), b) ora ps (groups of 2, approx. ssessment: German, Eng olaces	acepts of non-linear a language — if other than Gen contact hours) and co age — if other than German, curer will choose one il examination of one 20 minutes) glish	d "Applied Analysis" nalysis, can compar man) purse language avai examination offered — if no of the following met candidate each (ap	re them and assess their applica- lable) ot every semester, information on whether chods of assessment: a) written	
Intende The stu bility o Course V + Ü (I Method module is At the I examir nation Langua Allocat Additio Worklo	ed learn ident is n pract s (type, r no infor d of ass s creditab beginni hation (in grou age of a tion of p onal inf	ning outcomes acquainted with the cor ical problems. number of weekly contact hours, rmation on SWS (weekly sessment (type, scope, langua le for bonus) ng of the course, the lect 60 to 90 minutes), b) ora ps (groups of 2, approx. ssessment: German, Eng places ormation	acepts of non-linear a language — if other than Gen contact hours) and co age — if other than German, curer will choose one il examination of one 20 minutes) glish	d "Applied Analysis" nalysis, can compar man) purse language avai examination offered — if no of the following met candidate each (ap	re them and assess their applica- lable) ot every semester, information on whether chods of assessment: a) written	



Module appears in

Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Economathematics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)





Workshops and Seminars

Master's with 1 major Computational Mathematics

(2012)

Module title					Abbreviation	
Study (Group N	Mathematics in the Scien	ces		10-M=GMNW-122-m01	
Module	e coord	inator		Module offered by	offered by	
Dean o	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
10	nume	rical grade				
Duratio	·	Module level	Other prerequisites			
Duration Module level Other prerequisites 1 semester graduate Registration for the seminar must be made via SB@home at the ning of the course or as announced by the lecturer in accordate specified registration deadlines. Some seminars or workshop ly be open for students with previous knowledge and/or skills areas. Where applicable, details will be specified in the class		he lecturer in accordance with the seminars or workshops might on- owledge and/or skills in certain				
Conten	ts					
A mode	ern topi	c in mathematics in the s	sciences.			
Basic k	nowled	d previous knowledge: lge from the modules "Or recommended, as well as			duction to Partial Differential	
Intend	ed learı	ning outcomes				
	-	ains insight into contemp nniques in this field and o			in the sciences. He/She masters	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)		
V + S (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		s essment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
minar p sentati of one Assess semest	oresent on of a candida ment o ter, cou	ation (approx. 60 to 120 pprox. 60 to 120 minutes ate each (approx. 20 min	minutes), b) written e , c) written examinat utes), e) oral examin ed in the semester in r every four semester	elaboration of conter ion (approx. 90 to 12 ation in groups of 2 which the course is	ng methods of assessment: a) sents equivalent to a seminar pre- to minutes), d) oral examination candidates (approx. 30 minutes) offered and in the subsequent	
Allocat	ion of p	olaces				
Additio	onal info	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module	e appea	in				
Master	's degr	ee (1 major) Mathematics	5 (2012)			
	-	ee (1 major) Mathematica	•			
Master	's degr	ee (1 major) Computation	al Mathematics (201	2)		

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Module	Abbreviation						
Seminar in Mathematics in the Sciences					10-M=SMNW-122-m01		
Module coordinator				Module offered by			
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semester graduate		ning of the course o specified registratio ly be open for stude	r as announced by th n deadlines. Some s nts with previous kn	de via SB@home at the begin- he lecturer in accordance with the seminars or workshops might on- owledge and/or skills in certain specified in the class schedule.			
Conten	ts						
A mode	ern topi	c in mathematics in the s	sciences.				
Basic k	nowled	d previous knowledge: lge from the modules "Or recommended, as well as		•	duction to Partial Differential		
Intende	ed leari	ning outcomes					
					omprehending and structuring of ate in a scientific discussion.		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
S (no ir	format	ion on SWS (weekly cont	act hours) and cours	e language available	e)		
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether		
minar p sentatio Assess semest	oresent on of a ment o er, cou	ation (approx. 60 to 120 pprox. 60 to 90 minutes	minutes), b) written e ed in the semester in r every four semester	elaboration of conter which the course is	ng methods of assessment: a) se- nts equivalent to a seminar pre- offered and in the subsequent		
Allocat	<u> </u>						
Additio	nal inf	ormation					
Worklo	ad						
Teachir	ng cycl	e					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module							
		ee (1 major) Mathematics					
	Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Computational Mathematics (2012)						
master	s uegr		iai mainematics (201)	<u> </u>			

Modul	e title			Abbreviation		
Study	Group I	lumerical Mathematic	s and Applied Analysis		10-M=GNMA-102-m	101
Module coordinator				Module offered by		
Dean of Studies Mathematik (Mathematics)				Institute of Mathen	natics	
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)		
10	nume	rical grade				
Durati	on	Module level	Other prerequisites	5		
1 semester graduate		ning of the course of specified registration ly be open for stude	seminar must be ma or as announced by t on deadlines. Some s ents with previous kr cable, details will be	he lecturer in accord seminars or worksho oowledge and/or skil	ance with the ps might on- lls in certain	
Conter	nts					
Select	ed topic	s in numerical mathen	natics, applied analysis	s or scientific compu	ting.	
thema Intend	tics is re ed lear	equired. In case of dou ning outcomes	l advanced knowledge bt, it is recommended emporary research pro	to consult the lectur	er.	
			es in this field and can			
Course	es (type, r	umber of weekly contact hour	s, language — if other than Ge	rman)		
V + S (no infor	mation on SWS (weekl	y contact hours) and co	ourse language avail	able)	
		e ssment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
minar sentat of one	present ion of a candid	ation (approx. 60 to 12 pprox. 60 to 120 minut	ecturer will choose one o minutes), b) written es, c) written examinat ninutes), e) oral examin nglish	elaboration of conte ion (approx. 90 to 12	nts equivalent to a second to minutes), d) oral e	eminar pre- examination
Alloca	tion of _l	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulati	ons for teaching-degree progra	ammes)		
	e appea					
Master Master Master	r's degr r's degr r's degr	ee (1 major) Mathemat ee (1 major) Mathemat ee (1 major) Economatl ee (1 major) Mathemat ee (1 major) Computati	ics (2010) nematics (2011)	2)		
master	s uegr	ee (1 major) computati	unat mathematics (201	12)		
Master's w	/ith 1 majo	Computational Mathematics		enerated 26-Aug-2024 • exar	-	page 63 / 199
2012)			cord Master (120	ECTS) Computational Mathe	matics - 2012	

Module title					Abbreviation		
Study Group Robotic, Optimization and Control Theory					10-M=GROK-102-m01		
Module coordinator				Module offered by	I		
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
10		rical grade					
Duratio		Module level	Other prerequisites				
1 semester graduate		Registration for the ning of the course o specified registratio ly be open for stude	r as announced by t n deadlines. Some s nts with previous kn	de via SB@home at the begin- he lecturer in accordance with the seminars or workshops might on- lowledge and/or skills in certain specified in the class schedule.			
Conten	Its						
Recom	mende	ern topics in robotics, op d previous knowledge: the contents of the mode			ntrol Theory" is required.		
Intend	ed lear	ning outcomes					
The stu	udent g				imization and control theory. He/ problems.		
Course	S (type, r	number of weekly contact hours,	language — if other than Ger	man)			
	_	mation on SWS (weekly			able)		
		·			ot every semester, information on whether		
		le for bonus)			· · ·		
minar p sentati of one	oresent on of a candid	ation (approx. 60 to 120 pprox. 60 to 120 minutes	minutes), b) written e s, c) written examinati utes), e) oral examina	elaboration of contention (approx. 90 to 12	ng methods of assessment: a) se nts equivalent to a seminar pre- co minutes), d) oral examination ups of 2, approx. 30 minutes)		
Allocat	ion of j	olaces					
Additio	onal inf	ormation					
 Workla	ad						
	au						
Teachi	ng cycl	e	-				
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module	e appea	ars in					
		ee (1 major) Mathematics	5 (2012)				
	-	ee (1 major) Mathematics					
Master	Master's degree (1 major) Economathematics (2011)						
	Aaster's degree (1 major) Mathematical Physics (2012)						
	-	ee (1 major) Mathematica					

Master's with 1 major Computational Mathematic	S
(2012)	

Module	e title				Abbreviation		
Giovanni-Prodi Seminar (Master) 10-M=SGPC-102-m01							
Module coordinator				Module offered by			
Dean o	f Studi	es Mathematik (Math	nematics)	Institute of Mathen	natics		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites	i			
1 semester graduate		ning of the course o specified registratio ly be open for stude	r as announced by t on deadlines. Some s ents with previous kr	ade via SB@home at the begin- he lecturer in accordance with the seminars or workshops might on- nowledge and/or skills in certain specified in the class schedule.			
Conten	ts						
A mode	ern top	ic in the research exp	pertise of the current hold	ler of the Giovanni P	rodi Chair.		
Intende	ed lear	ning outcomes					
					omprehending and structuring of ate in a scientific discussion.		
Course	S (type, r	number of weekly contact h	ours, language — if other than Ge	rman)			
S (no ir	format	tion on SWS (weekly	contact hours) and cours	e language availabl	e)		
		sessment (type, scope, la le for bonus)	anguage — if other than German,	examination offered — if n	ot every semester, information on whether		
minar p sentati	oresent on of a	ation (approx. 60 to pprox. 60 to 90 minu	120 minutes), b) written e	elaboration of conte	ng methods of assessment: a) se nts equivalent to a seminar pre-		
Allocat	ion of _l	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cvcl	e					
	<u> </u>						
Referre	d to in	LPO I (examination regu	ations for teaching-degree progra	ammes)			
Module	annes	ars in					
		ee (1 major) Mathem	atics (2012)				
	-	ee (1 major) Mathem					
	-	ee (1 major) Econom					
Master	Master's degree (1 major) Mathematical Physics (2012)						
Master	Aaster's degree (1 major) Computational Mathematics (2012)						

Module title					Abbreviation						
Interdisciplinary Seminar					10-M=SIDZ-102-m01						
Module coordinator				Module offered by							
Dean o	f Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics						
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)							
5	nume	rical grade									
Duratio	n	Module level	Other prerequisites								
1 semester graduate		ning of the course o specified registratio ly be open for stude	r as announced by th n deadlines. Some s nts with previous kn	de via SB@home at the begin- he lecturer in accordance with the seminars or workshops might on- nowledge and/or skills in certain specified in the class schedule.							
Conten	ts										
A mode	ern topi	ic in mathematics with ir	nterdisciplinary aspec	ts.							
Intende	ed lear	ning outcomes									
					omprehending and structuring of ate in a scientific discussion.						
Course	S (type, r	number of weekly contact hours,	language — if other than Ger	man)							
S (no ir	format	tion on SWS (weekly con	tact hours) and cours	e language available	e)						
Metho	d of ass	sessment (type, scope, langua	age — if other than German, e	examination offered — if no	ot every semester, information on whether						
		le for bonus)									
minar p sentati	oresent on of a		minutes), b) written e		ng methods of assessment: a) se nts equivalent to a seminar pre-						
Allocat	ion of _l	olaces									
Additio	nal inf	ormation									
Worklo	ad										
Teachi	ng cycl	e									
Referre	d to in	LPOI (examination regulation	ns for teaching-degree progra	mmes)							
Module	e appea	ars in									
		ee (1 major) Mathematic	s (2012)								
Master	's degr	ee (1 major) Mathematic	s (2010)								
		ee (1 major) Economathe									
	Master's degree (1 major) Mathematical Physics (2012)										
Master	's degr	ee (1 major) Computatior	nal Mathematics (201	Aaster's degree (1 major) Computational Mathematics (2012)							

Module title					Abbreviation		
Seminar in Numerical Mathematics and Applied Analysis					10-M=SNMA-102-m01		
Module coordinator				Module offered by			
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)			
5		rical grade		, , , ,			
Duratio		Module level	Other prerequisites				
1 seme	ster	graduate	Registration for the ning of the course o specified registratio ly be open for stude	seminar must be ma r as announced by tl n deadlines. Some s nts with previous kn	de via SB@home at the begin- he lecturer in accordance with the seminars or workshops might on- iowledge and/or skills in certain specified in the class schedule.		
Conten	ts						
Recom Depend	mende ding on	c in numerical mathemat d previous knowledge: the content, basic and a equired. In case of doubt	dvanced knowledge	from different areas	of analysis and/or numerical ma er.		
Intende	ed learı	ning outcomes					
The stu	dent is	able to elaborate a cont			omprehending and structuring of ate in a scientific discussion.		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
S (no ir	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	e)		
		essment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
minar p sentati	oresent on of a		minutes), b) written e		ng methods of assessment: a) se nts equivalent to a seminar pre-		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Master's degree (1 major) Mathematics (2012)							
Master	Master's degree (1 major) Mathematics (2012)						
	Master's degree (1 major) Economathematics (2011)						
	Master's degree (1 major) Mathematical Physics (2012)						
Master	's degr	ee (1 major) Computation	ial Mathematics (201	2)			

Module	title				Abbreviation		
Seminar in Optimization					10-M=SOPT-102-m01		
Module coordinator				Module offered by			
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics		
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	ning of the course o specified registratio ly be open for stude	r as announced by th n deadlines. Some s nts with previous kn	de via SB@home at the begin- ne lecturer in accordance with the eminars or workshops might on- owledge and/or skills in certain specified in the class schedule.		
Conten	ts						
A mode	ern topi	c in optimisation.					
Intende	ed learı	ning outcomes					
					mprehending and structuring of ate in a scientific discussion.		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)			
S (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	2)		
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
minar p sentatio Assess semest	oresent on of a ment o er, cou	ation (approx. 60 to 120 pprox. 60 to 90 minutes	minutes), b) written e ed in the semester in r every four semester	elaboration of conter which the course is	ng methods of assessment: a) se- nts equivalent to a seminar pre- offered and in the subsequent		
Allocat							
Additio	nal inf	ormation					
Worklo	ad						
Teachir	ng cycl	e					
	<u> </u>						
Referre	d to in	LPO I (examination regulation)	s for teaching-degree progra	mmes)			
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Master's degree (1 major) Mathematics (2012)							
	Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)						
	Master's degree (1 major) Economathematics (2011)						
	Master's degree (1 major) Mathematical Physics (2012)						
Master	s degr	ee (1 major) Computation	al Mathematics (201	2)			

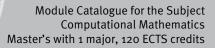


Application-oriented Subject



Application-oriented Subject Biology





Topics: Bioinformatics

Module title					Abbreviation		
Bioinfo	rmatic	s B			07-MBI-B-121-m01		
Module	coord	inator		Module offered by			
holder	of the O	Chair of Bioinformatics		Faculty of Biology			
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						
and sec	quence		ns and protein familie	es, large-scale data a	s includes results from genome analysis (e. g. net generation se- ncRNAs).		
Intende	ed learn	ning outcomes					
		cent results in bioinform al technologies and resea			advanced (Master) level know-		
Course	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available)		
module is	creditab	le for bonus)			t every semester, information on whether nt prior to the course. a) written		
examin	ation (ng multiple choice qu	uestions) or b) oral e	xamination of one candidate		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Worklo	ad						
Teachir	ng cycl	9					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			
Module appears in							
Master'	s degre	ee (1 major) Biology (2013	1)				
	Master's degree (1 major) Biology (2014)						
	Master's degree (1 major) Mathematics (2012)						
	-	ee (1 major) Biomedicine					
	-	ee (1 major) Biomedicine		2)			
Master's degree (1 major) Computational Mathematics (2012)							

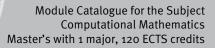
Module title					Abbreviation
Bioinformatics (Lecture and Seminar)					07-MS2BI-102-m01
Module	coord	inator		Module offered by	
holder	of the C	Chair of Bioinformatics		Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Conten	ts				
and sec	quence		ns and protein familie	es, large-scale data a	is includes results from genome analysis (e. g. net generation se- IncRNAs).
Intende	ed learr	ning outcomes			
		cent results in bioinform al technologies and resea			advanced (Master) level know-
Courses	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
S + V (n	o infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)
		essment (type, scope, langua) le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
one of t questio	he foll ns) or	owing options will be cho	osen: a) written exam e candidate each (30	ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	9			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module appears in					
Master's degree (1 major) Biochemistry (2012) Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Computational Mathematics (2012)					

Module title					Abbreviation
Bioinformatics (Practical Course and Seminar 1)					07-MS2BIF1-102-m01
Module	coord	inator		Module offered by	
holder	of the (Chair of Bioinformatics		Faculty of Biology	
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				
mics (so proteor	equend nics), t nalysis	ce-, domain analysis and opological and structural	annotation), omics d analysis of biologica	ata analysis (NGS, t Il interactions includ	d, fields covered include: geno- ranscriptomics, metabolomics, ling statistical methods, phyloge- a presentation, a publication or
Intende	ed learn	ning outcomes			
	e to de	sign experiments, collect			the field of bioinformatics. They hering to the principles of good
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)	
S + P (n	o infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
followir or b) log	ng optio g (appr	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (30 oral examination of o	to 60 minutes, inclune candidate each (o the course. Usually, one of the uding multiple choice questions) 30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
	-	ee (1 major) Biology (201:			
	-	ee (1 major) Biology (2010			
	-	ee (1 major) Biology (2014	•		
	-	ee (1 major) Mathematics ee (1 major) Computation		2)	
Master's degree (1 major) Computational Mathematics (2012)					

Module title					Abbreviation
Bioinfo	ormatic	s (Practical Course and S	eminar 2)		07-MS2BIF2-102-m01
Module coordinator				Module offered by	
holder	of the (Chair of Bioinformatics		Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
15	(not) s	successfully completed			
Duratio		Module level	Other prerequisites		
1 seme	ster	graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the
Conten	Its				
mics (s proteo netic a	sequeno mics), t nalysis d are m	ce-, domain analysis and opological and structura , protein structure analys	annotation), omics d l analysis of biologica is. The techniques ap	lata analysis (NGS, t al interactions incluc oplied are evaluated	ted, fields covered include: geno- ranscriptomics, metabolomics, ling statistical methods, phyloge on the basis of the results obtai- a presentation, a publication or a
Intend	ed lear	ning outcomes			
se a sc	ientific		informatics and to do	ocument the results	dependently perform and organi- obtained. Students are able to for their thesis.
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Ger	rman)	
S + P (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
followi or b) lo	ng opti og (appi	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of o	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) 30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)
Allocat					
Additic	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	9			
TEALIII	ing cycl	C			
 Defe					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	ars in			
Master's degree (1 major) Biology (2011)					
Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2010)					
Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)					
	's degr	ee (1 major) Biology (201	4)		
Master Master	's degr	ee (1 major) Biology (201 ee (1 major) Mathematics ee (1 major) Computatior	5 (2012)		

Master's with 1 major Computational Mathematics	5
(2012)	





Topics: System Biology

Module title Abbrevia					Abbreviation	
Systems Biology B					07-MS-B-121-m01	
Module	coord	inator		Module offered by		
holder	of the Q	Chair of Bioinformatics		Faculty of Biology		
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					
sults fro	om fun				nd discussed, this includes re- ind metabolic networks as well	
Intende	d learı	ning outcomes				
		cent results in systems b al technologies and resea			an advanced (Master) level know-	
Courses	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
module is	creditab	le for bonus)			t every semester, information on whether nt prior to the course. a) written	
examin	ation (ng multiple choice qu	uestions) or b) oral e	xamination of one candidate	
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ıg cycl	e				
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Module appears in						
		ee (1 major) Biology (201:				
	-	ee (1 major) Biology (201				
	Master's degree (1 major) Mathematics (2012)					
	-	ee (1 major) Biomedicine ee (1 major) Biomedicine				
	•	. , ,	• •	2)		
	Master's degree (1 major) Computational Mathematics (2012)					

title		Abbreviation			
System Biology (Lecture and Seminar)				07-MS3S-102-m01	
coord	inator		Module offered by		
of the O	Chair of Bioinformatics	_	Faculty of Biology		
Metho	od of grading	Only after succ. com	pl. of module(s)		
nume	rical grade				
n	Module level	Other prerequisites			
ster	graduate				
ts					
om fun	ctional genomics, dynam				
ed learn	ning outcomes				
				an advanced (Master) level know-	
S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
o infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)	
		ge — if other than German, e	examination offered — if no	t every semester, information on whether	
he foll ns) or	owing options will be cho b) oral examination of on	osen: a) written exam e candidate each (3c	ination (30 to 60 mi	nutes, including multiple choice	
ion of p	olaces				
nal inf	ormation				
ad					
ng cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
-					
Master's degree (1 major) Biology (2010)					
-					
Jucgi					
	e coordi of the C Metho numer n ster ts es and om fun- latory r ed learr tand re f typica s (type, n o infor l of ass creditab ts will l candid ion of p nal info ad ad ad a to in	Biology (Lecture and Seminar) coordinator of the Chair of Bioinformatics Method of grading numerical grade n Module level ster graduate ts es and current results of compute om functional genomics, dynamilatory networks. ed learning outcomes tand recent results in systems bind f typical technologies and reseated s (type, number of weekly contact hours, 1 o information on SWS (weekly contact hours, 1 ad hg cycle d to in LPO I (examination regulations s degree (1 major) Biology (2012 s degree (1 major) Mathematics	Biology (Lecture and Seminar) c coordinator of the Chair of Bioinformatics Method of grading Only after succ. com numerical grade n Module level Other prerequisites ster graduate ts es and current results of computational systems biol om functional genomics, dynamics of the transcriptor latory networks. ed learning outcomes tand recent results in systems biology. Discuss their f typical technologies and research questions of syst (type, number of weekly contact hours, language – if other than Germ o information on SWS (weekly contact hours) and co l of assessment (type, scope, language – if other than German, e creditable for bonus) ts will be informed about the method, length and sco candidates (approx. 30 to 60 minutes) ion of places nal information d to in LPO I (examination regulations for teaching-degree progra s degree (1 major) Biology (2011)	Biology (Lecture and Seminar)	

System biology Ory-MS3SYE1102-m01 Module contraction of Bioinformatics Faculty of Biology Faculty of Biology Faculty of Biology Balder Image: Second Se	Module title					Abbreviation
holder of the Chair of Bioinformatics Faculty of Biology ECTS Method of grading Only after succ. compl. of module(s) 10 numerical grade Duration Module level Other prerequisites isemester graduate Contents Contents The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical model-ling). Intended learning outcomes Students have gained knowledge on experimental setups and methods used in the field of systems biology. Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice. Courses (type, number of weekly contact hours, language — if other than German) P + S (no informed about the length and scope of the assessment prior to the course. Usally, one of the following options will be chosen: a) written examination of one candidate each (so to on inutes) or b) log (approx. so to so pages) or c) oral examination of one candidate	System Biology (Practical Course and Seminar 1)					07-MS3SYF1-102-m01
ECTS Method of grading Only after succ. compl. of module(s) 10 numerical grade Duration Module level Other prerequisites 1 semester graduate Contents Contents The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical modeling). Intende learning outcomes Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice. Courses (type, number of weekly contact hours, language – if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German) P -	Module coordinator				Module offered by	
10 numerical grade Duration Module level Other prerequisites 1 semester graduate Contents Contents The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical model-ling). Intended learning outcomes Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice. Courses (type, number of weekly contact hours, language – if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German) P + S (no informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes) or d) or al examination or on candidate each (30 to 60 minutes) or d) or al examination or on each didate each (30 to 60 minutes) Additional Informed to ILPO I (examination regulations for teaching-degree prog	holder	of the (Chair of Bioinformatics		Faculty of Biology	
Duration Module level Other prerequisites 1 semester graduate	ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
1 semester graduate Contents The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical modelling). Intendel learning outcomes Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice. Courses (type, number of weekly contact hours, language – if other than Geman) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than Geman, examination offered – if not every senester, information on whether module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or d) prasentation (20 to 45 minutes) Additional information - - - Referred to In LPO I (examination for teaching-degree programmes) - - - Module ap	10	nume	rical grade			
Contents The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical model-ling). Intendel learning outcomes Intende learning outcomes Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice. Courses (type, number of weekly contact hours, language – if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every senester, information on whether module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) withten examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or d) presentation (ao to 45 minutes) Additional information - - - Morkload - - - Morkload -	Duratio	n	Module level	Other prerequisites		
The practical course will provide students with advanced insights into a field of systems biology and will, in par- ticular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dy- namics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical model- ling). Intended learning outcomes Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the prin- ciples of good scientific practice. Courses (type, number of weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination of one candidate each (30 to 60 minutes) or d) oral ex- amination in groups of up to 3 pages) or 0 oral examination of one candidate each (30 to 60 minutes) or d) aral ex- amination in groups of up to 3 condidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes) Alditional information - Method places -	1 seme	ster	graduate			
ticular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic otwork analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical modelling). Intended learning outcomes Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice. Courses (type, number of weekly contact hours) and course language available) Method of assessment (type, scope, language — if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether following options will be chosen: a) written examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 pages) or c) oral examination and between the setup each each (30 to 60 minutes) or d) oral examination in groups of up to 3 pages) or c) oral examination for examination (20 to 45 minutes) Allocation of places	Conten	ts				
Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the prin- ciples of good scientific practice. Courses (type, number of weekly contact hours, language – if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral ex- amination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes) Allocation of places Method for ILPO 1 (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2012) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	ticular, protein namics	make s structu	students proficient in a d ure analysis and protein f	ynamical method in s olding, genome anal	systems biology (are ysis and evolution; c	as that may be selected include lynamic network analysis, the dy-
They are able to design scientific research, to collect data and to interpret them statistically, adhering to the prin- ciples of good scientific practice. Courses (type, number of weekly contact hours, language – if other than German) P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral ex- amination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes) Allocation of places Motkload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2012) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	Intende	ed learı	ning outcomes			
P + S (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral ex- amination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes) Allocation of places Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	They ar	e able	to design scientific resea			
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes) Allocation of places Additional information Morkload Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
module is creditable for bonus) Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes) Allocation of places Additional information Workload Teaching cycle Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	P + S (n	o infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)
following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral ex- amination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes) Allocation of places Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (201) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)				ge — if other than German, e	examination offered — if no	t every semester, information on whether
Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	followir or b) log	ng optio g (appr	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (30 oral examination of o	to 60 minutes, inclu ne candidate each (uding multiple choice questions) 30 to 60 minutes) or d) oral ex-
 Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	Allocat	ion of p	olaces			
 Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)						
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	Additio	nal inf	ormation			
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)						
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	Worklo	ad				
Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)						
Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	Teachir	ng cycl	e			
Module appears in Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)						
Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)						
Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)	-					
Master's degree (1 major) Biology (2014) Master's degree (1 major) Mathematics (2012)		-				
Master's degree (1 major) Mathematics (2012)		-				
		-		•		
		-			2)	

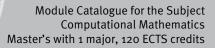
Module title					Abbreviation	
System	n Biolog	gy (Practical Course and	Seminar 2)		07-MS3SYF2-102-m01	
Module coordinator				Module offered by		
holder	ofthe	Chair of Bioinformatics		Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con			
15		successfully completed				
Duratio		Module level	Other prerequisites			
1 seme	ster	graduate	Admission prerequi	site to assessment: pletion of the respec	regular attendance of lab course ctive exercises as specified at the	
Conten	Its					
ticular, protein namics ling). T	make struct of pro he tech	students proficient in a d ure analysis and protein tein-protein interactions,	lynamical method in s folding, genome anal , modelling cellular re uated on the basis of	systems biology (are ysis and evolution; o gulation; modelling the results obtained	systems biology and will, in par- as that may be selected include dynamic network analysis, the dy metabolism, statistical model- and are modified where neces- erm paper.	
Intend	ed lear	ning outcomes				
nise a s	scientif		pioinformatics and to	document the result	ndependently perform and orga- is obtained. Students are able to for their thesis.	
Course	S (type, r	number of weekly contact hours,	language — if other than Gei	rman)		
P + S (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti og (appi	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30	to 60 minutes, incl	o the course. Usually, one of the uding multiple choice questions)	
aminat		groups of up to 3 candida			30 to 60 minutes) or d) oral ex-	
aminat Allocat						
					30 to 60 minutes) or d) oral ex-	
Allocat	ion of _l				30 to 60 minutes) or d) oral ex-	
Allocat	ion of _l	blaces			30 to 60 minutes) or d) oral ex-	
Allocat Additic	ion of ponal inf	blaces			30 to 60 minutes) or d) oral ex-	
Allocat Additio	ion of ponal inf	blaces			30 to 60 minutes) or d) oral ex-	
Allocat Additic Worklo 	ion of ponal inf	ormation			30 to 60 minutes) or d) oral ex-	
Allocat Additic	ion of ponal inf	ormation			30 to 60 minutes) or d) oral ex-	
Allocat Additio Worklo Teachin 	ion of ponal inf pad	ormation e	ates (approx. 30 to 60	o minutes) or e) pres	30 to 60 minutes) or d) oral ex-	
Allocat Additio Worklo Teachin Referre	ion of ponal inf pad	ormation	ates (approx. 30 to 60	o minutes) or e) pres	30 to 60 minutes) or d) oral ex-	
Allocat Additio Worklo Teachin Referre	ng cycl	ormation e LPOI (examination regulation	ates (approx. 30 to 60	o minutes) or e) pres	30 to 60 minutes) or d) oral ex-	
Allocat Additio Worklo Teachi Referre Modulo	ion of ponal inf pad ng cycl ed to in e appea	ormation e LPOI (examination regulation	ates (approx. 30 to 60	o minutes) or e) pres	30 to 60 minutes) or d) oral ex-	
Allocat Additio Worklo Teachi Referre Modulo	ion of ponal information onal information ong cycl ed to in e appea	e e upolaces ormation e p c c c c c c c c c c c c c c c c c c	ates (approx. 30 to 60 s for teaching-degree progra	o minutes) or e) pres	30 to 60 minutes) or d) oral ex-	
Allocat Additio Worklo Teachin Referre Modulo Master Master	ion of ponal inf ponal inf pad ed to in e appea 's degr 's degr	ormation e LPOI (examination regulation	ates (approx. 30 to 60 s for teaching-degree progra 1) 0)	o minutes) or e) pres	30 to 60 minutes) or d) oral ex-	
Allocat Additic Worklo Teachin Referre Master Master Master Master	ed to in e appea 's degr 's degr	e LPOI (examination regulation ars in ee (1 major) Biology (201 ee (1 major) Biology (201	ates (approx. 30 to 60 s for teaching-degree progra 1) 0) 4)	o minutes) or e) pres	30 to 60 minutes) or d) oral ex-	

Master's with 1 major Computational Mathematics	5
(2012)	



Application-oriented Subject Chemistry





Theoretical Chemistry

Modul	e title				Abbreviation
Compu	utationa	ll Chemistry			08-TCM2-102-m01
Modul	e coord	inator		Module offered by	
lecture	er of lec	ture "Computational C	hemistry"	Institute of Physica	l and Theoretical Chemistry
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
5	nume	rical grade			
Durati	on	Module level	Other prerequisites	;	
1 seme	ester	graduate	ses in the respectiv (usually 70% of exe	e classes as specifie rcises to be success	successful completion of exerci- ed at the beginning of the course fully completed) as well as regu- aximum of 2 incidents of unexcu-
Conter	nts				
This m	odule i	ntroduces students to	the fundamental princi	ples of computation	al chemistry.
Intend	ed lear	ning outcomes			
		able to explain the the emistry.	oretical principles of co	mputational chemis	try and to apply methods in com-
Course	es (type, r	number of weekly contact hou	ırs, language — if other than Ge	rman)	
S + Ü (no info	rmation on SWS (week	kly contact hours) and co	ourse language avai	lable)
		sessment (type, scope, lar le for bonus)	nguage — if other than German,	examination offered — if no	ot every semester, information on whether
		nation (90 minutes) ssessment: German o	r English		
Alloca	tion of _l	olaces			
Additio	onal inf	ormation			
Worklo	oad				
Teachi	ing cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
			· · ·		
Modul	e appea	ars in			
Master Master Master	r's degr r's degr r's degr	ee (1 major) Chemistry ee (1 major) Mathema ee (1 major) Mathema	tics (2012) tics (2010)		
Master	r's degr	ee (1 major) Computat	ional Mathematics (201	.2)	

Module title Abbreviation					Abbreviation
Theore	tical Cl	nemistry			08-TCM1-102-m01
Module	e coord	inator		Module offered by	
lecture	r of lec	ture "Theoretische Chem	nie"	Institute of Physica	l and Theoretical Chemistry
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 semester graduate Admission prerequisite to assessment: successful com ses in the respective classes as specified at the beginn (usually 70% of exercises to be successfully completed lar attendance of exercises (usually a maximum of 2 in sed absence).		d at the beginning of the course fully completed) as well as regu-			
Conten	ts				
This mo	odule i	ntroduces students to th	e fundamental princi	oles of theoretical ch	nemistry.
Intende	ed lear	ning outcomes			
		able to describe the mat amical approaches of the		al principles underly	ing the quantum chemical and
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
S + Ü (r	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langu le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
		nation (90 minutes) ssessment: German or E	nglish		
Allocat	ion of _l	olaces			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regulation	ns for teaching-degree progra	immes)	
Module	e appea	ars in			
Master	's degr	ee (1 major) Chemistry (2	2010)		
	-	ee (1 major) Mathematic			
	-	ee (1 major) Mathematic		、 、	
	•	ee (1 major) Computatio		2)	
master	s aegr	ee (1 major) FOKUS Phar	macy (2012)		

Module title					Abbreviation	
Programming in Theoretical Chemistryo8-TCM3-102-mo1					08-TCM3-102-m01	
Modul	e coord	linator		Module offered by		
			in Theoretischer Che-		l and Theoretical Chemistry	
mie"			F			
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites	5		
1 seme	ester	graduate				
Conter	nts					
		provides an introduct ation areas.	ion to the fundamentals	of programming in th	neoretical chemistry and discus-	
Intend	ed lear	ning outcomes				
		able to explain and u name its application a		ng languages typical	ly used in theoretical chemistry	
Course	es (type, i	number of weekly contact he	ours, language — if other than Ge	rman)		
S + Ü (no info	rmation on SWS (wee	ekly contact hours) and c	ourse language avail	able)	
module i	s creditat etion ar	ole for bonus) nd discussion of app	rox. 5 programming exerc		approx. 45 minutes)	
		ssessment: German	or English			
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	bad					
	_					
Teachi	ng cycl	е				
Referre	ed to in	LPOI (examination regu	lations for teaching-degree progr	ammes)		
	e appea					
		ee (1 major) Chemist				
	Master's degree (1 major) Chemistry (2010)					
	-	ee (1 major) Chemist				
	-	ee (1 major) Mathem ee (1 major) Mathem				
	-		ational Mathematics (201	12)		
muster	Jucgi	ce (i major) compute		,		

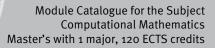
Module title					Abbreviation	
Theoretical Chemistry - Project work					08-TCAP-102-m01	
Module coordinator Mo			Module offered by			
head of	the re	search group offering the	module	Institute of Physical	l and Theoretical Chemistry	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	(not) s	uccessfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
		ives students the opport f Theoretical Chemistry a			the research groups based at sed in the discipline.	
Intende	d learr	ing outcomes				
		learned some of the me elevant to the fields cove		n theoretical chemis	stry. They are able to explain is-	
Course	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
• 0 • 0	8-TCAP 8-TCAP	as 3 components; inform -1-102: P (no information -2-102: P (no informatior -3-102: P (no informatior	on language and nu on language and nu	mber of weekly conta mber of weekly cont	act hours available) act hours available)	
		essment (type, scope, langua le for bonus)	ge — if other than German, e	xamination offered — if no	t every semester, information on whether	
		as the following 3 assess se three assessment com		o pass the module a	s a whole students must pass	
Wellen • 5 • p • Li Assess Wellen • 5 • p Li Assess Dichtef • 5 • p Li Assess	 Assessment component to module component o8-TCAP-1-102: Theoretische Chemie Arbeitsgruppenpraktikum Wellenpaketdynamik 5 ECTS credits, method of grading: (not) successfully completed 					
Allocat	ion of p	laces				
Additio	Additional information					
Additio	nal info	ormation on module dura	tion: 4 weeks			
Worklo	ad					
Teachir	ig cycle	9				

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)





Physical Chemistry

Module title					Abbreviation		
Advanc	Advanced Physical Chemistry 08-PCM1-102-m01						
Module coordinator Module offered b							
lecturer of seminar "Laserspektroskopie" (Laser Spectros- copy) Institute of Physical and Theoretical Chemistr					emistry		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	graduate					
Conten	ts						
and em tal metl	ission hods in nents ir	ntroduces students to the spectroscopy. In additio physical chemistry in th n the laboratory. Student	n, the module gives s e laboratory. After a	tudents the opportu safety briefing, the st	nity to use modern e tudents autonomous	experimen- sly conduct	
Intende	ed learr	ning outcomes					
of laser have de	techno evelope	ble to explain the comp blogy. They are able to de ed a high level of proficie resulting measurements	escribe the principles ncy in modern experi	of absorption and e imental methods in p	mission spectroscop	py. Students	
Courses	S (type, n	umber of weekly contact hours,	anguage — if other than Gei	rman)			
compor • o • o	nent. 8-PCM 8-PCM	omprises 2 module com 1-1-102: S + Ü (no inform 1-2-102: P (no informatio	ation on SWS (weekly n on SWS (weekly co	/ contact hours) and ntact hours) and cou	course language ava rse language availal	ailable) ble)	
		s essment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	t every semester, informati	on on whether	
	less st	n this module comprises ated otherwise, success ments.					
• 5 • w • Li Assess • 5 • V	 Assessment in module component o8-PCM1-1-102: Laser Spectroscopy Laser Spectroscopy 5 ECTS, Method of grading: numerical grade written examination (90 minutes) or oral examination (20 minutes) Language of assessment: German or English Assessment in module component o8-PCM1-2-102: Advanced Physical Chemistry (Lab) 5 ECTS, Method of grading: (not) successfully completed Vortestate (pre-experiment exams) and Nachtestate (post-experiment exams) (approx. 15 minutes), log (approx. 15 pages) Language of assessment: German or English 						
Allocati							
Additional information							
Workload Teaching cycle							
Master's wi (2012)	- aster's with 1 major Computational Mathematics 012) JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- cord Master (120 ECTS) Computational Mathematics - 2012						

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Computational Mathematics (2012)

Module title					Abbreviation
Chemical Dynamics					08-PCM2-102-m01
Module	e coord	inator		Module offered by	
lecture mics)	r of sen	ninar "Chemische Dynam	ik" (Chemical Dyna-	Institute of Physica	l and Theoretical Chemistry
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				
mics in	more o				ical kinetics and reaction dyna- cribing chemical reactions.
Studen	ts are a				dynamics. They can describe me-
Course	S (type, r	umber of weekly contact hours, l	anguage — if other than Ger	man)	
S + Ü (r	no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
		nation (90 minutes) or or ssessment: German or Ei		e candidate each (20	o minutes) or talk (30 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cvcl	6			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module appears in					
	• •	ee (1 major) Chemistry (2	013)		
	-	ee (1 major) Chemistry (2	-		
	Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Chemistry (2014)				
Master	's degr	ee (1 major) Mathematics	5 (2012)		
Master	's degr	ee (1 major) Computation	al Mathematics (201	2)	

Module title				Abbreviation		
Nanoscale Materials					08-PCM3-102-m01	
Module	coord	inator		Module offered by		
lecturer	r of the	seminar "Nanoskalige M	aterialien"	Institute of Physical	l and Theoretical Chemistry	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	graduate				
Conten	ts					
		iscusses advanced topic aracterisation methods a			e structure, properties, fabricati- ials.	
Intende	ed learn	ning outcomes				
		ble to characterise nano noscale materials.	scale materials. They	are able to name ar	nalytical methods and applicati-	
Courses	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
S + Ü (n	infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		s essment (type, scope, langua; le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
		nation (90 minutes) or or ssessment: German or Er		e candidate each (20	o minutes) or talk (30 minutes)	
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ng cycl	e				
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Module	appea	ins in				
	Bachelor' degree (1 major) Nanostructure Technology (2010)					
Bachelor' degree (1 major) Nanostructure Technology (2012)						
	-	ee (1 major) Chemistry (2				
	-	ee (1 major) Chemistry (20				
	-	ee (1 major) Chemistry (20 ee (1 major) Mathematics				
	-	ee (1 major) Mathematics		2)		
	-	ee (1 major) Functional M		<u>~</u>)		
	01					

Module title					Abbreviation			
Ultrafast spectroscopy and quantum-control					08-PCM4-102-m01			
Module	e coord	inator		Module offered by	1			
lecture Quante			eitspektroskopie and	Institute of Physic	al and Theoretical Chemistry			
ECTS	Metho	od of grading	Only after succ. co	mpl. of module(s)				
5	nume	rical grade						
Duratio	n	Module level	Other prerequisites	S				
1 seme	ster	graduate						
Conten	ts							
			opics in ultrafast spectro pectroscopy and cohere		n control. It focuses on ultrashort			
Intende	ed lear	ning outcomes						
plain th princip	ne theo les and	ry of time-resolved la l applications of qua	aser spectroscopy and na ntum control.	ame experimental m	haracterise them. They can ex- ethods. They can describe the			
			ours, language — if other than Ge					
			ekly contact hours) and c					
		sessment (type, scope, la le for bonus)	anguage — if other than German,	examination offered — if r	not every semester, information on whether			
		nation (90 minutes) ssessment: German		ie candidate each (2	eo minutes) or talk (30 minutes)			
Allocat	ion of p	olaces						
Additio	nal inf	ormation						
	-							
Worklo	ad							
Teachi	ng cycl	e						
Referre	d to in	LPO I (examination regu	lations for teaching-degree progr	ammes)				
Module appears in								
			ry (2010)					
	-	Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Mathematics (2012)						

Module title					Abbreviation
Physic	al chen	nistry of supramolecul	ar assemblies		08-PCM5-102-m01
Modul	e coord	inator		Module offered by	<u> </u>
	er of the r Strukt		ne Chemie Supramole-		l and Theoretical Chemistry
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites	;	
1 seme	ester	graduate			
Conter	nts				
			eractions between mole as key applications of s		he formation and physical-chemi- nistry.
Intend	ed lear	ning outcomes			
in the f	field. Th		rmation and physical-c		trating a high degree of expertise f aggregates. They can name mo-
Course	S (type, r	number of weekly contact hou	rs, language — if other than Ge	rman)	
S + Ü (no info	mation on SWS (week	ly contact hours) and co	ourse language avail	able)
module i written minute	s creditat exami s)	le for bonus)	nd/or oral examination		ot every semester, information on whether th (20 minutes) and/or talk (30
	tion of				
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
	3-)	-			
Referre	ed to in	LPO I (examination regulat	ions for teaching-degree progra	ammes)	
Modul	e appea	ars in			
Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Computational Mathematics (2012) Master's degree (1 major) Functional Materials (2012)					

Module title Abbreviation					Abbreviation
Physical Chemistry (Advanced Lab) 08-PCM6-102-m01					08-PCM6-102-m01
Module	e coord	inator		Module offered by	
lecture	rs Phys	ikalische Chemie (Physic	al Chemistry)	Institute of Physica	l and Theoretical Chemistry
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
		ives students the opport f Physical Chemistry and			the research groups based at lytical methods.
Intende	ed lear	ning outcomes			
					relevant physical chemistry rese- questions in physical chemistry.
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)	
P (no ir	format	tion on SWS (weekly cont	act hours) and cours	e language available	a)
		s essment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
•		(20 minutes) ssessment: German or E	nglish		
Allocat	ion of _l	olaces			
Additio	nal inf	ormation	<u>.</u>		
Worklo	ad				
Teachi	ng cycl	е			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	appea	ars in			
Master	's degr	ee (1 major) Chemistry (2	010)		
	Master's degree (1 major) Mathematics (2012)				
Master	's degr	ee (1 major) Computatior	al Mathematics (201	2)	



Application-oriented Subject Medicine

Modu	le title			Abbreviation	
Applied Mathematics and Medicine					03-MaMed1-122-m01
Modu	le coord	linator		Module offered by	, ,
Chair o ne	of Rudo	lf Virchow Center for Ex	perimental Biomedici-	Faculty of Medicin	e
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	rical grade			
Durati	on	Module level	Other prerequisites	;	
1 seme	ester	graduate			
Conte	nts				
		of mathematical model lling and quantitative i		edicine and, in partio	cular, in genomics, proteomics,
Intend	led lear	ning outcomes			
Stude	nts hav	e acquired an insight ir	to various application	areas of applied ma	thematics in the life sciences.
Course	es (type, 1	number of weekly contact hour	s, language — if other than Ge	rman)	
V + S ((no info	rmation on SWS (week	y contact hours) and co	ourse language avai	lable)
		sessment (type, scope, lang ble for bonus)	guage — if other than German,	examination offered — if n	ot every semester, information on whether
•		60 to 120 minutes) Issessment: German, E	nglish		
Alloca	tion of	places			
Additi	onal inf	ormation			
Workl	oad				
Teach	ing cycl	e			
Referr	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)	
Modu	le appe	ars in			
		ee (1 major) Computati	onal Mathematics (201	.2)	

Module title					Abbreviation	
Practical Research Course Medicine and Computational Mather					03-MaMed2-122-m01	
Module coordinator				Module offere	ed by	
Chair c ne	of Rudo	f Virchow Center for	Experimental Biomedici-	Faculty of Mee	dicine	
ECTS	Meth	od of grading	Only after succ. con	npl. of module((s)	
15	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conter	nts					
Practic	al appl	ication of mathemati	cal and bioinformatic me	thods in biome	edical research projects.	
Intend	ed lear	ning outcomes				
Studer	nts have	e gained practical ex	perience in the application	n areas of app	lied mathematics in the life sciences.	
Course	es (type, r	number of weekly contact he	ours, language — if other than Ge	rman)		
R (no i	nforma	tion on SWS (weekly	contact hours) and cours	e language ava	ailable)	
		Sessment (type, scope, la le for bonus)	anguage — if other than German,	examination offered	l — if not every semester, information on whether	
		50 to 120 minutes) ar ssessment: German,	nd project report (approx. English	. 10 to 20 pages	5)	
Alloca	tion of _l	olaces				
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ing cycl	e				
Referre	ed to in	LPO I (examination regul	lations for teaching-degree progra	ammes)		
	e appea					
Master	r's degr	ee (1 major) Computa	ational Mathematics (201	2)		

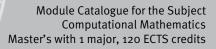


Application-oriented Subject Computer Science

Module title		Abbreviation				
Algorithmic G	raph Theory			10-l-AGT-122-m01		
Module coord	inator		Module offered by			
holder of the	Chair of Computer Scienc	e l	Institute of Comput	er Science		
ECTS Metho	od of grading	Only after succ. com	pl. of module(s)			
5 nume	rical grade					
Duration	Module level	Other prerequisites				
1 semester	undergraduate	Where applicable, p ning of the course (e		ified by the lecturer at the begin- xercises).		
Contents						
colourings, we of graph prob	ork with planar graphs an	d find out how the ra miliar with new conce	nking algorithm of G pts, for example how	ximal flows, find matchings and loogle works. Using the examples w we model problems as linear		
Intended lear	ning outcomes	·				
cipants are ab		om the course helps	solve a given graph	problems. In addition, the parti- problem algorithmically. In this prithms.		
Courses (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
V + Ü (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
Method of ass module is creditab		ge — if other than German, e	examination offered — if no	ot every semester, information on whether		
tion date, the amination in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)		
Allocation of						
Additional inf	ormation					
Workload						
Teaching cycl	e					
Referred to in	LPO I (examination regulations	s for teaching-degree progra	mmes)			
Module appears in						
Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Computational Mathematics (2012)						

Module title				Abbreviation			
Databases					10-I-DB-102-m01		
Module	Module coordinator			Module offered by	Module offered by		
Dean o	f Studi	es Informatik (Compute	er Science)	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5		rical grade		•			
Duratio		Module level	Other prerequisites	i			
1 seme		undergraduate	Admission prerequi	site to assessment: o ecturer at the beginn		scope to be	
Conten	Its						
Relatio ment.	nal alg	ebra and complex SQL	statements; database	planning and norma	l forms; transaction	manage-	
Intend	ed lear	ning outcomes					
The stu	udents	possess knowledge ab	out database modellin	g and queries in SQL	as well as transaction	ons.	
Course	S (type, r	number of weekly contact hour	s, language — if other than Ge	rman)			
	-	rmation on SWS (weekl			able)		
		sessment (type, scope, lang	·			ion on whether	
		le for bonus)	,				
if anno ced by nutes, Langua	unced an oral groups	nation (approx. 50 to 6 by the lecturer by four v examination of one ca of 2: 20 minutes, grou ssessment: German, E	veeks prior to the exan ndidate each or an ora ps of 3: 25 minutes)	l examination in grou			
Allocal		Diaces					
		ormation					
Additio	onal Inf	ormation					
Worklo	aa						
Teachi	ng cycl	e					
		LPO I (examination regulati		ammes)			
)atenbanksysteme und)atenbanksysteme und					
			Soltwaretechnologie				
	e appea	ree (1 major) Computer	Science (2010)				
	-	ree (1 major) Computer					
	-	ree (1 major) Mathema					
	Bachelor' degree (1 major) Business Information Systems (2013)						
Bachel	Bachelor' degree (1 major) Computational Mathematics (2012)						
Bachel	Bachelor' degree (1 major) Computational Mathematics (2013)						
	Bachelor' degree (1 major) Aerospace Computer Science (2009)						
	-	ree (1 major) Aerospace	•	011)			
	-	ree (1 major) Functiona					
	-	ee (1 major) Computer : ee (1 major) Mathemati					
Imaster	s uegi	ee (1 majoi) mathemath	(2012)				
Master's w (2012)	ith 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mather	-	page 101 / 199	

Julius-Maximilians-UNIVERSITÄT WÜRZBURG



Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Realschule Computer Science (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)

Module title				Abbreviation		
Knowledge-based Systems 10-I-WBS-102-m01					10-I-WBS-102-m01	
Module coordinator				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		Module level	Other prerequisites			
1 seme		undergraduate				
Conten		undergraduate				
Founda	tions i	n the following areas: kno dge acquisition, learning			ge representation, solving me-	
		ning outcomes	<u> </u>			
The stu	dents p	-			g and design of knowledge-based small project.	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
ced by nutes, g	an oral groups ge of a	examination of one canc of 2: 20 minutes, groups ssessment: German, Eng	lidate each or an oral of 3: 25 minutes)	l examination in grou	itten examination can be repla- ups (one candidate each: 15 mi-	
Additio	nal inf	ormation				
Worklo						
WORKIO	<u>au</u>					
 Taaabiu						
Teachir	ig cycl	e				
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Module						
	-	ree (1 major) Computer S				
	Bachelor' degree (1 major) Business Information Systems (2013)					
	Bachelor' degree (1 major) Aerospace Computer Science (2009)					
		ree (1 major) Aerospace ()11)		
	-	ee (1 major) Computer Sc				
	-	ee (1 major) Mathematics				
	-	ee (1 major) Mathematics		`		
	-	ee (1 major) Computation			,	
First sta	ate exa	mination for the teaching	g degree Gymnasium	Computer Science (2	2009)	

(2012)

Module title				Abbreviation				
Data Mining					10-I-DM-102-m01			
Module coordinator				Module offered by				
holder of the Chair of Computer Scienc			nce VI	Institute of Computer Science				
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)				
5	nume	rical grade						
Duratio	'n	Module level	Other prerequisites	Other prerequisites				
1 seme	ster	undergraduate		Admission prerequisite to assessment: exercises (type and scope to be announced by the lecturer at the beginning of the course).				
Conten	ts							
model, methoo	relatio Is (clus	nship to data warehou ster and association me	lefinition of data minin se and OLAP, data prep ethods), supervised lea lata types, other learnin	processing, data visu rning (e. g. Bayes cla	alisation, unsupervi	ised learning		
Intende	ed lear	ning outcomes						
ta mini the kno	ng and wledg	machine learning. The	nd practical knowledge y are able to solve prac se and by using the KDI gorithms.	tical knowledge disc	covery problems with	n the help of		
Course	S (type, r	number of weekly contact hour	s, language — if other than Gei	rman)				
V + Ü (r	no infoi	rmation on SWS (weekl	y contact hours) and co	ourse language avail	able)			
		Sessment (type, scope, lang Ile for bonus)	uage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether		
tion da aminat	te, the ion in ន្	written examination ca groups (one candidate	o minutes); if announce n be replaced by an or each: 15 minutes, grou nglish if agreed upon w	al examination of on ps of 2: 20 minutes,	e candidate each or	an oral ex-		
Allocat								
Additio	nal inf	ormation						
Worklo	ad							
Teachi	ng cycl							
	<u>15 cyc</u>							
Referre	d to in	LPO I (examination regulati	ons for teaching-degree progra	immes)				
Module	e appea	ars in						
Bachelor' degree (1 major) Computer Science (2010)								
Bachelor' degree (1 major) Business Information Systems (2013)								
Bachelor' degree (1 major) Aerospace Computer Science (2009)								
Bachelor' degree (1 major) Aerospace Computer Science (2011)								
Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012)								
Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)								
	-	-	onal Mathematics (201	2)				
				·				
Master's wi (2012)	ith 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mather	-	page 104 / 199		



First state examination for the teaching degree Gymnasium Computer Science (2009)

Master's with 1 major Computational Mathematics (2012)

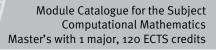
JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Master (120 ECTS) Computational Mathematics - 2012

Module title					Abbreviation			
Theory of Complexity				10-I-KT-102-m01				
Module coordinator				Module offered by	Module offered by			
Dean of Studies Informatik (Computer		er Science)	Institute of Comput	er Science				
ECTS			Only after succ. compl. of module(s)					
5								
Duration Module level		Other prerequisites	Other prerequisites					
1 seme	ster	undergraduate		Admission prerequisite to assessment: exercises (type and scope to be announced by the lecturer at the beginning of the course).				
Conten	ts							
sumpti	Complexity measurements and classes, general relationships between space and time classes, memory con- sumption versus computation time, determinism versus indeterminism, hierarchical theorems, translation me- thods, P-NP problem, completeness problems, Turing reduction, interactive proof systems.							
Intend	ed lear	ning outcomes						
The students possess a fundamental and applicable knowledge in the areas of complexity measurements and classes, general relationships between space and time classes, memory consumption versus computation time, determinism versus indeterminism, hierarchical theorems, translation methods, P-NP problem, completeness problems, Turing reduction, interactive proof systems.								
Course	S (type, r	number of weekly contact hours	s, language — if other than Ge	rman)				
V + Ü (ı	no info	rmation on SWS (weekl	y contact hours) and c	ourse language avail	able)			
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)								
written examination (approx. 50 to 60 minutes); if announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups (one candidate each: 15 minutes, groups of 2: 20 minutes, groups of 3: 25 minutes) Language of assessment: German, English if agreed upon with the examiner								
Allocat	ion of _l	places						
Additio	onal inf	ormation						
Worklo	ad							
Teachi	ng cycl	e						
Referre	d to in	IPOL (ovamination regulation	one for toaching dogroo progr	ammoc)				
Referred to in LPO I (examination regulations for teaching-degree programmes)								
Module appears in								
Bachelor' degree (1 major) Computer Science (2010)								
Bachelor' degree (1 major) Mathematics (2012)								
Bachelor' degree (1 major) Mathematics (2012)								
Bachelor' degree (1 major) Computational Mathematics (2012)								
Bachelor' degree (1 major) Computational Mathematics (2013)								
Bachelor' degree (1 major) Aerospace Computer Science (2009)								
Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Computer Science (2010)								
	-							
Imaster	Master's degree (1 major) Mathematics (2012)							
Master's w (2012)	ith 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mather	-	page 106 / 199		



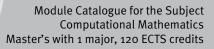
Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)

Module title					Abbreviation		
Automation and Control Technology				10-I-AR-102-m01			
Module coordinator				Module offered by			
holder of the Chair of Computer Science		nce VII	Institute of Comput	er Science			
ECTS Method of grading			Only after succ. compl. of module(s)				
8	nume	rical grade					
Duratio		Module level	Other prerequisites	Other prerequisites			
		undergraduate	Admission prerequisite to assessment: exercises (type and scope t announced by the lecturer at the beginning of the course).		scope to be		
Conten	ts						
Overview of automation systems, fundamental principles of control technology, Laplace transformation, transfer function, plant, controller types, basic feedback loop, fundamental principles of control engineering, automata, structure of Petri nets, Petri nets for automisation, machine-related structure of processing computation machines, communication between process computers and periphery devices, software for automation systems, process synchronisation, process communication, real-time operating systems, real-time planning.							
Intend	ed lear	ning outcomes					
The stu	Idents	master the fundamenta	als of automation and c	ontrol.			
			s, language — if other than Ge				
			ly contact hours) and co		able)		
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examination date, the written examination can be replaced by an oral examination of one candidate each or an oral examination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examination of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral							
examir	ation i	n groups of 3.	ute (approx.) oral exam nglish if agreed upon w		2 and a 40 minute (a	approx.) oral	
Allocat		-					
Additio	nal inf	ormation					
Worklo	ad						
Teachi							
Teacini	ig cyci	e					
Referre	a to in	LPUI (examination regulation	ons for teaching-degree progra	immes)			
		•					
Module							
Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013)							
Bachelor' degree (1 major) Computational Mathematics (2012)							
Bachelor' degree (1 major) Computational Mathematics (2013)							
Bachelor' degree (1 major) Aerospace Computer Science (2009)							
Bachelor' degree (1 major) Aerospace Computer Science (2011)							
Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012)							
		ee (1 major) Mathemat r Computational Mathematics		enerated 26-Aug-2024 • exan	n. reg. data re-	page 108 / 199	
(2012)	.,-			ECTS) Computational Mather	-		



Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)

Module title				Abbreviation		
Computer Networks and Communication Systems				10-I-RK-102-m01		
Module	Module coordinator			Module offered by		
holder	of the (Chair of Computer Scier	nce III	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
8	nume	rical grade		-		
Duratio		Module level	Other prerequisites			
1 seme	ster	undergraduate	Admission prerequi	site to assessment: ecturer at the beginn		scope to be
Conten	ts					
of com and str chies, o and ISO	Properties of computer and communication systems: data traffic in distributed systems. Performance analysis of computer networks and communication systems: problem statement and introduction to method architecture and structure of computer networks: network structure, network access, access methods, digital transfer hierarchies, dataflow control and traffic control, transfer network. Communication protocols: fundamental principles and ISO architecture models. Internet: structure and basic mechanism, TCP/IP, routing, network management. Mobile communication networks: fundamental concepts, GSM, UMTS. Future communication systems and net-					
	ed lear	ning outcomes				
The stu	dents	possess an intricate kn damental principles to		re of computer netwo	orks and communica	tion systems
		number of weekly contact hours		rman)		
	-	rmation on SWS (weekl			able)	
		sessment (type, scope, lang				ion on whether
		le for bonus)	auge in other than ochhan,		it every semester, mornati	on on whether
tion da aminat tion of examir	te, the ion in ន្ one ca iation i	nation (approx. 80 to 9 written examination ca groups. A 80 to 90 minu ndidate each, a 30 min n groups of 3. ssessment: German, Er	n be replaced by an or te written examinatior ute (approx.) oral exan	al examination of on i is equivalent to a 2 hination in groups of	e candidate each or o minute (approx.) o	an oral ex- ral examina-
Allocat	ion of j	olaces				
Additio	onal inf	ormation				
 Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) Aerospace Computer Science (2009) Master's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-						
(2012)				ECTS) Computational Mather	-	p



Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)

Module title				Abbreviation	
Artificial Intelligence				10-l=Kl-102-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)	
8	nume	rical grade		-	
Duratio		Module level	Other prerequisites		
1 seme	ster	graduate	Where applicable, p ning of the course (e		ified by the lecturer at the begin- kercises).
Conten	ts				
propos Bayesia	itional an netv	and predicate logic and i	nference, knowledge ecidability problems,	representation, plan , learning from obse	search with partial information, nning, probabilistic closure and rvations, knowledge while lear-
Intende	ed lear	ning outcomes			
		possess theoretical and p or its application.	oractical knowledge a	bout artificial intelli	gence and are able to assess
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infoi	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion dat aminati	te, the ion in ន្		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
Allocat					
Additio	nal inf	ormation			
Worklo	ad				
Workto	au				
Teachir					
Teachin	ig tyti	e			
 Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module appears in					
Master's degree (1 major) Computer Science (2010)					
Master's degree (1 major) Mathematics (2012)					
Master's degree (1 major) Mathematics (2010)					
Master's degree (1 major) Physics (2010)					
Master's degree (1 major) Physics (2011) Master's degree (4 major) Nanostructure Technology (2014)					
Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010)					
	-	-		2)	
	-	ee (1 major) Computation			
רוואו אנמ	ate exa	mination for the teaching	, degree Gymnasium		2009)

Master's with 1 major Computational Mathematics	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-	page 112 / 199
(2012)	cord Master (120 ECTS) Computational Mathematics - 2012	

Module title				Abbreviation	
E-Learning					10-l=EL-102-m01
Module	coord	inator		Module offered by	
holder	of the O	Chair of Computer Science	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	Where applicable, p ning of the course (e		ified by the lecturer at the begin- kercises).
Conten	ts				
intellige	ent tuto	oring systems, student m	odels, didactics, prol	olem-oriented learni	standards for learning systems, ng and case-based training sy- aluation of learning systems.
Intende	ed learn	ning outcomes			
The stu plicatio		possess a theoretical and	l practical knowledge	about eLearning an	d are able to assess possible ap-
Course	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion dat aminati	te, the ion in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module appears in					
Master's degree (1 major) Computer Science (2010)					
	-	ee (1 major) Mathematics			
Master's degree (1 major) Mathematics (2010)					
Master's degree (1 major) Business Information Systems (2011) Master's degree (1 major) Business Information Systems (2013)					
	-	ee (1 major) Computation		-	
		ee (1 major) Functional M		,	
First sta	ate exa	mination for the teaching	degree Gymnasium	Computer Science (2	2009)

Module title				Abbreviation		
Medical Informatics					10-I=MI-102-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		rerequisites as spec e.g. completion of ex	ified by the lecturer at the begin- xercises).	
Conten	ts					
mary ar	nd func		ision making and as	sistance systems, sta	operation of computers in infir- atistics and data mining in medi-	
Intende	ed learı	ning outcomes				
The stu medicir	•	possess theoretical and p	oractical knowledge a	about the applicatior	n of computer science methods in	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
tion dat aminati	te, the ion in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Computer Science (2010)						
	Master's degree (1 major) Mathematics (2012)					
	-	ee (1 major) Mathematics				
waster	Master's degree (1 major) Computational Mathematics (2012)					

Module title				Abbreviation	
Deductive Databases				10-l=DDB-102-m01	
Module coor	dinator		Module offered by		
Dean of Stud	ies Informatik (Computer	Science)	Institute of Comput	er Science	
ECTS Meth	od of grading	Only after succ. com	npl. of module(s)		
8 num	erical grade				
Duration	Module level	Other prerequisites			
1 semester	graduate		rerequisites as spec e.g. completion of ex	ified by the lecturer at the begin- xercises).	
Contents					
	emantics of logic program for Datalog; negation and			d applications for Prolog; analyti-	
Intended lea	rning outcomes				
The students	possess expertise in wor	king with Prolog and I	Datalog (including n	egation and disjunction).	
Courses (type,	number of weekly contact hours, I	anguage — if other than Ger	rman)		
V + Ü (no info	ormation on SWS (weekly	contact hours) and co	ourse language avail	able)	
Method of as	sessment (type, scope, langua	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
module is credita					
tion date, the amination in tion of one ca examination	e written examination can groups. A 80 to 90 minute	be replaced by an ora e written examination e (approx.) oral exam	al examination of on i is equivalent to a 20 nination in groups of	four weeks prior to the examina- e candidate each or an oral ex- o minute (approx.) oral examina- 2 and a 40 minute (approx.) oral	
Allocation of					
Additional in	formation				
Workload					
		,			
Teaching cyc	le				
Referred to in	LPO I (examination regulation	s for teaching-degree progra	immes)		
Module appears in					
Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)					

Module title				Abbreviation		
Databases II					10-l=DB2-102-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		Module level	Other prerequisites			
1 seme	ster	graduate	Where applicable, p ning of the course (e		ified by the lecturer at the begin- kercises).	
Conten	ts					
Data wa	arehou	ses and data mining; XM	L databases; web dat	tabases;introductior	n to Datalog.	
		ning outcomes				
		have advanced knowledg	e about relational da	tabases. XML and d	ata mining.	
		number of weekly contact hours, la	-		0	
		mation on SWS (weekly o			able)	
Method	d of ass	· · ·			t every semester, information on whether	
tion da aminat	te, the ion in g ge of a	written examination can groups (one candidate ea ssessment: German, Eng	be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)	
Allocut						
Additio	nal inf	ormation				
Additio	inat init					
Worklo	ad					
Teachi	ng cycl	۵				
	is cyce					
Poforro	d to in	LPO I (examination regulations				
Referre			s for teaching-degree progra	mmes)		
Module	2000	arc in				
Module appears in Master's degree (1 major) Computer Science (2010)						
Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)						
Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011)						
Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011)						
	Master's degree (1 major) Nanostructure Technology (2010)					
	Master's degree (1 major) Business Information Systems (2011)					
	Master's degree (1 major) Business Information Systems (2013)					
	-	ee (1 major) Computation		2)		
	-	ee (1 major) Functional M			`	
First sta	First state examination for the teaching degree Gymnasium Computer Science (2009)					

Module title					Abbreviation
Simula	Simulation Techniques for Performance Evaluation				10-l=ST-102-m01
Module	e coord	inator		Module offered by	
holder	of the (Chair of Computer Scienc	e III	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	Where applicable, p ning of the course (e	• •	ified by the lecturer at the begin- kercises).
Conten	ts				
bles, ra measui	ndom red dat f mode	sample theory and estim a, planning and evaluatio	ation techniques, sta on of simulation expe	tistical analysis of s riments, special ran	m numbers and random varia- imulation values, inspection of dom processes, possibilities and actical execution of simulation
Intende	ed lear	ning outcomes			
	cal) sys	stems, the evaluation of r			y for the stochastic simulation of possibilities and limits of simu-
Course	S (type, r	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion da aminat tion of examin	te, the ion in g one ca ation i	written examination can groups. A 80 to 90 minute	be replaced by an ora written examination e (approx.) oral exam	al examination of on is equivalent to a 2 ination in groups of	four weeks prior to the examina- e candidate each or an oral ex- o minute (approx.) oral examina- 2 and a 40 minute (approx.) oral
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012)					
	-	ee (1 major) Mathematics			
Master	's degr	ee (1 major) Computation	al Mathematics (2012		
First sta	ate exa	mination for the teaching	degree Gymnasium	Computer Science (2	2009)

Master's with 1 major Computational Mathematics
(2012)

Module title				Abbreviation		
Advanc	Advanced Topics in Computational Complexity				10-l=KT2-102-m01	
Module	coord	inator		Module offered by		
Dean of	fStudie	es Informatik (Computer	Science)	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	Where applicable, p ning of the course (e		ified by the lecturer at the begin- xercises).	
Conten	ts					
		IP-complete sets, autore stic algorithms.	ducibility, interactive	proof systems, poly	nomial time hierarchy, complexi-	
Intende	ed learr	ning outcomes				
			••		properties of NP-complete sets, exity of probabilistic algorithms.	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner						
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ng cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	Master's degree (1 major) Computer Science (2010)					
		ee (1 major) Mathematics				
master	Master's degree (1 major) Computational Mathematics (2012)					

Module title				Abbreviation	
Cryptography and Data Security				10-I=KD-102-m01	
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Informatik (Computer	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	Where applicable, p ning of the course (e		ified by the lecturer at the begin- kercises).
Conten	ts				
RSA, Di	iffie-He		ser-Micali, digital sig	nature, challenge-re	oublic key cryptography systems, sponse methods, secret sharing,
Intende	ed lear	ning outcomes			
stems, wasser	Vernar -Micali	n one-time pad, AES, per	fect security, public k nge-response metho	ey cryptography, RS	private key cryptography sy- A, Diffie-Hellman, Elgamal, Gold- llionaire problem, secure circuit
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion da aminat	te, the ion in ខ្		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
	-				
Worklo	ad				
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master's degree (1 major) Computer Science (2010)					
Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)					
	-	ee (1 major) Mathematics ee (1 major) Computation		2)	
					2009)
First state examination for the teaching degree Gymnasium Computer Science (2009)					

Module title					Abbreviation	
Computational Geometry					10-I=AG-102-m01	
Module	e coord	inator		Module offered by		
holder	of the (Chair of Computer Scienc	e l	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	Where applicable, p ning of the course (e		ified by the lecturer at the begin- kercises).	
Conten	ts					
formati algorith	on syst nmic as	tems it is necessary to s pects of these tasks: We	store, analyse, create will acquire techniqu	or manipulate spati les that are needed t	virtual reality and geographic in- al data. This class is about the to plan and analyse geometric al- in the practical areas listed abo-	
Intende	ed learı	ning outcomes				
metric	probler		to analyse new proble	ems and to come up	for the solution of a given geo- with their own efficient solutions	
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
tion dat aminati	te, the ion in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ıg cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Computer Science (2010)						
	Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)					
	-	ee (1 major) Mathematics ee (1 major) Computation		2)		
	-	mination for the teaching			2009)	

Module	title				Abbreviation		
Approx	imatio	n Algorithms			10-I=APA-102-m01		
Module	coord	inator		Module offered by			
holder	of the C	Chair of Computer Scienc	e l	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	Where applicable, p ning of the course (e		ified by the lecturer at the begin- kercises).		
Conten	ts						
there an are use drafting practica	re man d whic g and a al optin	y problems without an ef h do not always give the nalysing techniques for a	ficient algorithm for a optimal solution but algorithms which have cture will introduce s	n optimal solution. always give good so e a proven approxim tudents to importan	omputer science. Unfortunately, As a result, in practice, methods lutions. This lecture will discuss ation quality. With the help of t drafting techniques such as		
Intende	ed learr	ning outcomes					
dament	tal draf		greedy, local search a		quality. They understand fun- s methods based on linear pro-		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
		s essment (type, scope, langua) le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
tion dat aminati	te, the ion in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachir	ng cycl	e					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	appea	ars in					
	-	ee (1 major) Computer Sc					
	-	ee (1 major) Mathematics					
	-	ee (1 major) Mathematics ee (1 major) Computation		2)			
	-	mination for the teaching			2009)		
			- /	,			

Master's with 1 major Computational Mathematics	JMU Wü
(2012)	cord M

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holder of the Chair of Computer Science I 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 Where applicable, prerequisites as specified by the lecturer at the beginning of the course (e.g. completion of exercises). Contents - - Algorithmic foundations of geographic information systems and their application in selected problems of acquisition. Applications such as the creation of digital height models, working with GPS trajectories, tasks of spatial planning as well as cartographic generalisation. Intended learning outcomes - The students are able to formalise algorithmic problems in the field of geographic information systems as well as to select and improve suitable approaches to solving these problems. Courses (type, number of weekly contact hours, language – if other than German) V + 0 (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German) V + 0 (no information on SWS (weekly contact hours) and course language available) Method of assessment: German, English if agreed upon with the examination of exaction or al examination in groups (one candidate each: 15 minutes, groups of 2: 20 minutes, groups of 3: 25 minutes) Language of assessment: German, English if agreed upon with the examiner <	Algorit	nms fo	r Geographic Informatior	ı Systems		10-l=AGIS-102-m01
ECTS Method of grading Only after succ. compl. of module(s) 5 numerical grade - Duration Module level Other prerequisites 1 semester graduate Where applicable, prerequisites as specified by the lecturer at the beginning of the course (e.g., completion of exercises). Contents Algorithmic foundations of geographic information systems and their application in selected problems of acquisition, processing, analysis and presentation of spatial information. Processes of discrete and continuous optimisation. Applications such as the creation of digital height models, working with GPS trajectories, tasks of spatial planning as well as cartographic generalisation. Intended learning outcomes The students are able to formalise algorithmic problems in the field of geographic information systems as well as to select and improve suitable approaches to solving these problems. Courses (type, number of weekly contact hours, language – if other than German) V + Ü (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German) V + Ü (no information can be replaced by an oral examination of one candidate each or an oral examination of a prous of assessment (spe. scope, language – is other than German) written examination (can be replaced by an oral examination of one candidate each or an oral examination of places If announced by the lecturer by four weeks prior to the examination of a seassment: German, English if agreed upon with the examiner	Module	coord	inator		Module offered by	
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Duration Module level Other prerequisites 1 semester graduate Where applicable, prerequisites as specified by the lecturer at the beginning of the course (e. g. completion of exercises). Contents Algorithmic foundations of geographic information systems and their application in selected problems of acquisition, processing, analysis and presentation of spatial information. Processes of discrete and continuous optimisation. Applications such as the creation of digital height models, working with GPS trajectories, tasks of spatial planning as well as cartographic generalisation. Intended learning outcomes The students are able to formalise algorithmic problems in the field of geographic information systems as well as to select and improve suitable approaches to solving these problems. Courses (type, number of weekly contact hours, language – if other than German) V + Ü (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 50 to 6 minutes); if announced by the lecturer by four weeks prior to the examination date each n as projuces (use a seessment: German, English if agreed upon with the examiner Alditional information	ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
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to select and improve suitable approaches to solving these problems. Courses (type, number of weekly contact hours, language – if other than German) V + Ü (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 50 to 60 minutes); if announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups (one candidate each: 15 minutes, groups of 2: 20 minutes, groups of 3: 25 minutes) Language of assessment: German, English if agreed upon with the examiner Allocation of places Additional information Workload Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Computational Mathematics (2012)						
V + Ü (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 50 to 60 minutes); if announced by the lecturer by four weeks prior to the examination date, the written examination can be replaced by an oral examination of one candidate each or an oral examination in groups (one candidate each: 15 minutes, groups of 2: 20 minutes, groups of 3: 25 minutes) Language of assessment: German, English if agreed upon with the examiner Allocation of places Additional information Korkload Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Computational Mathematics (2012) <td></td> <td></td> <td></td> <td>•</td> <td></td> <td>ic information systems as well as</td>				•		ic information systems as well as
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 50 to 60 minutes); if announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups (one candidate each: 15 minutes, groups of 2: 20 minutes, groups of 3: 25 minutes) Language of assessment: German, English if agreed upon with the examiner Allocation of places Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012)	Courses	5 (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
module is creditable for bonus) written examination (approx. 50 to 60 minutes); if announced by the lecturer by four weeks prior to the examination date, the written examination can be replaced by an oral examination of one candidate each or an oral examination in groups (one candidate each: 15 minutes, groups of 2: 20 minutes, groups of 3: 25 minutes) Language of assessment: German, English if agreed upon with the examiner Allocation of places Additional information Morkload Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Computational Mathematics (2012)	V + Ü (r	io infoi	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
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Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)	tion dat aminati	te, the ion in g	written examination can groups (one candidate ea	be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	e candidate each or an oral ex-
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 Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)						
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)	Additio	nal inf	ormation			
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)						
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Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)						
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Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)						
Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)	Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)						
Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)	Module	appea	ars in			
Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012)		•				
Master's degree (1 major) Computational Mathematics (2012)						
		-			2)	
		-				2009)

Module	title				Abbreviation	
Compil	er Cons	struction			10-I=CB-102-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)		
8	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	Where applicable, p ning of the course (e		ified by the lecturer at the begin- kercises).	
Conten	ts					
Lexical	analys	is, syntactic analysis, ser	nantics, compiler gei	nerators, code gener	ators, code optimisation.	
Intende	ed lear	ning outcomes				
They ar	e able				uages and their compilation. utomata, push-down automata	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (r	no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
tion dat aminat tion of examin	te, the ion in g one ca ation i	written examination can groups. A 80 to 90 minute	be replaced by an ora written examination e (approx.) oral exam	al examination of on is equivalent to a 20 ination in groups of	four weeks prior to the examina- e candidate each or an oral ex- o minute (approx.) oral examina- 2 and a 40 minute (approx.) oral	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ıg cycl	e				
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)		
Module	Module appears in					
Master	's degr	ee (1 major) Computer Sc	ience (2010)			
	-	ee (1 major) Mathematics				
	-	ee (1 major) Mathematics				
	-	ee (1 major) Computation			`	
First sta	ate exa	mination for the teaching	degree Gymnasium	Computer Science (2	2009)	

Module	e title				Abbreviation
Program Design and Analysis 10			10-I=PA-102-m01		
Module	e coordi	inator		Module offered by	
holder	of the C	Chair of Computer Science	e ll	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	Where applicable, p ning of the course (e		ified by the lecturer at the begin- vercises).
Conten	ts				
Program	n analy	sis, model creation in so	ftware engineering, p	rogram quality, test	of programs, process models.
		ning outcomes			· · · ·
	dents a	-	ams, to use testing fra	ameworks and metri	cs as well as to judge program
Course	S (type, n	umber of weekly contact hours, la	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)
Method	l of ass	· · ·			t every semester, information on whether
tion dat aminati	te, the ion in g ge of a	written examination can roups (one candidate ea ssessment: German, Eng	be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
	<u> </u>				
Additio	nal info	ormation			
Worklo	ad				
Teachir	ng cycle	9			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module	e appea	irs in			
Master' Master' Master' Master' Master' Master' Master' Master'	s degre s degre s degre s degre s degre s degre s degre s degre s degre s degre	ee (1 major) Computer Sc ee (1 major) Mathematics ee (1 major) Mathematics ee (1 major) Physics (2010 ee (1 major) Physics (2012 ee (1 major) Nanostructur ee (1 major) Nanostructur ee (1 major) Business Info ee (1 major) Business Info ee (1 major) Computation	(2012) (2010) b) re Technology (2011) re Technology (2010) formation Systems (20 formation Systems (20 al Mathematics (2012)	2)	
First sta	ate exa	mination for the teaching	degree Gymnasium	Computer Science (2	2009)

Module	title				Abbreviation
Comput	ter Arit	hmetic			10-I=RAM-102-m01
Module	coord	inator		Module offered by	
holder	of the (Chair of Computer Scienc	e ll	Institute of Computer 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		rerequisites as spec e.g. completion of e>	ified by the lecturer at the begin- kercises).
Conten	ts				
		nerical computation, rast I calculation.	er and rounding, defi	nition and implemer	ntation of computational arithme-
Intende	ed learr	ning outcomes			
					aster and roundings, definition naster the application of algo-
Courses	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion dat aminati	te, the ion in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module	e appea	in in			
Master'	's degre	ee (1 major) Computer Sc	ience (2010)		
	-	ee (1 major) Mathematics			
	-	ee (1 major) Mathematics			
	-	ee (1 major) Computation			,
First sta	ate exa	mination for the teaching	g degree Gymnasium	Computer Science (2	2009)

Module	title				Abbreviation
Automa	ata The	ory			10-I=AUT-102-m01
Module	coord	inator		Module offered by	
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Compute	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	Admission prerequise announced by the le		exercises (type and scope to be ing of the course).
Conten	ts				
words,	langua		nonoids, syntactic mo	onoid, predicate logi	ations, predicate logic with cal and algebraic characterisati-
Intende	ed learr	ning outcomes			
ges, sta	ar-free l Is, synt	anguages, natural equiva actic monoid, predicate l	alence relations, pred	licate logic with word	inite automata, regular langua- ds, language acceptance through egular and star-free languages,
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)
		e essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion dat aminati	te, the ion in g		be replaced by an ora ch: 15 minutes, group	al examination of one os of 2: 20 minutes, g	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
Teachir	ng cycl	9			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module	appea	in in			
Master'	s degre	ee (1 major) Mathematics	(2012)		
	-	ee (1 major) Computation			
First sta	First state examination for the teaching degree Gymnasium Computer Science (2009)				

Module	title				Abbreviation
Comput	ability	Theory			10-I=BER-102-m01
Module	coord	inator		Module offered by	
Dean of	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	n	Module level	Other prerequisites		
1 semes	ster	graduate		site to assessment: e ecturer at the beginn	exercises (type and scope to be ing of the course).
Content	ts				
		ing, computable functior e sets, relative computab			problem, m-reducibility, creative 5, arithmetic hierarchy.
Intende	d learr	ning outcomes			
ons, de	cidable		ting problem, m-redu	icibility, creative and	Gödel numbers, countable functi- l productive sets, relative compu-
Courses	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (n	io infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		e essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion dat aminati	te, the on in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
Allocati	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
Teachin	ig cycl	9			
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)	
Module					
Master'	s degre	ee (1 major) Mathematics ee (1 major) Computation mination for the teaching	al Mathematics (201		2009)

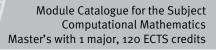
Module	title				Abbreviation
Mathematical Logic 10-I=ML-102-m01			10-I=ML-102-m01		
Module	coord	inator		Module offered by	
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate	Admission prerequis announced by the le		exercises (type and scope to be ing of the course).
Conten	ts				
		logic, first-order predicat ncompleteness theorem,			pleteness theorem, Tarski theo- of elemental arithmetic.
Intende	ed learr	ning outcomes			
predica	te logi		iödel's completeness	theorem, Tarski the	oropositional logic, first-order orem, Gödel's incompleteness
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
tion dat aminat	te, the ion in g		be replaced by an ora ch: 15 minutes, group	al examination of on os of 2: 20 minutes,	four weeks prior to the examina- e candidate each or an oral ex- groups of 3: 25 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)	
Module					
Master'	Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Computational Mathematics (2012)				
First sta	ate exa	mination for the teaching	degree Gymnasium	Computer Science (2	2009)



Application-oriented Subject Aerospace Computer Science

(ECTS credits)

Module	e title				Abbreviation	
Automation and Control Technology 10-I-AR-102-m01						
Module	e coord	inator		Module offered by		
holder	of the (Chair of Computer Scie	ence VII Institute of Computer Science			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
8	1	rical grade		•		
Duratio		Module level	Other prerequisites			
1 seme	ster	undergraduate	Admission prerequi	site to assessment: e ecturer at the beginn		scope to be
Conten	ts					
functio structu nes, co	n, plan re of Pe mmuni	t, controller types, bas etri nets, Petri nets for ication between proces	ndamental principles of ic feedback loop, funda automisation, machine as computers and perip nunication, real-time op	amental principles of -related structure of hery devices, softwa	control engineering processing computa re for automation sy	, automata, tion machi-
Intend	ed lear	ning outcomes				
The stu	Idents	master the fundamenta	als of automation and c	ontrol.		
			s, language — if other than Ge			
			ly contact hours) and co		able)	
module is written tion da aminat	examinates creditables examinates the second	le for bonus) nation (approx. 80 to 9 written examination ca groups. A 80 to 90 min	o minutes). If announc o minutes). If announc on be replaced by an or ute written examinatior oute (approx.) oral exam	ed by the lecturer by al examination of on 1 is equivalent to a 20	four weeks prior to t e candidate each or o minute (approx.) o	the examina- an oral ex- ral examina-
examir	ation i	n groups of 3.				
		-	nglish if agreed upon w	vith the examiner		
Allocat	ion of _l	places				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ummes)		
Module	e appea	ars in				
		ree (1 major) Computer	Science (2010)			
	Bachelor' degree (1 major) Mathematics (2012)					
Bachelor' degree (1 major) Mathematics (2013)						
	-		ional Mathematics (20			
	-		ional Mathematics (20	-		
	-		e Computer Science (20 2 Computer Science (20	•		
	-	ree (1 major) Aerospac ee (1 major) Computer	e Computer Science (20 Science (2010))11)		
	-	ee (1 major) Computer ee (1 major) Mathemat				
Master's w		r Computational Mathematics		enerated 26-Aug-2024 • exam	ı. reg. data re-	page 130 / 199
(2012)			cord Master (120	ECTS) Computational Mather	natics - 2012	1

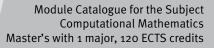


Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)

Module title A			Abbreviation			
Computer Architecture 10-I-RAK-102-m01						
Module coordinator Module offered by						
Dean o	f Studi	es Informatik (Compute	r Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio		Module level	Other prerequisites			
1 seme	ster	undergraduate		site to assessment: e ecturer at the beginn		scope to be
Conten	ts					
		t architectures, comma vector processors, multi	, – –	pipelining, statical a	and dynamic instruct	tion schedu-
Intende	ed lear	ning outcomes				
		master the most import l operating systems.	ant techniques to desi	gn fast computers as	s well as their interac	ction with
		number of weekly contact hours	, language — if other than Ge	rman)		
		mation on SWS (weekl			able)	
		sessment (type, scope, lang				ion on whether
		le for bonus)				
tion da aminat Langua	te, the ion in g ige of a	nation (approx. 50 to 60 written examination ca groups (one candidate 6 ssessment: German, Er	n be replaced by an or each: 15 minutes, grou	al examination of on ps of 2: 20 minutes,	e candidate each or	an oral ex-
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	е				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	immes)		
§ 69 (1)) 1. c) Ir	nformatik Technische In	formatik			
Module	e appea	ars in				
Bachel	or' deg	ree (1 major) Computer	Science (2010)			
	-	ree (1 major) Mathemat				
	-	ree (1 major) Mathemat	-	、 、		
	-	ree (1 major) Computat				
Bachelor' degree (1 major) Computational Mathematics (2013)						
	Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011)					
	-	ee (1 major) Computer S	•	···,		
	-	ee (1 major) Mathemati				
	-	ee (1 major) Mathemati				
	-	ee (1 major) Physics (20				
	-	ee (1 major) Physics (20				
Master's wi (2012)	ith 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exam ECTS) Computational Mather	-	page 132 / 199

Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Computational Mathematics (2012)

Module	e title				Abbreviation		
Computer Networks and Communication Systems				10-I-RK-102-m01			
Module	e coord	inator		Module offered by	_		
holder	of the (Chair of Computer Scier	nce III	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
8	nume	rical grade		-			
Duratio		Module level	Other prerequisites				
1 seme	ster	undergraduate	Admission prerequi	site to assessment: ecturer at the beginn		scope to be	
Conten	ts	•	<u> </u>	¥			
of com and str chies, and IS	Properties of computer and communication systems: data traffic in distributed systems. Performance analysis of computer networks and communication systems: problem statement and introduction to method architecture and structure of computer networks: network structure, network access, access methods, digital transfer hierarchies, dataflow control and traffic control, transfer network. Communication protocols: fundamental principles and ISO architecture models. Internet: structure and basic mechanism, TCP/IP, routing, network management. Mobile communication networks: fundamental concepts, GSM, UMTS. Future communication systems and net-						
	ed lear	ning outcomes					
The stu	idents	possess an intricate kn damental principles to		re of computer netwo	orks and communica	tion systems	
		number of weekly contact hours		rman)			
		rmation on SWS (weekl			able)		
		sessment (type, scope, lang				ion on whothor	
		le for bonus)	uage — II other than German,		every semester, mormati	on on whether	
tion da aminat tion of examir	te, the ion in g one can nation i	nation (approx. 80 to 9 written examination ca groups. A 80 to 90 minu ndidate each, a 30 min n groups of 3. ssessment: German, Er	n be replaced by an or ite written examinatior ute (approx.) oral exan	al examination of on i is equivalent to a 2 hination in groups of	e candidate each or o minute (approx.) o	an oral ex- ral examina-	
Allocat	ion of p	olaces					
Additio	onal inf	ormation					
 Worklo	ad						
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	immes)			
Module	e appea	ars in					
Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) Aerospace Computer Science (2009) Master's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-							
(2012)				ECTS) Computational Mather	-	P~5~ 1)4 / 199	



Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)

Module title					Abbreviation	
Embedo	ded Sy	stems			10-I=ES-102-m01	
Module coordinator				Module offered by		
Dean of	f Studi	es Informatik (Computer	Science)	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	Where applicable, prerequisites as specified by the lecturer at the begin- ning of the course (e. g. completion of exercises).			
Conten	ts					
	s, impl				troller), verification of embedded ms, hardware synthesis, softwa-	
Intende	ed lear	ning outcomes				
	nportar				dded systems and master the uch systems in hardware and	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (n	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
tion dat aminati tion of e examin	written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner					
Allocation of places						
Additio	nal inf	ormation				
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	-	ee (1 major) Computer Sc				
	Master's degree (1 major) Mathematics (2012)					
	-	ee (1 major) Mathematics ee (1 major) Computation		2)		
	-	mination for the teaching			2009)	

Module	Module title Abbreviation					
Robotics 10-I=RO-102-m01						
Module coordinator				Module offered by		
holder	of the (Chair of Computer Scie	nce VII	Institute of Comput	er Science	
ECTS		od of grading	Only after succ. con	· · ·		
8		rical grade				
Duratio		Module level	Other prerequisites			
1 semes		graduate	Where applicable, p		ified by the lecturer xercises).	at the begin-
Conten	ts					
homoge tor conf Worksp se dyna lonome Movem	enous figurati ace an amics. es and ent cor	coordinates, axis coord on, numerical and ana alysis and trajectory p Mobile robots: direct a non-holonome restricti ntrol and path planning	of robots, direct kinem linates, arm equation. lytical approaches, exa anning, dynamics of m nd inverse kinematics, ons, kinematic classifi g: roadmap methods, c nsors, distance sensors	Inverse kinematics: imples of different ro anipulators: Lagrans propulsion system, cation of mobile rob ell decomposition m	solution properties, bots for analytical a ge-Euler model, direc tricycle, Ackermann ots, posture kinemat	end effec- pproaches. ct and inver- steering, ho- ic model.
	-	ning outcomes				
			als of robot manipulato ell as the planning of pa			niliar with
		· · · · · · · · · · · · · · · · · · ·	s, language — if other than Ger			
			y contact hours) and co		able)	
Method	l of ass		guage — if other than German,			on on whether
tion dat aminati tion of e examin	written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3.					
Language of assessment: German, English if agreed upon with the examiner Allocation of places						
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ng cycl	۹				
	is cyci					
Poforro						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	20002	ors in				
	Module appears in Bachelor' degree (1 major) Aerospace Computer Science (2009)					
	Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011)					
	Master's degree (1 major) Computer Science (2010)					
	Master's degree (1 major) Mathematics (2012)					
Master'	Master's degree (1 major) Mathematics (2010)					
Master's wi (2012)	th 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mather	-	page 137 / 199



Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)

Module title Abbreviation						
Spacecraft Systems Design					10-l=SSD-102-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	numer	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme:	ster	graduate		Where applicable, prerequisites as specified by the lecturer at the begin- ning of the course (e. g. completion of exercises).		
Conten	ts					
orbits, angle o on of th lemetry generat	disturb of incide nermal o o, teleco tion: so	ance forces, transfer orb ence. Thermal control of designs. Telecommunica ommando). Structure and	its. Mission analysis: satellites: thermal an tion: ground contact I mechanisms. Energ	earth and sun-syncl alysis, thermal desig analysis, data trans y systems: primary, s	cs: two-body dynamics, Kepler hronous orbits, shadows, solar gn and technologies, verificati- mission, satellite monitoring (te- secondary, management, power lechanical, electrical). Operation	
Intende	ed learr	ning outcomes				
		naster system aspects of s and their integration in			g the example of spacecraft, ma-	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner						
Allocation of places						
Additional information						
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module						
	-	ee (1 major) Computer Sc				
	-	ee (1 major) Mathematics ee (1 major) Mathematics				
	-	ee (1 major) Kathematics		2)		

Advanced Automation 10-I=AA-102-m01 Module contributor Institute of Computer Science Institute of Computer Science ECTS Method of grading Only after succ. compl. of module(S) 8 numerical grade Duration Module level Other prerequisites Bottomic (S) graduate Where applicable, prerequisites as specified by the lecturer at the beginning of the course (e.g. completion of exercises). Contents Advanced topics in automation systems as well as instrumentation and control engineering, for example from the field of sensor data processing, actuators, cooperating systems, mission and trajectory planning. Intended learning outcomes	Module title					Abbreviation	
holder of the Chair of Computer Science VII 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 Where applicable, prerequisites as specified by the lecturer at the beginning of the course (e. g. completion of exercises). Contents Advanced topics in automation systems as well as instrumentation and control engineering, for example from the field of sensor data processing, actuators, cooperating systems, mission and trajectory planning. Intended learning outcomes Intended learning outcomes The students have an advanced knowledge of selected topics in automation systems. They are able to implement advanced automation systems. Courses (type, number of weekly contact hours, language – if other than German) V + 0 (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examination of ne candidate each, a 30 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner Additional information	Advanced Automation					10-I=AA-102-m01	
ECTS Method of grading Only after succ. compl. of module(s) 8 numerical grade - Duration Module level Other prerequisites 1 semester graduate Where applicable, prerequisites as specified by the lecturer at the beginning of the course (e. g. completion of exercises). Contents Advanced topics in automation systems as well as instrumentation and control engineering, for example from the field of sensor data processing, actuators, cooperating systems, mission and trajectory planning. Intended learning outcomes Intended learning outcomes The students have an advanced knowledge of selected topics in automation systems. They are able to implement advanced automation systems. Courses (type, number of weekly contact hours, language – if other than German) V + 0 (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German) V + 0 (no information on SWS (weekly contact hours)) and course language available) Method of easessment (uppe, scope, language – if other than German) V + 0 (no information (approx. 80 to 90 minutes)). If announced by the lecturer by four weeks prior to the examination of ne candidate each a 30 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner Additional information Morkload	Module coordinator				Module offered by		
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Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner Allocation of places Method function Workload Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)	Courses	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
module is creditable for bonus) written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner Allocation of places Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)	V + Ü (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
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Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)	tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3.						
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Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)	Additio	nal inf	ormation				
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Master's degree (1 major) Computer Science (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)							
Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)							
Master's degree (1 major) Mathematics (2010)		-					
		-					

Module title					
		10-l=R02-102-m01			
	Module offered by				
e VII	Institute of Comput	er Science			
Only after succ. com	pl. of module(s)				
Other prerequisites					
rver, feedback with s dom processes, stock	tate observer, time c nastic dynamic syste	liscrete systems, stochastic sy- ems, Kalman filter: derivation, in-			
s a knowledge of adva airs controllability - o	anced controller and bservability as well	observer methods and recogni- as controller design and observer			
anguage — if other than Ger	man)				
contact hours) and co	urse language avail	able)			
ge — if other than German, e	examination offered — if no	t every semester, information on whether			
written examination (approx. 80 to 90 minutes). If announced by the lecturer by four weeks prior to the examina- tion date, the written examination can be replaced by an oral examination of one candidate each or an oral ex- amination in groups. A 80 to 90 minute written examination is equivalent to a 20 minute (approx.) oral examina- tion of one candidate each, a 30 minute (approx.) oral examination in groups of 2 and a 40 minute (approx.) oral examination in groups of 3. Language of assessment: German, English if agreed upon with the examiner					
Teaching cycle					
s for teaching-degree progra	mmes)				
Master's degree (1 major) Computer Science (2010)					
Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010)					
	2)				
Master's degree (1 major) Computational Mathematics (2012) First state examination for the teaching degree Gymnasium Computer Science (2009)					
	Other prerequisites Where applicable, p ning of the course (e rollability and observerver, feedback with si dom processes, stockers of Kalman filters, that are necessary to s a knowledge of adva bairs controllability - o nship between the Ka language — if other than Ger contact hours) and co age — if other than German, e minutes). If announce be replaced by an ora e written examination te (approx.) oral exam glish if agreed upon w s for teaching-degree progra s for teaching-degree progra cience (2010) al Mathematics (2012)	e VII Institute of Comput Only after succ. compl. of module(s) Other prerequisites Where applicable, prerequisites as specenting of the course (e.g. completion of ex- rollability and observability, controller deverse, feedback with state observer, time of dom processes, stochastic dynamic systemers of Kalman filters, extended Kalman filters, extended Kalman filters as a state that are necessary to understand Kalmanns a knowledge of advanced controller and bairs controllability - observability as well nship between the Kalman filter as a state language — if other than German) contact hours) and course language avail age — if other than German, examination offered — if no minutes). If announced by the lecturer by be replaced by an oral examination of a zerie (approx.) oral examination in groups of glish if agreed upon with the examiner s for teaching-degree programmes) cience (2010) 5 (2012) 5 (2010) hal Mathematics (2012)			

Master's with 1 major Computational Mathematics
(2012)



Application-oriented Subject Physics

(ECTS credits)



Solid State Physics and Nanostructures (Experiment)

(ECTS credits)

Module	e title				Abbreviation
Semico	onducto	or Lasers - Principles and	l Current Research		11-HLF-092-m01
Module coordinator				Module offered by	
Manag	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics a	and Astronomy
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 semester		graduate	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.		
	cture di				semiconductor lasers, and cur- d on the basis of a general laser
riers ar des, la: ductor cade la	nd phot ser reso lasers. isers, te	cons. Other topics of the onators, mode selection, The lecture closes with o erahertz lasers or high-p	lecture are optical pro dynamic properties a current topics of laser	ocesses in semicond as well as technology	d rate equations for charge car- uctors, layer and ridge wavegui- y for the generation of semicon- iantum dot lasers, quantum cas-
		ning outcomes			
		have advanced knowled modern questions and k			r physics. They can apply their opment of components.
Course	S (type, r	number of weekly contact hours,	language — if other than Ger	rman)	
R + V (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		S essment (type, scope, langua ole for bonus)	age — if other than German, o	examination offered — if no	ot every semester, information on whether
groups project (appro: Assess and wil examir	(appro report x. 30 m ment o Il be an nation r	ox. 30 minutes per candio (approx. 8 to 10 pages, t inutes) ffered: When and how of	date, for modules with ime to complete: 1 to ften assessment will h der observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese pe offered depends o	date each or oral examination in edits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	ion of p	places			
Additio	nal inf	ormation			
Workla	ad				

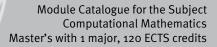
Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)
Master's degree (1 major) Functional Materials (2012)

Module title					Abbreviation	
Solid State Physics 2 11-FK2-092-m01						
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of A	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts					
cal mo	del. Die	id-State Physics. Electro electric properties and fe optical properties [optic	erroelectrics. Semicon			
Intende	ed learı	ning outcomes				
		have specific and advar e in a sub-discipline of		field of Solid-State F	Physics. They are the	oretically ab-
Course	S (type, n	number of weekly contact hours	, language — if other than Gei	rman)		
R + V (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langu le for bonus)	age — if other than German,	examination offered — if no	t every semester, informat	ion on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.					nutes) or c) esentation sessment	
_		ssessment: German, En blaces	5			
Allocation of places						
Additional information						
Workload						
 Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
	 Module appears in					
module	e appea	Irs In				
Master's w (2012)	aster's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- cord Master (120 ECTS) Computational Mathematics - 2012 page 146 / 199					



Bachelor' degree (1 major) Physics (2010)	
Bachelor' degree (1 major) Physics (2012)	
Master's degree (1 major) Mathematics (2012)	
Master's degree (1 major) Mathematics (2010)	
Master's degree (1 major) Physics (2010)	
Master's degree (1 major) Physics (2011)	
Master's degree (1 major) Nanostructure Technology (2011)	
Master's degree (1 major) Nanostructure Technology (2010)	
Master's degree (1 major) FOKUS Physics - Nanostructuring Technol	ogy (2010)
Master's degree (1 major) FOKUS Physics (2010)	
Master's degree (1 major) FOKUS Physics (2011)	
Master's degree (1 major) Computational Mathematics (2012)	

Module title					Abbreviation		
Solid S	tate Sp	ectroscopy			11-FKS-092-m01		
Module	coord	inator		Module offered by			
Managi	ng Dire	ector of the Institute of Ap	oplied Physics	plied Physics Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. com	Only after succ. compl. of module(s)			
6	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
Conten	ts						
-		any-particle picture of ele X-ray spectroscopies.	ectrons in solids. Ligh	t-matter interaction.	Optical spectrosco	oy. Electron	
Intende	ed learr	ning outcomes					
types o	f spect	nave specific and advanc roscopy and their fields o in research.					
Course	S (type, n	umber of weekly contact hours, I	anguage — if other than Ger	man)			
R + V (n	o infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)		
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, informat	on on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					nutes) or c) esentation sessment		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Workload							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module	appea	in and a second s					
Master's wi (2012)	Aaster's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-						

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module	Module title Abbreviation						
Semico	onducto	or Physics			11-HLP-092-m01		
Module	e coord	inator		Module offered by			
Manag	ing Dire	ector of the Institute of	Applied Physics	plied Physics Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
6	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.				
Conten	Its						
ons an sation	d their effects	coupling effects. Electi of semiconductors wit	nding and the electronic ron-phonon coupling. T h reduced dimensions.	emperature-depende	ent transport propert		
	-	ning outcomes					
	nciples		nced knowledge in the I have gained an overvi				
Course	S (type, r	number of weekly contact hour	rs, language — if other than Ge	rman)			
R + V (r	no infor	mation on SWS (week	y contact hours) and co	ourse language avail	able)		
		sessment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informati	on on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocat	ion of j	olaces					
Additional information							
Workload							
Teaching cycle							
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Master's w (2012)	ith 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mather	-	page 150 / 199	



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2012)

Module title A					Abbreviation	
Semiconductor Nanostructures 11-HNS-092-mo					11-HNS-092-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester graduate			sessment. The lectu at the beginning of t sidered a declaratio dents have obtained the course of the se sessment into effect ted to assessment in	rer will inform stude the course. Registrat n of will to seek adm the qualification fo mester, the lecturer t. Students who mee n the current or in th date, students will h	alify for admission to as- nts about the respective details ion for the course will be con- nission to assessment. If stu- r admission to assessment over will put their registration for as- t all prerequisites will be admit- e subsequent semester. For as- ave to obtain the qualification for	
Conten	ts		<u>.</u>			
or mach ging the tures of with a f of nove	roscopi eir size f varyin focus o el optoe	c crystals, their electroni . The lecture addresses t g dimensions (2D, 1D, oI n optical properties and	c, optical and magne echnological challen D). It provides the bas light-matter coupling hotonic devices base	tic properties can be ges in the preparatio sic theoretical conce . Moreover, it discus ed on such nanostrue	. In contrast to atoms, molecules e systematically tailored by chan- on of semiconductor nanostruc- pts to describe their properties, ses the challenges and concepts ctures, including building blocks	
Intende	ed learı	ning outcomes				
knowle	dge of		ds to fabricate such s	tructures, and of the	tor nanostructures. They have ir applications to novel photonic arch.	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
R + V (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English						
Allocat	Allocation of places					
Additio	nal inf	ormation				
Worklo	ad					

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Technology of Functional Materials (2010)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)
Master's degree (1 major) Functional Materials (2012)

Module of Managing ECTS A 6 n Duration 1 semest 1 semest 2 semest 2 semest 2 semest	er graduate	of Applied Physics Only after succ. con Other prerequisites Certain prerequisite sessment. The lectur at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	es must be met to qu urer will inform stude the course. Registrat on of will to seek adn d the qualification for emester, the lecturer ct. Students who mee in the current or in th date, students will h	and Astronomy alify for admission to as- ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- te subsequent semester. For as- nave to obtain the qualification for
Managin ECTS A 6 n Duration 1 semest 1 semest Principles as of elect Intended	g Director of the Institute of Method of grading numerical grade Module level er graduate s of Semiconductor Physic	Only after succ. con Other prerequisites Certain prerequisites sessment. The lectur at the beginning of the sidered a declaration dents have obtained the course of the server sessment into effect ted to assessment into sessment at a later	Faculty of Physics a mpl. of module(s) es must be met to qu urer will inform stude the course. Registrat on of will to seek adm d the qualification for emester, the lecturer ct. Students who meet in the current or in th date, students will h	alify for admission to as- ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- re subsequent semester. For as-
ECTS A 6 n Duration 1 semest 1 semest Principles as of elect Intended	Method of grading numerical grade Module level er graduate s of Semiconductor Physic	Only after succ. con Other prerequisites Certain prerequisites sessment. The lectur at the beginning of the sidered a declaration dents have obtained the course of the server sessment into effect ted to assessment into sessment at a later	mpl. of module(s) es must be met to qu urer will inform stude the course. Registrat on of will to seek adm d the qualification for emester, the lecturer et. Students who meet in the current or in th date, students will h	alify for admission to as- ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- re subsequent semester. For as-
6 n Duration 1 semest Principle as of elec Intended	numerical grade Module level er graduate s of Semiconductor Physic	 Other prerequisites Certain prerequisite sessment. The lecture at the beginning of sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i sessment at a later	es must be met to qu urer will inform stude the course. Registrat on of will to seek adn d the qualification for emester, the lecturer ct. Students who mee in the current or in th date, students will h	ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- re subsequent semester. For as-
Duration 1 semest Principle as of elec Intended	Module level rer graduate s s of Semiconductor Physic	Certain prerequisite sessment. The lectu at the beginning of sidered a declaratio dents have obtained the course of the se sessment into effec ted to assessment i sessment at a later	es must be met to qu urer will inform stude the course. Registrat on of will to seek adm d the qualification for emester, the lecturer ct. Students who mee in the current or in th date, students will h	ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- re subsequent semester. For as-
1 semest	er graduate graduate s of Semiconductor Physic	Certain prerequisite sessment. The lectu at the beginning of sidered a declaratio dents have obtained the course of the se sessment into effec ted to assessment i sessment at a later	es must be met to qu urer will inform stude the course. Registrat on of will to seek adm d the qualification for emester, the lecturer ct. Students who mee in the current or in th date, students will h	ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- re subsequent semester. For as-
Contents Principle as of elec Intended	s of Semiconductor Physic	sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment in sessment at a later	urer will inform stude the course. Registrat on of will to seek adm d the qualification for emester, the lecturer ct. Students who meet in the current or in th date, students will h	ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- re subsequent semester. For as-
Principle as of elec Intended	s of Semiconductor Physic			
Principle as of elec Intended	s of Semiconductor Physic			
as of elec Intended		s. Introduction to key the	eories on semicondu	uctors. Components from the are
		st introduction to key the		
The stude	l learning outcomes			
nents of o and Gunr ser). They	electronics (diodes, transi n diode) and optoelectron y know the realisation pos	stor, FET, thyristor, diac, ics (photo diode, solar ce sibilities of low-dimensio	triac), microwave ap ell, light-emitting dio onal charge carrier s	and function of the main compo- oplications (tunnel, impatt, barit ode, semiconductor injection la- ystems on the basis of semicon- opments in the field of compon-
Courses ((type, number of weekly contact ho	urs, language — if other than Ge	rman)	
V + R (no	information on SWS (wee	kly contact hours) and co	ourse language avail	able)
	of assessment (type, scope, la reditable for bonus)	nguage — if other than German,	examination offered — if no	ot every semester, information on whether
groups (a ject repor 30 minut Assessm and will t examinat	approx. 30 minutes per can rt (approx. 8 to 10 pages, t res) ent offered: When and how	ndidate, for modules with ime to complete: 1 to 4 v w often assessment will l under observance of Sec	h less than 4 ECTS ci weeks) or presentatio be offered depends	each or oral examination in redits approx. 20 minutes) or pro on/seminar presentation (appro on the method of assessment 3 ASPO (general academic and
Allocatio	n of places			
Addition	al information			

Workload

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

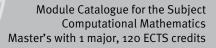
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012) Master's degree (1 major) Functional Materials (2012)



Astrophysics and Particle Physics (Experiment)

1 semester under Contents under History of astronomy pes and detectors, sistellar medium, strue large-scale structure nucleosynthesis, cost Intended learning ou The students are fam physical observation on s. They know the sis lopment. Courses (type, number or V + S (no information Method of assessme module is creditable for boor written examination Allocation of places Only as part of pool of Additional information Additional information Workload Teaching cycle 					
Managing Director of and Astrophysics ECTS Metion of gr 6 numerical gr Duration Modu 1 semester under I semester under History of astronomy pes and detectors, sistellar medium, structure nucleosynthesis, cost stellar medium, structure nucleosynthesis, cost nucleosynthesis, cost stellar medium, structure nucleosynthesis, cost nucleosynthesis,				11-A4-072-m01	
and Astrophysics ECTS Method of gr G numerical gr Duration Modu 1 semester under 1 semester under Semester under Kistory astrophysics History astrophysics ges and detectors, sistellar medium, structure astrophysical structure nucleosynthesis, cos Intended learning ou The students are fam physical observation ons. They know the site cos Iopment. Courses (type, number of V + S (no information Method of assessment module is creditable for bool of Adlitional information Additional information Figure 1 Method of assessment cos Morkload cos and allocation of places cos Only as part of pool of Additional information Feaching cycle cos Teaching cycle cos			Module offered by		
ECTS Method of g 6 numerical gr Duration Modu 1 semester under 1 semester under 1 semester under Kontents under History of astronomy pes and detectors, s stellar medium, structure nucleosynthesis, cost Intended learning out The students are fam physical observation ons. They know the stopment. Intended learning out Courses (type, number or V + S (no information V + S (no information Allocation of places Only as part of pool of Additional informati Workload	f the Institute of T	heoretical Physics	Faculty of Physics and Astronomy		
6 numerical gr Duration Modu 1 semester under 1 semester under 1 semester under Semester under History of astronomy pes and detectors, sistellar medium, structure nucleosynthesis, costellars estructure nucleosynthesis, costellar in edium, structure nucleosynthesis	rading	Only after succ. con	ompl. of module(s)		
Duration Modu 1 semester under Semester under Contents station History of astronomy pes and detectors, sistellar medium, structure large-scale structure nucleosynthesis, cost Intended learning out The students are fame physical observation ons. They know the set lopment. Courses (type, number or V + S (no information Method of assessment module is creditable for bool or Adlitional information Allocation of places Only as part of pool or Additional information Workload Teaching cycle			•		
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History of astronomy pes and detectors, si stellar medium, struc- large-scale structure nucleosynthesis, cos Intended learning ou The students are fam physical observation ons. They know the si lopment. Courses (type, number of V + S (no information Method of assessme module is creditable for boo written examination Allocation of places Only as part of pool of Additional informati Workload Teaching cycle	1 semesterundergraduateAdmission prerequisite to assessment: successful co 50% of exercises. Certain prerequisites must be met sion to assessment. The lecturer will inform students ve details at the beginning of the course. Registration be considered a declaration of will to seek admission students have obtained the qualification for admission over the course of the semester, the lecturer will put assessment into effect. Students who meet all prerequited to assessment at a later date, students will have to obt				lify for admis- the respecti- e course will sessment. If ssessment egistration for s will be ad- emester. For
History of astronomy pes and detectors, si stellar medium, struc- large-scale structure nucleosynthesis, cos Intended learning ou The students are fam physical observation ons. They know the si lopment. Courses (type, number of V + S (no information Method of assessme module is creditable for boo written examination Allocation of places Only as part of pool of Additional informati Workload Teaching cycle		for admission to ass	sessment anew.		
Courses (type, number of V + S (no information Method of assessme module is creditable for boo written examination Allocation of places Only as part of pool of Additional informati Workload Teaching cycle	smic microwave b utcomes niliar with the mo ns and evaluation	dern world view of Ast s. They are able to use niverse, e.g. of stars a	structure formation, rophysics. They know these methods to p	inflation w methods and tool lan and analyse ow	s for astro- n observati-
V + S (no information Method of assessme module is creditable for boo written examination Allocation of places Only as part of pool of Additional informati Workload Teaching cycle 	C 11 1				
Method of assessme module is creditable for bor written examination Allocation of places Only as part of pool of Additional informati Workload Teaching cycle				abla)	
Allocation of places Only as part of pool of Additional informati Workload Teaching cycle	ent (type, scope, langu nus)	age — if other than German,			tion on whether
Only as part of pool of Additional informati Workload Teaching cycle 		utes)			
Additional informati Workload Teaching cycle			1	ad builet	
 Workload Teaching cycle 	<u> </u>	ins (ASQ): 15 places. P	laces will be allocate	eu by lot.	
 Teaching cycle 					
 Teaching cycle 					
		_			
Referred to in LPO I					
	(examination regulatio	ns for teaching-degree progra	immes)		
Module appears in					
Bachelor' degree (1 r	major) Physics (20	007)			
Master's with 1 major Computa (2012)	ational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mather	-	page 157 / 199





Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2009) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Module	e title				Abbreviation		
Atmos	phere a	and Space Physics			11-AWP-092-m01		
Module	e coord	linator		Module offered by			
	ing Dir	ector of the Institute of	Theoretical Physics				
ECTS	1	od of grading	Only after succ. con	compl. of module(s)			
6	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 semester graduate Cert. sess at th side dent the o sess ted t sess			sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification fo			
Conten	nts						
	agnetos	lanetary atmospheres. I spheres and interplanet					
Intend	ed lear	ning outcomes					
and ne ry spac Course	ar-Eart ce miss es (type, 1	have knowledge of the h space. They are able t ions. number of weekly contact hours rmation on SWS (weekly	o apply the acquired k	nowledge to the solu	ution of problems o		
Metho	d of as	sessment (type, scope, lang ble for bonus)			· ·	ition on whether	
groups or d) pr Assess and wil examin	(appro resenta ment c Il be ar nation r	mination (approx. 90 m ox. 30 minutes per cand ation/seminar presentat offered: When and how o nounced in due form un regulations) 2009. assessment: German or	idate) or c) project rep ion (approx. 30 minute often assessment will l nder observance of Sec	ort (approx. 8 pages es) be offered depends (, time to complete: on the method of as	1 to 4 weeks) ssessment	
Allocat	tion of	places					
Additio	onal inf	ormation					
Worklo	bad						
 Taa-b*							
Teachi	ng cycl	e					
 Roforr	ad to in	LPO I (examination regulation	one for togehing dogge are	ummoc)			
Referre							
			_				

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)

Module title Abbreviation							
Experin	nental	Particle Physics			11-TPE-092-m01		
Module	e coord	inator		Module offered by			
Managi	ing Dire	ector of the Institute of	Applied Physics	plied Physics Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
4	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment into	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for				
Conten	ts						
supersy	ymmeti as oth	ry and other physics be er parameters of the st	ers at the LHC and at the eyond the standard mod andard model. Introduc	del. Determination of	f the top quark mass	and W mass	
Intende	ed learı	ning outcomes					
questic	The students are familiar with the principles of modern particle detector physics, especially with currently open questions of Particle Physics, which are examined by using these detectors. They know modern methods of analysis and are able to put results into context and to assess their systematic uncertainties.						
			s, language — if other than Ger				
		-	y contact hours) and co		· · · · · · · · · · · · · · · · · · ·		
		essment (type, scope, lang le for bonus)	guage — if other than German, o	examination offered — if no	t every semester, informati	ion on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocat	ion of p	olaces					
Additional information							
Workload							
Teachi	ng cycl	e					
Referre	d to in	LPO I (examination regulation	ons for teaching-degree progra	mmes)			
Master's wi (2012)	ith 1 major	Computational Mathematics		enerated 26-Aug-2024 • exam ECTS) Computational Mather	-	page 161 / 199	

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)

Modul	e title				Abbreviation	
Particle Physics (Standard Model)					11-TPS-092-m01	
Module coordinator				Module offered by		
		ectors of the Institute of of Theoretical Physics an		Faculty of Physics a	and Astronomy	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semestergraduateCertain prerequisites must be met to qualify for admission sessment. The lecturer will inform students about the res at the beginning of the course. Registration for the cours sidered a declaration of will to seek admission to assess 				nts about the respe ion for the course w hission to assessme or admission to asse will put their registra et all prerequisites w e subsequent seme	ctive details ill be con- nt. If stu- ssment over ation for as- rill be admit- ster. For as-	
Conter	nts	1				
		o the theory of electrow lel and determination of		ontaneous symmetr	y breaking. Experim	ents on the
		ning outcomes	•			
perime	ents tha	know the theoretical fur It have established and sults in the framework o	confirmed the standa	rd model. They are al	ble to interpret expe	
		number of weekly contact hours				
		rmation on SWS (weekly				
		sessment (type, scope, langu ble for bonus)	age — if other than German,	examination offered — if no	ot every semester, informat	tion on whether
groups project (appro Assess and wi examir	s (appro t report x. 30 m sment o Il be ar nation r	mination (approx. 90 mi ox. 30 minutes per candi (approx. 8 to 10 pages, inutes) offered: When and how co nounced in due form ur regulations) 2009. assessment: German, En	date, for modules with time to complete: 1 to ften assessment will l der observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	edits approx. 20 mi entation/seminar pr on the method of as	nutes) or c) esentation sessment
Allocat	tion of	places				
Additio	onal inf	ormation				
	_					
Worklo	bad					
			_			
Teachi	ng cycl	e				
 Dof						
Keferre	ea to in	LPO I (examination regulatio	ns tor teaching-degree progra	ammes)		
/laster's w	/ith 1 majo	r Computational Mathematics		enerated 26-Aug-2024 • exan		page 163 / 199
2012)			cord Master (120	ECTS) Computational Mather	matics - 2012	

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)



Complex Systems, Quantum Control and Biophysics (Experiment)

Module	e title				Abbreviation		
Statisti	ics, Dai	a Analysis and Comput	11-SDC-092-m01				
Module coordinator				Module offered by			
Managing Director of the Institute of Applied Physics				Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
4	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semestergraduateCertain prerequisites must be met to qualify for a sessment. The lecturer will inform students abou at the beginning of the course. Registration for th sidered a declaration of will to seek admission to dents have obtained the qualification for admiss the course of the semester, the lecturer will put t sessment into effect. Students who meet all prer ted to assessment at a later date, students will have to ob admission to assessment anew.						ctive details ill be con- nt. If stu- ssment over ation for as- rill be admit- ster. For as-	
Conten	ts						
Statisti	cs, dat	a analysis and compute	r physics.				
Intende	ed lear	ning outcomes					
The stu Physics		nave specific and advan	ced knowledge in the	field of statistics, da	ita analysis and Con	nputational	
Courses	S (type, r	umber of weekly contact hours,	language — if other than Ger	man)			
R + V (n	o infor	mation on SWS (weekly	contact hours) and co	urse language availa	able)		
		eessment (type, scope, langu le for bonus)	age — if other than German, e	examination offered — if no	t every semester, informat	ion on whether	
groups project (approx Assessi and wil examin	(appro report k. 30 m ment o l be an ation r	mination (approx. 90 mi x. 30 minutes per candi (approx. 8 to 10 pages, inutes) ffered: When and how o nounced in due form un egulations) 2009. ssessment: German, En	date, for modules with time to complete: 1 to ften assessment will h der observance of Sec	1 less than 4 ECTS cr 4 weeks) or d) prese pe offered depends o	edits approx. 20 min entation/seminar properties of the second se	nutes) or c) esentation sessment	
Allocati	ion of p	olaces	_				
Additio	nal inf	ormation					
Worklo	ad		-				
Teachir	ng cycl	e					
Referre	d to in	LPO I (examination regulatio	ns for teaching-degree progra	mmes)			
Module		are in					
		ree (1 major) Physics (20	210)				
	-						
	Bachelor' degree (1 major) Physics (2012) aster's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- cord Master (120 ECTS) Computational Mathematics - 2012 page 166 / 199 cord Master (120 ECTS) Computational Mathematics - 2012						



Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)



Solid State Physics and Nanostructures (Theory)

Module title			1	Abbreviation	
Quantum Me	echanics II			11-QM2-092-m01	
Module coor	dinator		Module offered by	~	
Managing Di and Astrophy	rector of the Institute of ysics	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS Met	hod of grading	Only after succ. con	npl. of module(s)		
8 num	erical grade				
Duration	Module level	Other prerequisites			
1 semesterundergraduateCertain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective d at the beginning of the course. Registration for the course will be d sidered a declaration of will to seek admission to assessment. If s dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be a ted to assessment in the current or in the subsequent semester. F 					
Contents					
 2. Band strue 3. Angular m 4. Scattering 5. Relativistion of atomic sp 6. Quantum 7. Canonical 	antisation: Fermions an ctures of particles in a c omentum, symmetry op theory: Potential scatte c quantum mechanics: H ectra entanglement formalism	rystal erators, Lie Algebras ring, partial wave expai		tz group, fine struct	ure splitting
Intended lea	rning outcomes				
of the mather modern theo thods and to	s acquire in-depth know ematical and theoretical pretical Quantum Physic pinterpret the results ph Physics and Condensed	concepts of the listed t s mathematically, to so ysically. The course is p	opics. They are able lve problems analyti vivotal to subsequen	to describe or mode cally, to use approx t theory courses in A	el problems of imation me- Astrophysics,
Courses (type	, number of weekly contact hour	rs, language — if other than Ger	rman)		
R + V (no info	ormation on SWS (week	y contact hours) and co	ourse language avail	able)	
Method of as module is credita	ssessment (type, scope, lang able for bonus)	guage — if other than German, o	examination offered — if no	ot every semester, informat	ion on whether
groups (appr project report (approx. 30 r Assessment and will be a examination	amination (approx. 90 n rox. 30 minutes per cano rt (approx. 8 to 10 pages minutes) offered: When and how innounced in due form u regulations) 2009. assessment: German, E	didate, for modules with , time to complete: 1 to often assessment will h under observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese pe offered depends o	edits approx. 20 min entation/seminar properties of the method of as	nutes) or c) esentation sessment

Allocation of places
Additional information
Workload
Teaching cycle
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module	title			Abbreviation				
Theoret	tical So	lid State Physics			11-TFK-092-m01			
Module	coord	inator		Module offered by				
Managi and Ast	•	ector of the Institute of ics	Theoretical Physics	Faculty of Physics a	nd Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)				
8	nume	rical grade						
Duratio	n	Module level	Other prerequisites					
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment into	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for					
Content	ts		1					
		heoretical Solid-State I tism. Superconductivity		eory. Electron-electro	on interaction. Varia	tional me-		
Intende	ed learn	ning outcomes						
respond theory a	The students have basic knowledge of the theoretical description of solid-state phenomena. They know the cor- responding mathematical or theoretical methods and are able to apply them to basic problems of solid-state theory and to understand the connections to experimental results. The individual students have elaborated on an advanced topic of solid-state theory and have discussed this topic in a seminar presentation.							
Courses	S (type, n	umber of weekly contact hours	5, language — if other than Ger	man)				
R + V (n	o infor	mation on SWS (weekly	y contact hours) and co	ourse language availa	able)			
		s essment (type, scope, lang le for bonus)	uage — if other than German, o	examination offered — if no	t every semester, informati	on on whether		
groups project (approx Assess and will examina	a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocati	ion of p	olaces						
Additio	nal info	ormation						
Worklo	Workload							
Teachin	ng cycl	e						
Referre	d to in	LPO I (examination regulation	ons for teaching-degree progra	mmes)				
Master's wit (2012)	th 1 major	Computational Mathematics		enerated 26-Aug-2024 • exam ECTS) Computational Mathen	-	page 171 / 199		



Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Master's with 1 major Computational Mathematics

(2012)

Module	e title				Abbreviation		
Theory of Superconduction					11-TSL-092-m01		
Module	e coord	inator		Module offered by			
	ing Dire	ector of the Institute of Th	eoretical Physics	Faculty of Physics a	nd Astronomy		
ECTS		od of grading	Only after succ. con	pl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semestergraduateCertain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective de at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be added to assessment at a later date, students will have to obtain the qualification							
Conten	ts		admission to assess				
vity (An elemen Intende The stu the pro	idreev s its. ed lear dents l	ning outcomes	de Gennes equation, the theoretical mode	SQUIDS). Quantum	scopic aspects of superconducti- computing with superconductive n of superconductivity. They know ulation methods to simple pro-		
blems.							
		umber of weekly contact hours, I			abla)		
		mation on SWS (weekly o			able) It every semester, information on whether		
		le for bonus)	ge — If other than German, o	examination offered — if no	t every semester, information on whether		
groups project (approx Assess and wil examin	a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English						
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					

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Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)



Astrophysics and Particle Physics (Theory)

Module	e title				Abbreviation
Introdu	uction t	o Plasmaphysics			11-EPP-092-m01
Module	e coord	inator		Module offered by	
	ing Dire	ector of the Institute of T	heoretical Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con	nnl. of module(s)	
6		rical grade			
Duratio		Module level	Other prerequisites	j	
1 seme	ster	graduate	sessment. The lectu at the beginning of sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	trer will inform stude the course. Registrat on of will to seek adm d the qualification for mester, the lecturer t. Students who mee n the current or in th date, students will h	alify for admission to as- ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- e subsequent semester. For as- ave to obtain the qualification fo
Conten	its	1			
Transp thin the celerat	ort equ e solar ion and	ations for energetic part	icles, Properties of ma on via shock waves a	agnetic turbulence, F nd via interaction wi	elds, Magnetohydrodynamics, Propagation of solar particles wi- th plasma turbulence, Particle ac- liation.
			 lasma Physics_especi	ially the description	of transport phenomena in plas-
					nowledge to Astrophysics.
Course	S (type, r	number of weekly contact hours,	, language — if other than Ge	rman)	
V + R (r	no infoi	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		s essment (type, scope, langu ble for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
groups project (approz Assess and wil examir	(appro report x. 30 m ment o Il be an nation r	ox. 30 minutes per candi (approx. 8 to 10 pages, inutes) Iffered: When and how o	date, for modules with time to complete: 1 to ften assessment will der observance of Se	h less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	ion of j	places	-		
Additio	onal inf	ormation			
Worklo	ad		_		
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulatio	ns for teaching-degree progra	ammes)	



Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Modul	e title				Abbreviation
Cosmology					11-AKM-092-m01
Module	e coord	inator		Module offered by	<u> </u>
	ing Dir	ector of the Institute of	Theoretical Physics	Faculty of Physics a	and Astronomy
ECTS	<u>г і і</u>	od of grading	Only after succ. con	npl. of module(s)	
6	1	rical grade		•	
Duratio	on .	Module level	Other prerequisites	i	
1 semester graduate		sessment. The lecture at the beginning of sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for		
Conten	ts	<u>.</u>			
matter	, primo		cosmic microwave bac	kground, structure fo	e early universe, inflation, dark ormation, supercluster, galaxies
Intend	ed lear	ning outcomes			
scienti Course	fic que S (type, 1		s, language — if other than Ge	rman)	h topics and are able to work on able)
Metho	d of as	· · · · · · · · · · · · · · · · · · ·	<u> </u>		ot every semester, information on whether
groups project (appro. Assess and wi examir	(appro report x. 30 m ment o Il be an nation r	ox. 30 minutes per cand (approx. 8 to 10 pages inutes) iffered: When and how	lidate, for modules with , time to complete: 1 to often assessment will nder observance of Sec	h less than 4 ECTS cr 4 weeks) or d) prese be offered depends	date each or oral examination ir redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	ion of	places			
Additio	onal inf	ormation			
Worklo	ad				
		e			
 Teachi	ng cycl				
 Teachi 	ng cycl				
		LPOI (examination regulati	ons for teaching-degree progra	ammes)	

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)

Managing Director of the Institute of Theoretical Physics Fa	11-APL-092-m01 Module offered by
Managing Director of the Institute of Theoretical Physics Fa	Nodule offered by
and Astrophysics	aculty of Physics and Astronomy
ECTS Method of grading Only after succ. comp	l. of module(s)
6 numerical grade	
Duration Module level Other prerequisites	
sessment. The lecture at the beginning of the sidered a declaration of dents have obtained t the course of the seme sessment into effect. S ted to assessment in t	must be met to qualify for admission to as- r will inform students about the respective details e course. Registration for the course will be con- of will to seek admission to assessment. If stu- he qualification for admission to assessment over ester, the lecturer will put their registration for as- Students who meet all prerequisites will be admit- the current or in the subsequent semester. For as- ite, students will have to obtain the qualification for pert anew
Contents	
acceleration via shock waves and via interaction with plasma galaxies and other cosmic objects. Intended learning outcomes The students have basic knowledge of Plasma Astrophysics. T	They have mastered the theoretical description of
motion and acceleration of charged particles in space, they kr compare and evaluate theory and experiments.	now corresponding measuring methods and can
${f Courses}$ (type, number of weekly contact hours, language — if other than Germa	
R + V (no information on SWS (weekly contact hours) and cour	
Method of assessment (type, scope, language — if other than German, exa module is creditable for bonus)	amination offered — if not every semester, information on whether
a) written examination (approx. 90 minutes) or b) oral examin- groups (approx. 30 minutes per candidate, for modules with le project report (approx. 8 to 10 pages, time to complete: 1 to 4 (approx. 30 minutes) Assessment offered: When and how often assessment will be and will be announced in due form under observance of Section examination regulations) 2009. Language of assessment: German, English	ess than 4 ECTS credits approx. 20 minutes) or c) weeks) or d) presentation/seminar presentation offered depends on the method of assessment
Allocation of places	
Additional information	
Workload	
Teaching cycle	



Module appears in

Module title Abbreviation					
Introduction	to Space Physics			11-ASP-092-m01	
Module coordinator			Module offered by		
Managing D and Astroph	irector of the Institute of T ysics	heoretical Physics	Faculty of Physics a	and Astronomy	
ECTS Met	hod of grading	Only after succ. compl. of module(s)			
6 numerical grade					
Duration	Module level	Other prerequisites			
1 semester graduate Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective de at the beginning of the course. Registration for the course will be co- sidered a declaration of will to seek admission to assessment. If st dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be a ted to assessment in the current or in the subsequent semester. Fo sessment at a later date, students will have to obtain the qualificat				nts about the respective details ion for the course will be con- nission to assessment. If stu- r admission to assessment over will put their registration for as- et all prerequisites will be admit- e subsequent semester. For as-	
Contents					
4. The sun a 5. Accelerati 6. Instrumer	of space physics nd heliosphere on and transport of energ its to measure energetic p arning outcomes				
The student	s have basic knowledge of ticles in space and in the l			cterisation of the dynamics of ers, theoretical concepts and	
Courses (type	, number of weekly contact hours,	language — if other than Ge	rman)		
R + V (no inf	ormation on SWS (weekly	contact hours) and co	ourse language avail	able)	
Method of a module is credit		age — if other than German,	examination offered — if no	ot every semester, information on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					
Allocation of places					
Additional in	nformation				
Workload					

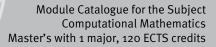
Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)

Module	Module title Abbreviation							
Group 1	Group Theory 11-GRT-092-m01							
Module	coord	inator		Module offered by				
Managi and Ast	-	ector of the Institute of ⁻ sics	Theoretical Physics	Faculty of Physics and Astronomy				
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)				
6	nume	rical grade						
Duratio	n	Module level	Other prerequisites					
1 semes	ster	graduate	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective detail at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as sessment into effect. Students who meet all prerequisites will be admit ted to assessment in the current or in the subsequent semester. For as sessment at a later date, students will have to obtain the qualification admission to assessment anew.					
Conten	ts							
Group t	heory.	Finite groups. Lie group	os. Lie algebra. Depicti	on. Tensors. Classifie	cation theorem. App	lications.		
Intende	ed learr	ning outcomes						
The students know the basics of group theory, especially of Lie groups. They are able to identify problems of group theory and to solve them by using the acquired methods. They are able to apply group theory to the formulation and processing of physical problems.								
Courses	5 (type, n	umber of weekly contact hours	, language — if other than Ge	rman)				
R + V (n	o infor	mation on SWS (weekly	contact hours) and co	ourse language availa	able)			
		e essment (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether		
groups project (approx Assessi and wil examin	a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocati	ion of p	olaces						
Additio	nal inf	ormation						
Workload								
Teaching cycle								
			_					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in								
Master's wi (2012)	aster's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- cord Master (120 ECTS) Computational Mathematics - 2012 page 184 / 199							



Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Module title					Abbreviation		
Renorm	Renormalization Theory 11-RNT-092-m01						
Module	e coord	inator		Module offered by			
	Managing Director of the Institute of Theoretical Physics and Astrophysics			Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
6 numerical grade							
Duratio	n	Module level	Other prerequisites				
1 semestergraduateCertain prerequisites must be met to qualify for admission to a sessment. The lecturer will inform students about the respecti at the beginning of the course. Registration for the course will sidered a declaration of will to seek admission to assessment dents have obtained the qualification for admission to assess the course of the semester, the lecturer will put their registrati sessment into effect. Students who meet all prerequisites will ted to assessment in the current or in the subsequent semest sessment at a later date, students will have to obtain the qual admission to assessment anew.			nts about the respective details ion for the course will be con- ission to assessment. If stu- r admission to assessment over will put their registration for as- t all prerequisites will be admit- e subsequent semester. For as-				
Conten	tc						
behavio levance ons. Sto berg-Ma and cor Intende	Renormalisation group methods for Hamiltonian systems. Partial non-linear differential equations with scaling behaviour for dynamics beyond the equilibrium. Classical-critical and quantum-critical phenomena and their re- levance for phase diagrams in cryogenic temperatures. Instability of statistical and dynamic mean-field soluti- ons. Stochastic non-linear partial differential equations. Construction of generating functionals. Halperin-Hohen- berg-Ma differential equations. Symmetries, e.g. in the stochastic Burgers' equation (KPZ equation). Introduction and comparison of different RG methods. Intended learning outcomes						
					n-linear partial differential equa- are able to apply them to specific		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)			
R + V (n	io infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)		
		s essment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	t every semester, information on whether		
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocation of places							
Additio	nal inf	ormation					
Worklo	ad						

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Module co Managing and Astrop ECTS Me 8 nu Duration	Director of the Institute ohysics ethod of grading imerical grade Module level	of Theoretical Physics Only after succ. cor Other prerequisites Certain prerequisite sessment. The lectu at the beginning of	s es must be met to qu urer will inform stude			
Managing and Astrop ECTS Me 8 nu Duration 1 semester	Director of the Institute ohysics ethod of grading imerical grade Module level	Only after succ. cor Other prerequisites Certain prerequisite sessment. The lectu at the beginning of	Faculty of Physics a mpl. of module(s) s es must be met to qu urer will inform stude			
and Astrop ECTS Me 8 nu Duration 1 semester	ethod of grading Imerical grade Module level	Only after succ. cor Other prerequisites Certain prerequisite sessment. The lectu at the beginning of	npl. of module(s) s es must be met to qu urer will inform stude			
8 nu Duration 1 semester	imerical grade Module level	 Other prerequisites Certain prerequisite sessment. The lectu at the beginning of	s es must be met to qu urer will inform stude	alify for admission to as-		
8 nu Duration 1 semester	imerical grade Module level	Certain prerequisite sessment. The lectu at the beginning of	es must be met to qu urer will inform stude	alify for admission to as-		
1 semester		Certain prerequisite sessment. The lectu at the beginning of	es must be met to qu urer will inform stude	alify for admission to as-		
	r graduate	sessment. The lectu at the beginning of	urer will inform stude	alify for admission to as-		
Contonto		1 semester graduate Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective det at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment of the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be ad ted to assessment in the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualification admission to assessment anew.				
coments	<u> </u>		Sment unew.			
	/nman rules. Quantum e			and interaction. Perturbation ion. Radiative corrections and re-		
	earning outcomes					
They know processes	how to use perturbation	n theory and how to apply ntum electrodynamics in	y Feynman rules. The	ivistic quantum field theories. ay are able to calculate basics over, they have a basic under-		
		ours, language — if other than Ge				
		ekly contact hours) and co				
	assessment (type, scope, la ditable for bonus)	anguage — if other than German,	examination offered — if no	ot every semester, information on whether		
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English						
Allocation of places						
Additional	information					
Workload						
Teaching o	cycle					



Module appears in

Module title					Abbreviation	
Theory	of Rela	ativity			11-RTT-092-m01	
Module	e coord	linator		Module offered by	<u> </u>	
Manag	ing Dir	ector of the Institute of	Theoretical Physics	Faculty of Physics a	and Astronomy	
and As			Only offer and	nnl of module(-)		
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
6 Duratio		rical grade Module level	Other prerequisites	•		
1 semestergraduateCertain prerequisites must be met to qualify for admission to a sessment. The lecturer will inform students about the respectiv at the beginning of the course. Registration for the course will b sidered a declaration of will to seek admission to assessment. dents have obtained the qualification for admission to assess the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites will b 				ents about the respective detail tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as et all prerequisites will be admi re subsequent semester. For as		
Conten	ts	1				
ments	of diffe		rodynamics as an exam	nple of a relativistic §	mmary of special relativity; ele- gauge theory; field equations o ılation	
		ning outcomes				
able to Course	apply s (type, 1	understanding of the f the acquired knowledg number of weekly contact hour rmation on SWS (weekl	e to problems of Astrop s, language — if other than Ge	ohysics and cosmolo		
		Sessment (type, scope, lang ole for bonus)	guage — if other than German,	examination offered — if no	ot every semester, information on whethe	
groups project (approz Assess and wil examin	(appro report x. 30 m ment o Il be ar nation r	ox. 30 minutes per cano (approx. 8 to 10 pages linutes) offered: When and how	lidate, for modules with , time to complete: 1 to often assessment will nder observance of Se	h less than 4 ECTS cr 9 4 weeks) or d) preso be offered depends	idate each or oral examination redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and	
Allocat	ion of	places				
Additio	onal inf	ormation				
Worklo	ad					
 Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)		
Aactor's wi	aster's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- o12) cord Master (120 ECTS) Computational Mathematics - 2012					

Module appears in

Modul	Module title Abbreviation					
Theore	tical El	ementary Particle Physic	:S		11-TEP-092-m01	
Modul	e coord	inator		Module offered by		
	ing Dire trophys	ector of the Institute of Th sics	neoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
8 numerical grade						
Duration Module level Other prerequisites			Other prerequisites			
1 semester graduate Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective der at the beginning of the course. Registration for the course will be co- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be ac- ted to assessment in the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualification				ints about the respective details ion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- e subsequent semester. For as-		
admission to assessment anew. Contents						
Fundamental forces and particles. Groups and symmetries. Quark model. Principles of quantum field theory. Gauge theories. Spontaneous symmetry breaking. Electroweak standard model. Quantum chrome dynamics. Ex- tensions of the standard model. Intended learning outcomes The students are familiar with the mathematical methods of Elementary Particle Physics. They understand the						
lation I	method		mple problems and p	processes of Element	al observations. They know calcu- tary Particle Physics. Furthermo- aded theories.	
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)		
R + V (1	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English						
Allocat	tion of p	olaces				
Additional information						
Worklo	ad					
Teaching cycle						
	1					



Module appears in

Module	Module title Abbreviation					
Supers	ymmet	ry I and II			11-SUS-092-m01	
Module	coord	inator		Module offered by		
	Managing Director of the Institute of Theoretical Physics			Faculty of Physics a	and Astronomy	
and As	· · ·	-	F			
ECTS						
6 numerical grade						
Duratio		Module level	Other prerequisites		alifa fan adminaian ta ac	
1 semester graduate Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective deta at the beginning of the course. Registration for the course will be con sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment o the course of the semester, the lecturer will put their registration for a sessment into effect. Students who meet all prerequisites will be adm ted to assessment in the current or in the subsequent semester. For a sessment at a later date, students will have to obtain the qualification admission to assessment anew.					nts about the respective details ion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- e subsequent semester. For as-	
Conten	ts			sincht unew.		
persym Supers ticles. F	Supersymmetry I: Grassmann variable. Coleman-Mandula theorem and Haag-Lopuszanski-Sohnius theorem. Su- persymmetry: Algebra and multiplets. Superfield formalism. Breaking of supersymmetry. Supersymmetry II: Minimal supersymmetric standard model. Higgs sector. The spectrum of supersymmetric par- ticles. Phenomenology of LEP, Tevatron and LHC, supersymmetric neutrino mass models. Violation of R-parity.					
		ning outcomes				
tric mo	dels. Tł		y's formalism and re		persymmetry and supersymme- ons to other models as well as its	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Gei	rman)		
V + R (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		eessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
groups project (approx Assess and wil examin	a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					
Allocat	ion of p	olaces				
Additio	Additional information					
Worklo	ad					
Teachi	Teaching cycle					



Module appears in

Module title					Abbreviation		
Computational Astrophysics					11-NMA-111-m01		
Module	e coord	inator		Module offered by	y		
Managing Director of the Institute of Theoretical Physics Faculty of and Astrophysics			Faculty of Physics a	Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. compl. of module(s)				
6	nume	rical grade					
Duration Module level Other prerequisites							
1 semestergraduateCertain prerequisites must be met to qualify for admission to sessment. The lecturer will inform students about the respect at the beginning of the course. Registration for the course wil sidered a declaration of will to seek admission to assessmen dents have obtained the qualification for admission to assess the course of the semester, the lecturer will put their registrat sessment into effect. Students who meet all prerequisites wil ted to assessment in the current or in the subsequent semest sessment at a later date, students will have to obtain the qua admission to assessment anew.				ective details vill be con- ent. If stu- essment over ration for as- vill be admit- ester. For as-			
Conten	ts						
ENO). <i>N</i> CL). Intende The stu	Aethod ed lear dents a	ann). Hyperbolic conser s of high-performance co ning outcomes are able to solve typical j	omputing. Message-p	assing interface (MP	PI). GPGPU program	ming (Open-	
		elp of numerical simula roblems and of validatir		ally capable of choo	ising adequate stra	tegies to ap-	
		umber of weekly contact hours,					
		mation on SWS (weekly	-				
		s essment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, informa	ition on whether	
in grou weeks) Assess and wil examin	ps (app or d) p ment o l be an ation r	mination (approx. 120 m prox. 30 minutes per can resentation/seminar pre ffered: When and how of nounced in due form un- egulations) 2009. ssessment: German, Eng	didate) or c) project re esentation (approx. 30 ften assessment will l der observance of Sec	eport (approx. 8 to 10 o minutes) oe offered depends o	o pages, time to con on the method of as	mplete: 1 to 4 ssessment	
Allocat	ion of p	olaces					
Additional information							
Worklo	ad						
Teachir	ıg cycl	e					
Master's wi (2012)	th 1 majoi	Computational Mathematics		enerated 26-Aug-2024 • exam ECTS) Computational Mather		page 196 / 199	

Module appears in

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Mathematical Physics (2012)

Master's degree (1 major) Mathematics (2012)

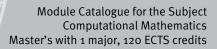
Master's degree (1 major) Physics (2011)

Master's degree (1 major) Mathematical Physics (2012)

Master's degree (1 major) FOKUS Physics (2011)

Master's degree (1 major) Computational Mathematics (2012)





Thesis (30 ECTS credits)

Module title Abbreviation							
Master	Master Thesis Computational Mathematics10-M=MACM-102-m01						
Module coordinator Module offer					<u> </u>		
Dean o	f Studi	es Mathematik (Mathe	matics)	Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
30	nume	rical grade					
Duratio	Duration Module level Other prerequisites						
1 seme	ster	graduate					
Conten	ts						
Indepe	ndently	/ researching and writi	ng on a topic in mather	natics selected in co	nsultation with the supervisor.		
Intende	ed lear	ning outcomes					
The student is able to work independently on a given mathematical topic and apply the skills and methods ob- tained during his/her studies in the master programme. He/She can write down the result of his/her work in a suitable form.							
Course	S (type, r	number of weekly contact hour	s, language — if other than Ge	rman)			
no cou	rses as	signed					
		sessment (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	ot every semester, information on whether		
written	thesis						
Langua	ige of a	ssessment: German, E	nglish				
Allocat	ion of p	olaces					
	-						
Additio	nal inf	ormation					
Worklo	ad						
Teaching cycle							
Referre	ed to in	LPO I (examination regulati	ons for teaching-degree progra	mmes)			
Module	Module appears in						
Master	Master's degree (1 major) Computational Mathematics (2012)						