

## Subdivided Module Catalogue for the Subject

# **Computational Mathematics**

as a Bachelor's with 1 major with the degree "Bachelor of Science" (180 ECTS credits)

> Examination regulations version: 2009 Responsible: Institute of Mathematics

JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record 82|f24|-|-|H|2009

## **Course of Studies - Contents and Objectives**

The Bachelor programme in Computational Mathematics is offered by the Department of Mathematics, with a total of currently (SS 2010) 9 chairs.

At the end of this course of study, the students should be familiar with the main branches of mathematics, taught methods of mathematical reasoning and working as well as analytical thinking, abstract concepts and the ability to recognize and construct complex structures and interconnections. In addition, they should also have interdisciplinary knowledge on the borderline between mathematics, computer science, natural science, and engineering.

Through the course these skills which the students acquire provide the basic knowledge required for a consecutive Bachelor-Masters degree. Moreover, they can later familiarize themselves with the many areas of society in which innovative computer-aided mathematical methods can be applied to or be of use. This is supported through the study of an integrated elective application-oriented subject in which the students become familiar with the basic thoughts and techniques of a subject of their choice, either in natural sciences or engineering, where mathematical methods apply.

In the Bachelor study in computational mathematics, the main emphasis is put on basic mathematical knowledge, method knowledge and the development of the mental constructs which are typical for mathematics. The acquisition of special topics in different secondary branches of mathematics is subordinate.

For the Bachelor thesis the student should work on a thematic and temporally closely limited frame in order to carry out a mathematical task, preferably in some application-oriented context, using well-known procedures and scientific criteria under guidance but, to a large extent, independently.

The exam enables the acquisition of a comparable, international degree in the field of mathematics and provides the framework of a consecutive Bachelor-Masters degree as an initial professional qualification which can be used as a mean for entry into the working world or as preparation for a subsequent Masters study. The exam should ascertain whether the candidate overlooks the context of the basics in mathematics and possesses the ability to use the corresponding scientific methods, with regards to mathematics and the selected elective application-oriented subjects.

## 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:

#### ASPO2007

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

#### 10-Aug-2009 (2009-62)

#### 15-Mar-2010 (2010-10)

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

## The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	page
Compulsory Courses (88	ECTS credits)			
10-M-PPM-082-m01	Propaedeutics of Mathematics	2	B/NB	93
10-M-NM1-082-m01	Numerical Mathematics 1	8	NUM	87
10-M-ANA-082-m01	Analysis	17	NUM	52
10-M-LNA-082-m01	Linear Algebra	14	NUM	82
10-M-NM2-082-m01	Numerical Mathematics 2	5	NUM	89
10-M-DFT-082-m01	Ordinary Differential Equations and Complex Analysis	13	NUM	71
10-M-VAN-082-m01	Advanced Analysis	8	NUM	10
10-M-GAP-092-m01	Geometric Analysis and Partial Differential Equations	13	NUM	78
10-M-MWR-092-m01	Modelling and Computational Science	8	NUM	84
Compulsory Electives (62	ECTS credits)			
no more than one may b 10-M-EDM-072-m01	e modules worth no less than 8 ECTS credits; however, of the tre taken. Introduction to Discrete Mathematics	wo modules 1	NUM	73
10-M-FAN-072-m01	Introduction to Functional Analysis	5	NUM	76
10-M-ORS-072-m01	Operations Research	5	NUM	9
10-M-EZT-072-m01	Introduction to Number Theory	5	NUM	7
10-M-NLD-072-m01	Non-Linear Dynamics	5	NUM	8
10-M-GEO-082-m01	Introduction to Geometry	8	NUM	80
10-M-ZAL-082-m01	Number Theory and Algebra	13	NUM	11
10-M-ST1-082-m01	Stochastics 1	8	NUM	10
10-M-ST2-082-m01	Stochastics 2	5	NUM	10
Mathematics 2 (4 ECTS o	credits)			
10-M-RCS-082-m01	Reading Course Stochastics	4	NUM	10
10-M-RCD-082-m01	Reading Course Discrete Mathematics	4	NUM	97
10-M-RCF-082-m01	Reading Course Functional Analysis	4	NUM	98
10-M-RCO-082-m01	Reading Course Operations Research	4	NUM	99
10-M-RCY-082-m01	Reading Course Dynamical Systems	4	NUM	10
10-M-RCP-082-m01	Reading Course Optimisation	4	NUM	10
Mathematics 3 (5 ECTS of	credits)			
10-M-BSA-072-m01	Seminar in Analysis	5	NUM	56
10-M-BSL-072-m01	Seminar in Linear Algebra	5	NUM	6:
10-M-BSE-072-m01	Seminar in Algebra	5	NUM	59
10-M-BSG-072-m01	Seminar in Geometry	5	NUM	6
10-M-BSZ-072-m01	Seminar in Number Theory	5	NUM	6
10-M-BSW-072-m01	Seminar in Ordinary Differential Equations	5	NUM	60
10-M-BSC-072-m01	Seminar in Complex Analysis	5	NUM	57
10-M-BSN-072-m01	Seminar in Numerical Mathematics	5	NUM	6
10-M-BSS-072-m01	Seminar in Stochastics	5	NUM	6
10-M-BSF-072-m01	Seminar in Functional Analysis	5	NUM	60
10-M-BSO-072-m01	Seminar in Operation Research	5	NUM	6.
	Seminar in Discrete Mathematics	5	NUM	58
10-M-BSD-072-m01			-	

	Physics)) with the specified mandatory courses and/or mandator ubject Chemistry (35 ECTS credits)	,		
Application-oriented S	Subject Chemistry Compulsory Courses (26 ECTS credits)			
11-EFNF-072-m01	Introduction to Physics for Students of Non-physics-related Mi- nor Subjects	7	NUM	1
08-CM1-072-m01	General Chemistry for Mathematics Majors	6	NUM	
08-PC1-092-m01	Physical Chemistry 1	8	NUM	
08-0C1-092-m01	Organic Chemistry 1	5	NUM	
Application-oriented S	Subject Chemisty Compulsory Electives (9 ECTS credits)	-	1	
08-0C2-092-m01	Organic Chemistry 2	9	NUM	
08-TC-092-m01	Theoretical Models in Chemistry	3	NUM	
	Physical and Theoretical Chemistry 3: Symmetry and Quantum	_		+
08-PC3-092-m01	Chemistry	6	NUM	
Application-oriented Su	ubject Computer Science (35 ECTS credits)		<u>I</u>	
Students are recommer I-RK, (b) 10-I-ADS, 10-I-S LOG, 10-I-GT, 10-I-KT	nded to select one of the following four combinations: (a) 10-I-RAI ST, 10-I-PP, 10-I-SWP, (c) 10-I-ADS, 10-I-ST, 10-I-DB, 10-I-WMS, 10-I-	-, 10-l-ST, -00P, (d) :	10-l-AR, 10-l-R/ 10-l-ADS, 10-l-	AK, 1 TI, 10
Application-oriented	Subject Computer Science Compulsory Electives (35 ECTS credits	)		
10-l-lÜ-072-m01	Information transmission	8	NUM	
10-I-RAL-072-m01	Digital computer systems	8	NUM	
10-I-TI-072-m01	Theoretical informatics	8	NUM	
10-I-ADS-072-m01	Algorithm and data structures	8	NUM	
10-I-AR-072-m01	Automation and control technology	8	NUM	
10-I-DB-072-m01	Data bases	5	NUM	
10-l-GT-072-m01	Graphtheoretical concepts and algorithms	8	NUM	
10-I-KT-072-m01	Theory of complexity	8	NUM	
10-I-LOG-072-m01	Logic for informatics	5	NUM	
10-I-00P-072-m01	Object oriented programming	5	NUM	
10-I-PP-072-m01	Practical course in programming	9	B/NB	
10-I-RAK-072-m01	Computer architecture	5	NUM	
10-I-RK-072-m01	Computer networks and communication systems	8	NUM	
10-I-ST-072-m01	Software technology	8	NUM	
10-I-SWP-072-m01	Practical course in software	10	B/NB	
10-I-WMS-072-m01	Knowledge management systems and data mining	10	NUM	
If consent is obtained for placed with modules 11	u <b>bject Physics (35 ECTS credits)</b> rom the examination committee, modules 11-ENNF1 and 11-ENNF2 -E1 and 11-E2 (8 ECTS credits each).	(7 ECTS c	redits each) m	nay b
Application-oriented S	Subject Physics Compulsory Courses (16 ECTS credits)			
11-ENNF1-062-m01	Introduction to Physics Part 1 for students of Physics Related	7	NUM	
	Minor Subjects	,		
11-ENNF2-062-m01	Introduction to Physics Part 2 for students of Physics Related	7	NUM	
	Minor Subjects	-		
11-PFR-072-m01	Measurements and Data Analysis	2	NUM	:
Application-oriented	Subject Physics Compulsory Electives 1 (3 ECTS credits)		<u></u>	
11-PNNF-062-m01	Physics Laboratory Course for students of Physics Related Mi- nor Subjects	3	B/NB	:
11-PG-IAF-072-m01	Practical Course	4	B/NB	1

	Experimental Physics 3 (Optics, Quantum Phenomena, Intro-			
11-E3-072-m01	duction Atomic Physics)	8	NUM	11
11-T1-072-m01	Theoretical Physics 1 (Theoretical Mechanics)	8	NUM	12
<b>-</b>	Theoretical Physics 2 (Theoretical Electrostatics and Electrody-			
11-T2-072-m01	namics)	8	NUM	1
11-T3-072-m01	Theoretical Physics 3 (Theoretical Quantum Mechanics)	8	NUM	1
	Theoretical Physics 4 (Theoretical Thermodynamics and Stati-			
11-T4-072-m01	stics)	8	NUM	1
11-E5-082-m01	Experimental Physics 5 (Introduction to Solid State Physics)	8	NUM	1
Application-oriented Su	bject Biology (35 ECTS credits)			
wortliche(r)) will be able as to what applicants w ces offered by the Facul val will cover in particul ses. Approval may be w components from the ap approval will become vo		ion-oriente e ranked b cording to from the a ompleting	ed subject. A de by lottery and th this ranking. A rea of mandato any modules /	ecisi ne pl oppro ory c moo
	ubject Biology Compulsory Courses (10 ECTS credits)			—
, ,	Genetics, Neurobiology, Behaviour	6	NUM	1
07-1A1Z-072-m01	Structure and Function of Cells	4	NUM	:
Students must take tw		When taki that will he	ng up their stu Ip them choose	dies e ap
07-3A3BI-072-m01	Bioinformatics	2	NUM	1
07-3A30E-072-m01	Ecology of plants and animals		NUM	1
07-4BFMZ4-092-m01	Bioinformatics for advanced students	5	NUM	1
07-4BFN- V03-092-m01	Ecology of Animals for advanced students	5	NUM	1
07-4BFPS2-092-m01	Biophysics - Basic course	5	NUM	2
07-4S1MZ6-092-m01	Special Bioinformatics I	5	NUM	1
07-4S1N-	Neurobiology I	_	NUM	
V01-092-m01		5	NUM	2
07-4S1N-	Ecology of populations	_	NUM	
V05-092-m01		5	NOM	2
07-4S1PS1-092-m01	Molecular modelling - From DNA to protein	5	NUM	2
07-5S2MZ3-092-m01	Specific Bioinformatics II	10	NUM	2
07-1A1E-072-m01	Evolution - Basics and Principles (Lecture and Practice)	1	NUM	
07-1A1T-072-m01	The Animal Kingdom	4	NUM	1
07-1A1P-072-m01	The Plant Kingdom	4	NUM	
07-3A3GE-072-m01	Genetics	2	NUM	:
hesis (10 ECTS credits)		-		
	Thesis Computational Mathematics (Bachelor Thesis)	10	NUM	5
10-M-BAC-092-m01				-
10-M-BAC-092-m01 ubject-specific Key Skills		1		
	(15 ECTS credits)	I		
ubject-specific Key Skills Key Skills 1 (Compulsory Students must take the fo	(15 ECTS credits)	o-M-PRG a	nd 10-M-COM)	or (:

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Bachelor's with 1 major Computational Mathematics	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-	page 6 / 125
(2009)	cord Bachelor (180 ECTS) Computational Mathematics - 2009	

10-M-PRGk-082-m01	Programming course for students of Mathematics and other subjects, simple		B/NB	96
		1	D /ND	
10-M-VKM-082-m01			B/NB	109
10-M-PRG-082-m01	Programming course for students of Mathematics and other subjects	3	B/NB	94
10-M-COM-082-m01	Computeroriented Mathematics	3	B/NB	68
10-M-BAKC-092-m01	Defense of Bachelor Thesis in Computational Mathematics	3	NUM	55
Key Skills 2 (Elective) (1 Students may not select	<b>o ECTS credits)</b> modules they already took in the area of mandatory electives.	•		
10-M-BSA-072-m01	Seminar in Analysis	5	NUM	56
10-M-BSL-072-m01	Seminar in Linear Algebra	5	NUM	62
10-M-BSE-072-m01	Seminar in Algebra	5	NUM	59
10-M-BSG-072-m01	Seminar in Geometry	5	NUM	61
10-M-BSC-072-m01	Seminar in Complex Analysis	5	NUM	57
10-M-BSF-072-m01	Seminar in Functional Analysis	5	NUM	60
10-M-BSD-072-m01	Seminar in Discrete Mathematics	5	NUM	58
10-M-EDM-072-m01	Introduction to Discrete Mathematics	5	NUM	73
10-M-FAN-072-m01	Introduction to Functional Analysis	5	NUM	76
10-M-ORS-072-m01	Operations Research	5	NUM	91
10-M-EZT-072-m01	Introduction to Number Theory	5	NUM	75
10-M-NLD-072-m01	Non-Linear Dynamics	5	NUM	85
10-M-ST2-082-m01	Stochastics 2	5	NUM	105
10-M-RCS-082-m01	Reading Course Stochastics	4	NUM	101
10-M-RCD-082-m01	Reading Course Discrete Mathematics	4	NUM	97
10-M-RCF-082-m01	Reading Course Functional Analysis	4	NUM	98
10-M-RCO-082-m01	Reading Course Operations Research	4	NUM	99
10-M-RCY-082-m01	Reading Course Dynamical Systems	4	NUM	102
10-M-RCP-082-m01	Reading Course Optimisation	4	NUM	100

Modul	e title				Abbreviation	
Evoluti	Evolution - Basics and Principles (Lecture and Practice)				07-1A1E-072-m01	
Modul	e coord	inator		Module offered by		
holder	ofthe	Chair of Zoology II		Faculty of Biology		
ECTS		od of grading	Only after succ. con	pl. of module(s)		
1	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
		vill address one of the ce cussed and students will			nental mechanisms and hypothe- onstruction methods.	
Intend	ed lear	ning outcomes				
		gnise evolution as the dr ic relationships between		e phylogeny of speci	es. Familiarity with the concepts	
Course	<b>es</b> (type	, number of weekly conta	ct hours, language —	- if other than Germa	in)	
Ü (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language available	2)	
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-	
written	exami	nation (30 minutes)				
Allocat	tion of <sub>l</sub>	olaces				
Additio	onal inf	ormation				
Worklo	bad					
Teachi	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
		ree (1 major) Mathematic	s (2008)			
	-	ree (1 major) Mathematic				
Bachel	Bachelor' degree (1 major) Computational Mathematics (2009)					

Module title				Abbreviation		
The Plant Kingdom				07-1A1P-072-m01		
Module	coord	inator		Module offered by		
holder	of the (	Chair of Plant Physiology	and Biophysics	Faculty of Biology		
ECTS		od of grading	Only after succ. com	pl. of module(s)		
4	nume	rical grade				
Duratio		Module level	Other prerequisites			
1 semes	ster	undergraduate			regular attendance of exercises respective exercises.	
Content	ts					
of group	ps in th nd fun	ne plant kingdom, studen ctions of plant organisms	ts will acquire the fu	ndamental knowledg	versity of eukaryotes. At the level ge necessary to understand the scussed in an evolutionary and	
Intende	ed leari	ning outcomes				
copes. Fundam <b>Courses</b> V + Ü (n	Fundar nental <b>s</b> (type no infor	nental skills in the interp preparation skills. , number of weekly conta mation on SWS (weekly o	retation of macrosco ct hours, language — contact hours) and co	pic and histologic pr if other than Germa purse language avail	able)	
		<b>sessment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
written	examiı	nation (approx. 60 minut	es)			
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Workloa	ad					
Teachin	ng cycl	е				
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module	Module appears in					
	-	ree (1 major) Mathematic				
	-	ree (1 major) Mathematic		\`		
Bachelo	or' deg	ree (1 major) Computatio	nal Mathematics (200	09)		

Modul	e title				Abbreviation	
The An	The Animal Kingdom				07-1A1T-072-m01	
Module coordinator				Module offered by		
	of the F	Professorship of Zoology scopy	at the Department of	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
4	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate		as well as successf	regular attendance of and parti- ful completion of the respective of the course.	
Conter	nts					
vel of g the for	groups i ms and	n the animal kingdom, st	udents will acquire th	he fundamental kno	liversity of eukaryotes. At the le- wledge necessary to understand ng discussed in an evolutionary	
Intend	ed learı	ning outcomes				
micros crosco Course	copes. py. Fun <b>es</b> (type		interpretation of ma lls. ct hours, language —	croscopic and histol if other than Germa		
Metho	d of ass	· · · · ·	nguage — if other tha	an German, examina	tion offered — if not every seme-	
written	exami	nation (approx. 60 minut	es)			
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	oad					
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Modul	e appea	irs in				
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Computational Mathematics (2009)						

Module	e title				Abbreviation	
Structu	ire and	Function of Cells			07-1A1Z-072-m01	
Module coordinator				Module offered by		
holder	of the (	Chair of Plant Physiology	and Biophysics	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
4	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate		pletion of the respec	regular attendance of exercises tive exercises as specified at the	
Conten	ts					
(bacter acquai knowle before	ia, arch nt stud dge, th moving	aebacteria) and eukaryo ents with the elementary e course will then discus	tic cells (animals, pla building blocks of lif is the cell, the smalle ructure. It will point o	ants).] [Version 2: Th e as well as biologic st unit of life, startin ut differences and si	rities between prokaryotic cells e first part of the module will al categories. Building on this g with its macroscopic structure milarities between prokaryotic	
Intende	ed learr	ning outcomes				
ge of th and pla	ie spec ant cells	ific characteristics of the s. Familiarity with the cor	intracellular and extr nponents and functio	racellular structures oning of microscopes		
		, number of weekly conta				
		mation on SWS (weekly o				
		s <b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
written	examir	nation (60 minutes)				
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
Teachi	ng cycl	9				
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)		
Module						
	-	ree (1 major) Mathematic				
	Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Computational Mathematics (2009)					
Datiel	oi uegi			ر کر		

			Abbreviation			
Geneti	Genetics, Neurobiology, Behaviour 07-2A2GNV-072-m01					
Module coordinator M				Module offered by		
Dean o	f Studi	es Biologie (Biology)		Faculty of Biology		
ECTS		od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate		, additional prerequi	sites are listed in the	section on
			assessments.			
Conter	Its					
Fundar	mental	principles of genetics, ne	urobiology and beha	vioural biology.		
Intend	ed lear	ning outcomes				
proces bases cal me	ses inv of inhei chanisr	Idents will understand th olved in animal behaviou ritance.] [Version 2: Stude ns and processes involve I formal bases of inherita	r and will be able to ents will understand ed in animal behaviou	relate animal behavi that there are molect	our to the molecular aular, cellular and syst	and formal tem biologi-
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)	
compo • c • c • c	nent. 07-2A20 07-2A20 07-2A20 07-2A20 <b>d of ass</b>	omprises 3 module comp GNV-1G-072: V + Ü (no info GNV-2N-072: V + Ü (no info GNV-3V-072: V + Ü (no info Gessment (type, scope, la	ormation on SWS (we ormation on SWS (we ormation on SWS (we nguage — if other tha	ekly contact hours) a ekly contact hours) a ekly contact hours) a an German, examina	nd course language a nd course language a nd course language a	available) available) available)
Assess low. Ur	ment ir	ion on whether module can this module comprises ated otherwise, successf	the assessments in t	he individual module		
<ul> <li>Assessment in module component o7-2A2GNV-1G-072: Basic Genetics Basic Genetics</li> <li>2 ECTS, Method of grading: numerical grade</li> <li>written examination (approx. 30 minutes)</li> <li>Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.</li> <li>Assessment in module component o7-2A2GNV-2N-072: Basic Neurobiology Basic Neurobiology</li> <li>2 ECTS, Method of grading: numerical grade</li> <li>written examination (approx. 30 minutes)</li> <li>Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.</li> <li>Assessment in module component 07-2A2GNV-2N-072: Basic Neurobiology Basic Neurobiology</li> <li>2 ECTS, Method of grading: numerical grade</li> <li>written examination (approx. 30 minutes)</li> <li>Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.</li> <li>Assessment in module component 07-2A2GNV-3V-072: Behavioural Biology Behavioural Biology</li> <li>2 ECTS, Method of grading: numerical grade</li> <li>written examination (approx. 30 minutes, word problems and/or multiple choice questions)</li> <li>Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful complexity of grading: numerical grade</li> </ul>						
cessful completion of the respective exercises as specified at the beginning of the course.						
Allocation of places						
Only as part of "spezielles Studienangebot": 10 places.						
Additional information						
Worklo	ad					
WORKI	au					
 Bachelor's (2009)	with 1 ma	jor Computational Mathematics		enerated 26-Aug-2024 • exam DECTS) Computational Mathe	-	page 12 / 125

#### Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Biology (2011) Bachelor' degree (1 major) Biology (2007) Bachelor' degree (1 major) Biology (2010) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major, 1 minor) Biology (Minor, 2008) Bachelor's degree (1 major, 1 minor) Biology (Minor, 2010) No final examination Special study offering (2010)

Module title				Abbreviation		
Bioinformatics 07-3A3BI-072-m01						
Module coordinator			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)		
2	numei	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	its					
Fundar	nental p	orinciples of bioinformati	cs.			
Intend	ed learr	ning outcomes				
Studen	its are p	proficient in methods for	the analysis of DNA a	nd protein database	25.	
		, number of weekly conta	· ·	•		
		omprises 2 module comp				ach module
compo			onents. montation	on courses witt be th		
		ll-1B-072: V (no informati	on on SWS (weekly c	ontact hours) and co	ourse language avail	able)
• 0	97-3A3B	I-2B-072: S (no informati	on on SWS (weekly c	contact hours) and co	ourse language avail	able)
		essment (type, scope, la			tion offered — if not	every seme-
		on on whether module ca		· · ·		
		this module comprises				
	iless sta assessi	ated otherwise, successf	ul completion of the	module will require s	successful completio	on of all indi-
viuuai	a558551	nents.				
Assess	ment ir	n module component 07-:	3A3BI-1B-072: Bioinf	ormatics (Lecture)		
		Method of grading: nume				
		examination (approx. 20	-	· · · · · · · · · · · · · · · · · · ·		
		n module component o7- Method of grading: (not)				
		per (approx. 5 to 10 pages		eu		
	ion of p		,			
	· · · ·	f Biochemistry Master's:	nlaces Places will l	he allocated by lot		
-		ormation	5 places. Flaces with			
Auunu						
Worklo						
WORKIO						
Teachi	ng cycl	9				
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)		
Module appears in						
Bachelor' degree (1 major) Biochemistry (2011)						
Bachelor' degree (1 major) Biochemistry (2009)						
Bachelor' degree (1 major) Biology (2007)						
	Bachelor' degree (1 major) Mathematics (2008)					
Bachelor' degree (1 major) Mathematics (2007)						
	Bachelor' degree (1 major) Computational Mathematics (2009)					
	-	ee (1 major) Biochemistry				
		gree (1 major, 1 minor) Bi		enerated 26-Aug-2024 • exam	reg data re-	nage 14 / 135
(2009)	with 1 maj	or computational Mathematics		ECTS) Computational Mathe	_	page 14 / 125

Module title			Abbreviation			
Genetics					07-3A3GE-072-m01	
Modul	e coord	inator		Module offered by		
holder	of the (	Chair of Neurobiology and	d Genetics	Faculty of Biology		
ECTS		od of grading	Only after succ. com	pl. of module(s)		
2	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conter	ts					
Molecu	ular and	classical genetics.				
Intend	ed learı	ning outcomes				
	nts are f / as a w		sms of inheritance th	at are essential for o	developing an understanding of	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V + S (I	no infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)	
ster, in	formati	on on whether module ca			tion offered — if not every seme-	
		nation (30 minutes)				
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor' degree (1 major) Biology (2007)						
Bachel	Bachelor' degree (1 major) Mathematics (2008)					
	-	ree (1 major) Mathematic				
Bachel	Bachelor' degree (1 major) Computational Mathematics (2009)					

Module title					Abbreviation			
		nts and animals			07-3A30E-072-m01			
Modul	e coordi	inator	Module offered by					
	· · · · ·	es Biologie (Biology)		Faculty of Biology				
ECTS	1	od of grading	Only after succ. con	pl. of module(s)				
6	<u> </u>	rical grade						
Duratio		Module level	Other prerequisites					
1 seme		undergraduate						
This m and bid as on t model	<b>Contents</b> This module will provide students with an overview of the interactions of plants and animals with their abiotic and biotic environments. The module will focus on the functional adaptation to environmental conditions as well as on the structure and dynamics of populations and ecosystems. Students will be introduced to fundamental model concepts of ecology, will become familiar with examples of research findings and will acquire the fundamental knowledge necessary to develop an understanding of current ecological problems.							
Studer	its are f	amiliar with the fundame			ecology and with the most im-			
their e		ent. In addition, they une			f occurrence of organisms in has to the assessment of envi-			
Course	<b>s</b> (type,	number of weekly conta	ct hours, language –	- if other than Germa	n)			
compo • c • c <b>Metho</b> ster, in	nent. 97-3A30 97-3A30 <b>d of ass</b> formati	DE-1T-072: V + Ü (no inforn DE-2P-072: V + Ü (no inforn <b>essment</b> (type, scope, la on on whether module ca	mation on SWS (wee mation on SWS (wee nguage — if other tha an be chosen to earn	kly contact hours) an kly contact hours) ar an German, examina a bonus)	sted separately for each module ad course language available) ad course language available) tion offered — if not every seme- e components as specified be-			
Assessment in this module comprises the assessments in the individual module components as specified be- low. Unless stated otherwise, successful completion of the module will require successful completion of all indi- vidual assessments. <b>Assessment in module component o7-3A3OE-1T-072:</b> Ecology of Animals (Lecture and Practice) Ecology of Ani- mals (Lecture and Practice) • 3 ECTS, Method of grading: numerical grade • written examination (45 minutes) <b>Assessment in module component o7-3A3OE-2P-072:</b> Ecology of Plant (Lecture and Practice) Ecology of Plant (Lecture and Practice) • 3 ECTS, Method of grading: numerical grade								
	ion of p	examination (60 minutes) <b>llaces</b>						
Additio	nal info	ormation						
Additte	-inactified							
	- d							
Worklo	Dad							
Teachi	ng cycle	9						
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)				

Bachelor's with 1 major Computational Mathematics	
2009)	

#### Module appears in

Bachelor' degree (1 major) Biology (2007) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Computational Mathematics (2009)

Module	e title				Abbreviation		
Bioinfo	Bioinformatics for advanced students 07-4BFMZ4-092-mo1						
Module	Module coordinator Module offered by						
ECTS	r	Chair of Bioinformatics od of grading	Only after succ. con	Faculty of Biology			
5		rical grade					
Duratio		Module level	Other prerequisites				
1 seme		undergraduate					
Conten		undergraduate	<u> </u>				
		ill introduce students to	the practice of high	ormatics and will so	ver the following topics: se-		
					etworks as well as gene regulati-		
on.	2 anaty	515, 5114etare analy515, 5e	nome unatysis, cetta		tworks us well us gene regulati		
Intende	ed lear	ning outcomes					
			ioinformatic algorith	ms to address simpl	e problems as well as to interpret		
their re							
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	ın)		
V + Ü (r	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)		
Metho	d of as	sessment (type, scope, la	inguage — if other th	an German, examina	tion offered — if not every seme-		
		ion on whether module c			,		
log (ap	prox. 1	o to 20 pages)					
Allocat	ion of	places					
Additio	onal inf	ormation					
Worklo	ad						
WORKIO	au						
 Taaahi							
Teachi	ng cyci	e	-				
Referre	ed to in	LPOI (examination regu	llations for teaching-o	degree programmes)			
Module							
	-	ree (1 major) Biology (20					
	-	ree (1 major) Mathematic					
	-	ree (1 major) Mathematic					
Bachel	or' deg	ree (1 major) Computatio	nal Mathematics (20	09)			

Modul	e title				Abbreviation	
Ecolog	Ecology of Animals for advanced students 07-4BFNV03-092-m01					
Modul	e coord	linator		Module offered by		
holder	ofthe	Chair of Zoology III		Faculty of Biology		
ECTS	-	od of grading	Only after succ. con	· · · · · · · · · · · · · · · · · · ·		
5	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conte	nts					
Select logy.	ed topi	cs in autecology and syn	ecology; experimenta	l design, data collec	tion and analysis in animal eco-	
Intend	led lear	ning outcomes				
		e acquired an advanced l and field experiments a			They are able to design simple dings.	
Course	<b>es</b> (type	, number of weekly conta	act hours, language –	- if other than Germa	in)	
V + Ü (	(no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		<b>sessment</b> (type, scope, la ion on whether module c			tion offered — if not every seme-	
		nation (60 minutes)				
	tion of					
Additi	onal inf	ormation				
Workl	oad					
			-			
Teach	ing cycl	e				
Referr	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Modul	e appea	ars in				
Bache	lor' deg	ree (1 major) Biology (20	07)			
	-	ree (1 major) Mathematio				
	-	ree (1 major) Mathematio		、 、		
Bache	lor' deg	ree (1 major) Computatio	onal Mathematics (20	09)		

Module	e title				Abbreviation		
Biophy	Biophysics - Basic course 07-4BFPS2-092-m01						
Module	coord	inator		Module offered by			
holder	of the (	Chair of Plant Physiology	and Biophysics	Faculty of Biology			
		od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
methoo molecu	ls with lar bio	which it can be characte logy and imaging as well	rised. For this purpos	se, students will be in	ne transport and the biophysical ntroduced to modern methods of		
Intende	ed lear	ning outcomes					
		erstand basic membrane tact plants, isolated plan			experimental methods in experi- ms.		
Courses	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)		
V + Ü (r	no infor	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-		
written	examiı	nation (60 minutes)					
Allocati	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachir	ng cvcl	e					
	5 . 7						
Referre	d to in	LPO I (examination regu	lations for teaching-o	degree programmes)			
Module	e appea	ars in					
Bachelo	or' deg	ree (1 major) Biology (200	07)				
	Bachelor' degree (1 major) Mathematics (2008)						
	Bachelor' degree (1 major) Mathematics (2007)						
Bachelo	or' deg	ree (1 major) Computatio	nal Mathematics (20	09)			

Module					Abbreviation		
Special	Special Bioinformatics I 07-4S1MZ6-092-m01						
Module	e coord	inator		Module offered by			
holder	of the (	Chair of Bioinformatics		Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
	tal prin	ciples of evolutionary bio			ics (methods and markers), fun- structure prediction, phylogene-		
Intende	ed lear	ning outcomes					
Studen netic re			databases for seque	nce analysis, RNA st	ructure prediction and phyloge-		
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	in)		
V + Ü (r	no infoi	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		<b>sessment</b> (type, scope, la ion on whether module c			tion offered — if not every seme-		
log (ap	prox. 1	o to 20 pages)					
Allocat	ion of <sub>l</sub>	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)			
Module	e appea	ars in					
	-	ree (1 major) Biology (20					
	-	ree (1 major) Mathematic					
		ree (1 major) Mathematic		、 、			
	Bachelor' degree (1 major) Computational Mathematics (2009)						
Bachel	or's de	gree (1 major, 1 minor) Bi	ology (Minor, 2008)				

Module title Abbreviation						
Neurob	Neurobiology I 07-4S1NVO1-092-m01					
Module	Module coordinator Module offered by					
holder	of the (	Chair of Neurobiology and	d Genetics	Faculty of Biology		
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	undergraduate				
Conten	ts					
Neurob	oiology	and methods in neurobic	ology, using Drosophi	la as a neurogenetic	: model system.	
Intende	ed lear	ning outcomes	,			
		e acquired an advanced k nethods in neurobiology.	nowledge of the neu	robiology of a model	organism and are able to apply	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
P (no ir	nformat	ion on SWS (weekly cont	act hours) and course	e language available	2)	
		<b>sessment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
log (ap	prox. 1	o to 20 pages)				
Allocat	ion of <sub>l</sub>	olaces				
Additio	onal inf	ormation				
Worklo	ad					
	-					
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programmes)		
Module	e appea	ars in				
	-	ree (1 major) Biology (200				
	-	ree (1 major) Mathematic				
	-	ree (1 major) Mathematic		,		
		ree (1 major) Computation		09)		
Bachel	3achelor's degree (1 major, 1 minor) Biology (Minor, 2008)					

Ecology of populations       07-451NV05-092-m01         Module cordinator       Module offered by         holder of the Chair of Zoology III       Faculty of Biology         ECTS       Method of grading       Only after succ. compL of module(s)         5       numerical grade          Duration       Module level         Other prerequisites          Intended learning outcomes         Torterequisites         Intended learning outcomes         Students are able to interpret the structure and dynamics of human and animal populations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.         Courses (type, number of weekly contact hours, language – if other than German)         This module comprises 2 module components. Information on courses will be listed separately for each module component.         or -451NV05-1P0-092: V + Ü (no information on SWS (weekly contact hours) and course language available)         Method of assesment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)         Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments	Module title				Abbreviation					
holder of the Chair of Zoology III       Faculty of Biology         ECTS       Method of grading       Only after succ. compl. of module(s)         5       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents         More in-depth discussion of the structure and dynamics of human and animal populations; regulation of population density; management.         Intended learning outcomes         Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.         Courses (type, number of weekly contact hours, language — if other than German)         This module comprises 2 module components. Information on courses will be listed separately for each module component.         or-4S1NV05-1PO-092: 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 can be chosen to earn a bonus)         Assessment in this module component or-4S1NVO5-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)         otherwise, successful completion of the module will require successful completion of all individual assessments. <td>Ecology of po</td> <td colspan="7">Ecology of populations 07-4S1NV05-092-m01</td>	Ecology of po	Ecology of populations 07-4S1NV05-092-m01								
ECTS       Method of grading       Only after succ. compl. of module(s)         5       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents         More in-depth discussion of the structure and dynamics of human and animal populations; regulation of population density; management.         Intended learning outcomes         Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.         Courses (type, number of weekly contact hours, language — if other than German)         This module comprises 2 module components. Information on courses will be listed separately for each module component.         o7-4\$1NV05-1PO-092: 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 can be chosen to earn a bonus)         Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.         Assessment in module component o7-4\$1NV05-1PO-092: Basic Ecology of Populations (Lecture, Practice) <td< td=""><td>Module coord</td><td>linator</td><td></td><td>Module offered by</td><td></td><th></th></td<>	Module coord	linator		Module offered by						
5       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           More in-depth discussion of the structure and dynamics of human and animal populations; regulation of population density; management.          Intended learning outcomes           Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.         Courses (type, number of weekly contact hours, language — if other than German)          This module comprises 2 module components. Information on courses will be listed separately for each module component.          • 07-4\$1NV05-1P0-092: 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 can be chosen to earn a bonus)          Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.         Assessment in module component 07-4\$1NV05-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)       -	holder of the	Chair of Zoology III		Faculty of Biology						
Duration         Module level         Other prerequisites           1 semester         undergraduate            Contents            More in-depth discussion of the structure and dynamics of human and animal populations; regulation of population density; management.           Intended learning outcomes           Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.           Courses (type, number of weekly contact hours, language — if other than German)           This module comprises 2 module components. Information on courses will be listed separately for each module component.           • 07-4\$1NV05-1P0-092: V + Ü (no information on SWS (weekly contact hours) and course language available)           • 07-4\$1NV05-2P0-092: S (no information on SWS (weekly contact hours) and course language available)           • 07-4\$1NV05-2P0-092: S (no information on SWS (weekly contact hours) and course language available)           • 07-4\$1NV05-2P0-092: S (no information on SWS (weekly contact hours) and course language available)           • 08thod of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)           Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assess	ECTS Method of grading Only after succ. compl. of module(s)									
1 semester       undergraduate          Contents         More in-depth discussion of the structure and dynamics of human and animal populations; regulation of population density; management.         Intended learning outcomes         Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.         Courses (type, number of weekly contact hours, language — if other than German)         This module comprises a module components. Information on courses will be listed separately for each module component.         • 07-451NV05-1PO-092: V + Ü (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: 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 can be chosen to earn a bonus)         Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual a	5 nume	rical grade								
Contents         More in-depth discussion of the structure and dynamics of human and animal populations; regulation of population density; management.         Intended learning outcomes         Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.         Courses (type, number of weekly contact hours, language — if other than German)         This module comprises 2 module components. Information on courses will be listed separately for each module component.         • 07-451NV05-1PO-092: V + Ü (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-451NV05-2PO-092: 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 can be chosen to earn a bonus)         Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.         Assessment in module component o7-4S1NV05-1PO-092: Basic Ecology of Po		1	Other prerequisites							
<ul> <li>More in-depth discussion of the structure and dynamics of human and animal populations; regulation of population density; management.</li> <li>Intended learning outcomes</li> <li>Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.</li> <li>Courses (type, number of weekly contact hours, language — if other than German)</li> <li>This module comprises 2 module components. Information on courses will be listed separately for each module component.</li> <li>o7-4S1NVO5-1PO-092: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>o7-4S1NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)</li> <li>Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component 07-451NV05-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>		undergraduate								
Intended learning outcomes         Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.         Courses (type, number of weekly contact hours, language — if other than German)         This module comprises 2 module components. Information on courses will be listed separately for each module component.         • 07-4S1NV05-1PO-092: V + Ü (no information on SWS (weekly contact hours) and course language available)         • 07-4S1NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-4S1NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-4S1NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)         • 07-4S1NV05-2PO-092: 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 can be chosen to earn a bonus)         Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.         Assessment in module component o7-4S1NV05-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)       • 4 ECTS, Method of grading: numerical grade	More in-dept	More in-depth discussion of the structure and dynamics of human and animal populations; regulation of popula-								
<ul> <li>Students are able to interpret the structure and dynamics of populations and metapopulations on the basis of model concepts in population ecology and to apply more advanced methods of quantitative analysis to these.</li> <li><b>Courses</b> (type, number of weekly contact hours, language — if other than German)</li> <li>This module comprises 2 module components. Information on courses will be listed separately for each module component.</li> <li>o7-451NV05-1PO-092: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>o7-451NV05-2PO-092: S (no information on SWS (weekly contact hours) and course language available)</li> <li><b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li><b>Assessment in module component 07-451NVO5-1PO-092:</b> Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>										
<ul> <li>This module comprises 2 module components. Information on courses will be listed separately for each module component.</li> <li>o7-4S1NVO5-1PO-092: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>o7-4S1NVO5-2PO-092: S (no information on SWS (weekly contact hours) and course language available)</li> <li>Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component o7-4S1NVO5-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>	Students are	able to interpret the struc								
<ul> <li>component.         <ul> <li>o7-4S1NVO5-1PO-092: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>o7-4S1NVO5-2PO-092: S (no information on SWS (weekly contact hours) and course language available)</li> </ul> </li> <li>Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component o7-4S1NVO5-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>	Courses (type	, number of weekly conta	act hours, language –	- if other than Germa	n)					
<ul> <li>ble)</li> <li>o7-4S1NVO5-2PO-092: S (no information on SWS (weekly contact hours) and course language available)</li> <li>Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component o7-4S1NVO5-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>	component.									
<ul> <li>Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component o7-4S1NVO5-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>	ble)			·	-	-				
<ul> <li>ster, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component o7-4S1NVO5-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>										
<ul> <li>low. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component o7-4S1NVO5-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)         <ul> <li>4 ECTS, Method of grading: numerical grade</li> </ul> </li> </ul>					tion offered — if not	every seme-				
<ul> <li>vidual assessments.</li> <li>Assessment in module component o7-4S1NV05-1PO-092: Basic Ecology of Populations (Lecture, Practice) Basic Ecology of Populations (Lecture, Practice)</li> <li>4 ECTS, Method of grading: numerical grade</li> </ul>										
<ul><li>Ecology of Populations (Lecture, Practice)</li><li>4 ECTS, Method of grading: numerical grade</li></ul>				module will require .						
• 4 ECTS, Method of grading: numerical grade				Basic Ecology of Popu	ulations (Lecture, Pra	actice) Basic				
<ul> <li>written examination (45 minutes)</li> </ul>										
Assessment in module component o7-4S1NVO5-2PO-092: Ecology of Populations (Seminar)	Assessment i	n module component 07-	4 <b>S1NVO5-2PO-092:</b> E		ns (Seminar)					
<ul> <li>1 ECTS, Method of grading: (not) successfully completed</li> <li>presentation (approx. 20 to 30 minutes)</li> </ul>				ted						
			infutes)							
Allocation of places	Allocation of	places								
Additional information	 Additional inf									
	Additional Inf	ormation								
Workload	Workload									
Teaching cycle	Teaching cycl	e								
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)	Referred to in	LPOI (examination regu	llations for teaching-o	degree programmes)						
Module appears in										
Bachelor' degree (1 major) Biology (2007) Bachelor' degree (1 major) Mathematics (2008)	-									
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007)	-									
Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Computational Mathematics (2009)	-			09)						
Bachelor's with 1 major Computational Mathematics     JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- cord Bachelor (180 ECTS) Computational Mathematics - 2009     page 23 / 125	Bachelor's with 1 ma (2009)	jor Computational Mathematics				page 23 / 125				



Bachelor's degree (1 major, 1 minor) Biology (Minor, 2008)

Module title					Abbreviation	
Molecu	ılar mo	delling - From DNA to pro		07-4S1PS1-092-m01		
Module coordinator Module c					ered by	
holder	of the (	Chair of Plant Physiology	and Biophysics	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites	;		
1 seme	ster	undergraduate				
Conten	ts					
	s as we	ell as on the search for ar			function of nucleic acids and molecules using databases and	
Intende	ed lear	ning outcomes				
		e acquired a specialist kn rk with relevant databas		ture-function relation	nships of macromolecules and	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	– if other than Germa	n)	
V + Ü (r	no infoi	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		<b>sessment</b> (type, scope, la ion on whether module c			tion offered — if not every seme-	
comput	terised	practical examination (4	hours)			
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 programmes)		
Module	e appea	ars in				
Bachel	or' deg	ree (1 major) Biology (20	07)			
	-	ree (1 major) Mathematic				
	-	ree (1 major) Mathematic		``````````````````````````````````````		
	Bachelor' degree (1 major) Computational Mathematics (2009)					
Bachel	or's de	gree (1 major, 1 minor) Bi	ology (Minor, 2008)			

Module	title				Abbreviation	
Specific Bioinformatics II					07-5S2MZ3-092-m01	
Module	coord	inator		Module offered by		
holder	of the Q	Chair of Bioinformatics		Faculty of Biology		
ECTS		od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Conten	ts					
quence	analys		olution - gene expres		rom the following list: - se- in structure analysis - program-	
Intende	ed learn	ning outcomes				
		e acquired knowledge abo perform scientific laborate		and methods of bio	informatics. They are able to in-	
Course	<b>s</b> (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V + Ü (n	io infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)	
ster, inf	formati	on on whether module ca	an be chosen to earn	a bonus)	tion offered — if not every seme-	
didate e	each (a		oral examination in g		r c) oral examination of one can- to 3 candidates, approx. 60 mi-	
Allocati	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
Teachir	ng cycl	9				
	<u> </u>					
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)		
		- C (chainination regu				
Module	appea	irs in				
		ree (1 major) Biology (200	7)			
	-	ree (1 major) Mathematic				
		ree (1 major) Mathematic				
Bachelo	Bachelor' degree (1 major) Computational Mathematics (2009)					

Modul	e title				Abbreviation		
General Chemistry for Mathematics Majors 08-CM1-072-m01							
Modul	Module coordinator Module offered by						
lecture Chemi		ture "Experimentalchemi	e" (Experimental	Institute of Inorgan	ic Chemistry		
ECTS		od of grading	Only after succ. cor	npl. of module(s)			
6	nume	rical grade					
Durati	on	Module level	Other prerequisites	i			
1 seme	ester	undergraduate					
Conter	nts						
les, me	etals, a		eriodic table, chemic	al equilibrium and co	of chemistry. It focuses on partic- omplexometry. In addition, the c chemistry.		
Intend	ed lear	ning outcomes					
mical f are ab	ormula le to de	s to describe chemical re	actions and to interp tive and qualitative a	pret them by identifyi analytical methods ar	bility to use the language of che- ng the type of reaction. Students nd their application areas.		
		tion on SWS (weekly cont					
Metho	d of ass		anguage — if other th	an German, examina	tion offered — if not every seme-		
writter	ı exami	nation (approx. 60 minut	es)				
Alloca	tion of	places					
Additio	onal inf	ormation					
			_				
Worklo	bad						
Teachi	ng cycl	e					
Referre	ed to in	LPOI (examination regu	llations for teaching-	degree programmes)			
Modul	e appea	ars in					
		ree (1 major) Mathematic	cs (2008)				
Bache	lor' deg	ree (1 major) Mathematic	cs (2007)				
Bache	lor' deg	ree (1 major) Computatio	nal Mathematics (20	09)			

Module	e title				Abbreviation		
Organi	c Chem	istry 1			08-0C1-092-m01		
Module coordinator				Module offered by			
holder of the Professorship of Organic Chemistry			Chemistry	Institute of Organic	Chemistry		
ECTS		od of grading	Only after succ. con				
5	nume	ical grade		<b>2</b>			
Duratio	on	Module level	Other prerequisites	;			
1 seme	ster	undergraduate	Admission prerequi	site to assessment:	successful completi	on of exerci-	
			ses in the respective classes as specified at the beginning of the course				
				rcises to be success	• •	-	
				ercises (usually a m	aximum of 2 inciden	ts of unexcu-	
			sed absence).				
Conten	ts						
the bor organic	nding si compo	rovides students with ar tuation of carbon and in ounds. The module also nination reactions as we	troduces students to discusses the fundar	the nomenclature of nental principles of s	f simple and modera	ately complex	
Intende	ed learr	ing outcomes					
lecules	. They a rpose,	re to determine simple s are able to describe and they can analyse and ca	formulate some of th	e most important rea	actions in organic ch	emistry. For	
Course	<b>s</b> (type	number of weekly conta	act hours, language –	– if other than Germa	ın)		
v + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		<b>essment</b> (type, scope, la on on whether module c			tion offered — if not	every seme-	
nutes e	each; 3	n examinations (1 writte written examinations: 60 oral examination in grou	o minutes each) or b)	oral examination of			
Allocat	ion of p	laces					
Additio	onal info	ormation					
Worklo	ad						
Teachi	ng cycl	2					
	-5 cycli	-					
Referre	ed to in	LPO I (examination regu	ulations for teaching-	degree programmes)			
§ 62 (1)	) 2. Che	mie "Organische und Bi	oorganische Chemie'	I			
Module	e appea	rs in					
Bachel	or' deg	ree (1 major) Biochemist	ry (2011)				
	-	ree (1 major) Biochemist	• -				
	-	ree (1 major) Biochemist					
	-	ee (1 major) Chemistry (					
	-	ree (1 major) Chemistry ( ree (1 major) Mathematio					
				anaratad of Aug and a	a rog data ta		
2009)	with 1 maj	or Computational Mathematics		enerated 26-Aug-2024 • exan o ECTS) Computational Mathe	-	page 28 / 125	

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011) First state examination for the teaching degree Gymnasium Chemistry (2009)

Module title					Abbreviation		
Organic Chemistry 2					08-0C2-092-m01		
Module coordinator				Module offered by			
holder of the Chair of Physically Organi			c Chemistry Institute of Organic Chemistry				
			Only after succ. com	Only after succ. compl. of module(s)			
9	9 numerical grade						
Duration Module level		Other prerequisites					
1 semester undergraduate							
Conten	ts						
This module introduces students to the rules of aromaticity and discusses specific reactions of aromatics. Using the example of carbonyl compounds, it extends the students' knowledge of substitution, elimination and addition reactions to complex reaction mechanisms. The course also focuses on oxidation and reduction reactions as well as rearrangement. In addition, it introduces students to the spectroscopic methods of infrared spectroscopy, mass spectrometry and NMR spectroscopy.							
Intende	ed learn	ning outcomes					
Students have become familiar with the criteria for aromaticity. They can analyse the varying reactivity of car- bonyl compounds. They are able to describe specific reactions of carbonyls and aromatics. For that purpose, they can plan and formulate multi-stage syntheses with complex reaction mechanisms and can transfer them to unknown reactions. Students are able to describe important spectroscopic methods, to evaluate a spectrum and to draw conclusions regarding the molecular structure.							
Course	<b>s</b> (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)		
V + Ü +	V (no i	nformation on SWS (wee	kly contact hours) and	d course language a	vailable)		
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)							
a) 1 to 3 written examinations (1 written examination: 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination in groups (groups of 2, approx. 30 minutes)							
Allocation of places							
Additional information							
Workload							
Teaching cycle							
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)							
Module appears in							
Bachelor' degree (1 major) Biochemistry (2009)							
	Bachelor' degree (1 major) Chemistry (2009)						
Bachel	Bachelor' degree (1 major) Computational Mathematics (2009)						

Module	e title				Abbreviation		
Physical Chemistry 1					08-PC1-092-m01		
Modula	e coord	inator		Module offered by			
			antenmochanik and	•	l and Theoretical Ch	omistry	
lecturer of lecture "Grundlagen der Quantenmechanik and Spektroskopie" (Principles of Quantum Mechanics and						emistry	
•	oscopy)	-					
ECTS		od of grading	Only after succ. con	npl. of module(s)			
8		rical grade		• • • •			
Duration Module level Other prerequisites							
1 semester		undergraduate	Admission prerequisite to assessment: successful completion of exerci-				
			ses in the respective classes as specified at the beginning of the course				
		(usually 70% of exercises to be successfully completed) a				well as regu-	
		lar attendance of exercises (usually a maximum of			aximum of 2 inciden	ts of unexcu-	
			sed absence).				
Conten	its		·				
This mo	odule ir	ntroduces students to the	e fundamental princi	oles of quantum med	chanics. It analyses	molecules on	
		e following models: part		•			
		cuses on vibrational spe					
		oscopy. In addition, the r					
tation, sted at		ntial equations, Fourier t	ransform and orthogo	onal functions as ma	thematical bases of	the topics li-	
		ing outcomes					
		ning outcomes	le of quantum macha	nice and to apply th	am to molecules. Th		
		able to explain key mode ferent spectroscopic me					
	im mec		tilous. In addition, st		apply the mathema	lical bases of	
•		, number of weekly conta	act hours, language –	- if other than Germa	ın)		
		no information on SWS (					
		essment (type, scope, la		-	-	every seme-	
ster, in	formati	on on whether module c	an be chosen to earn	a bonus)			
a) 1 to <u>s</u>	3 writte	n examinations (1 writter	n examination: appro	x. 90 minutes; 2 wri	tten examinations: 6	50 or 90 mi-	
		written examinations: 60	, ,		one candidate each	(approx. 20	
		oral examination in grou	ips (groups of 2, appi	rox. 30 minutes)			
Allocat	tion of p	olaces					
Additional information							
Worklo	ad						
Teachi	ng cycl	e					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)							
Module	e appea	in in					
		ree (1 major) Biochemist	ry (2011)				
	-	ree (1 major) Biochemist					
Bachelor' degree (1 major) Biochemistry (2009)							
Bachelor' degree (1 major) Chemistry (2010)							
Bachelor's	with 1 mai	or Computational Mathematics	JMU Würzburg • ge	enerated 26-Aug-2024 • exan	n. reg. data re-	page 31 / 125	
(2009)		,		ECTS) Computational Mathe	-		

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Module lecturer ECTS 6	al and The				Abbreviation			
lecturer ECTS 6		oretical Chemistry 3:	Symmetry and Quant	um Chemistry	08-PC3-092-m01			
lecturer ECTS 6								
<b>ECTS</b> 6		· · · · · · · · · · · · · · · · · · ·		Module offered by				
6	of lecture	"Quantenchemie"		Institute of Physica	l and Theoretical Chemistry			
	Method o		Only after succ. com	pl. of module(s)				
	numerica	l grade						
Duratio	n Mo	dule level	Other prerequisites					
1 semes	ster un	dergraduate	Admission prerequisite to assessment: successful completion of exer					
			ses in the respective classes as specified at the beginning of the cours (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexc sed absence).					
Content	ts							
This mo	dule disci	usses the fundament	al principles of quant	um chemistry and sy	mmetry in chemistry.			
		goutcomes						
					wister and summer staring she			
			edge they have devel	•	emistry and symmetry in che-			
			;	•	n)			
			act hours, language —					
			weekly contact hours		-			
					tion offered — if not every sen			
			an be chosen to earn	-				
					minations: 60 or 90 minutes			
-			groups of 2, approx. 3		andidate each (approx. 20 mir			
			3100ps 01 2, approx. 3	5 minutes)				
Allocati	ion of plac	es						
Addition	nal inform	ation						
			_					
Workloa	ad							
Teachin	ng cvcle							
	0 . ,							
Poforro	d to in I D(	L (avamination rog	ulations for teaching-c	lagraa programmac)				
Referred				legiee programmes)				
	appears i							
Bachelor' degree (1 major) Biochemistry (2013)								
	Bachelor' degree (1 major) Chemistry (2010)							
Bachelo	Bachelor' degree (1 major) Chemistry (2009)							
Bachelo Bachelo	Bachelor' degree (1 major) Mathematics (2012)							
Bachelo Bachelo Bachelo	-	Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2009)						
Bachelo Bachelo Bachelo Bachelo	or' degree	(1 major) Computation	-					
Bachelo Bachelo Bachelo Bachelo Bachelo	or' degree or' degree		onal Mathematics (200	•				
Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo	or' degree or' degree or' degree	(1 major) Computatio	onal Mathematics (200 onal Mathematics (202	12)				
Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo	or' degree or' degree or' degree or' degree	(1 major) Computatio (1 major) Computatio	onal Mathematics (200 onal Mathematics (202 onal Mathematics (202	12)				
Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo	or' degree or' degree or' degree or' degree or' degree	(1 major) Computatic (1 major) Computatic (1 major) FOKUS Che	onal Mathematics (200 onal Mathematics (202 onal Mathematics (202 mistry (2011)	12) 13)				
Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo First sta	or' degree or' degree or' degree or' degree or' degree ate examin	(1 major) Computatio (1 major) Computatio (1 major) FOKUS Che ation for the teachin	onal Mathematics (200 onal Mathematics (202 onal Mathematics (202	2) 13) Chemistry (2009)				
Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo First sta First sta	or' degree or' degree or' degree or' degree or' degree ate examin ate examin	(1 major) Computatio (1 major) Computatio (1 major) FOKUS Che ation for the teachin ation for the teachin	onal Mathematics (200 onal Mathematics (202 onal Mathematics (202 mistry (2011) g degree Grundschule	2) 23) Chemistry (2009) Chemistry (2009)				



First state examination for the teaching degree Gymnasium Chemistry (2009) First state examination for the teaching degree Mittelschule Chemistry (2013)

Module title				Abbreviation			
Theoretical Models in Chemistry					08-TC-092-m01		
Module coordinator				Module offered by			
		ture "Quantenchemie"			l and Theoretical Chemistry		
ECTS	1	od of grading	Only after succ. con	npl. of module(s)			
3	3 numerical grade						
Duration         Module level         Other prerequisites							
1 seme	ster	undergraduate		Admission prerequisite to assessment: successful completion of exerci-			
				•	d at the beginning of the course		
			(usually 70% of exe	(usually 70% of exercises to be successfully completed) as well as regu-			
			lar attendance of ex	lar attendance of exercises (usually a maximum of 2 incidents of unexcu			
			sed absence).				
Conten	Its						
This mo	odule p	provides students with	deeper insights into ad	vanced topics in qua	antum chemistry. It focuses on		
spin, th	ne Paul	i principle, Slater dete	rminants, the Hartree-Fe	ock method, correlat	ion energy, configuration interac		
tion and	d excit	ed states, the Born-Op	penheimer approximat	ion and bonding mo	dels of H2+.		
Intende	ed lear	ning outcomes					
Studen	its are a	able to describe excite	d states of molecules w	ith the help of key co	oncepts and models.		
Course	s (type	, number of weekly co	ntact hours, language –	- if other than Germa	ın)		
			ly contact hours) and co				
					tion offered — if not every seme		
ster, in	formati	ion on whether modul	e can be chosen to earn	a bonus)			
					tten examinations: approx. 60		
					l examination of one candidate		
			examination in groups	(groups of 2, approx	. 30 minutes)		
Allocat	ion of p	olaces					
Additio	onal inf	ormation					
Worklo	ad						
Worklo	ad						
		e					
Worklo  Teachir		e					
 Teachir 	ng cycl		egulations for teaching-	degree programmes)			
 Teachir 	ng cycl		egulations for teaching-o	degree programmes)			
 Teachir 	ng cycl ed to in	LPOI (examination re	egulations for teaching-	degree programmes)			
 Teachir  Referre  Module	ng cycl ed to in e appea	LPOI (examination re		degree programmes)			
 Teachir  Referre  Module Bachelo	ng cycl ed to in e appea or' deg	LPOI (examination reases in	y (2010)	degree programmes)			
 Teachir  Referre  Module Bachelo Bachelo	ng cycl ed to in e appea or' deg or' deg	LPOI (examination re ars in ree (1 major) Chemisti	y (2010) y (2009)	degree programmes)			
 Teachir  Referre  Module Bachelo Bachelo Bachelo	ng cycl ed to in e appea or' deg or' deg or' deg	<b>LPO I</b> (examination re <b>ars in</b> ree (1 major) Chemistr ree (1 major) Chemistr	y (2010) y (2009) atics (2012)	degree programmes)			
 Teachir  Referre  Bachelo Bachelo Bachelo Bachelo	ng cycl ed to in e appea or' deg or' deg or' deg or' deg	LPOI (examination re ars in ree (1 major) Chemistr ree (1 major) Chemistr ree (1 major) Mathema ree (1 major) Mathema	y (2010) y (2009) atics (2012)				
 Teachir  Referre  Bachelo Bachelo Bachelo Bachelo Bachelo	ng cycl ed to in e appea or' deg or' deg or' deg or' deg or' deg or' deg	LPOI (examination re ars in ree (1 major) Chemistr ree (1 major) Chemistr ree (1 major) Mathema ree (1 major) Mathema ree (1 major) Computa	y (2010) y (2009) atics (2012) atics (2013)	09)			
 <b>Referre</b>  <b>Module</b> Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo	ng cycl ed to in e appea or' deg or' deg or' deg or' deg or' deg or' deg or' deg	LPOI (examination re ars in ree (1 major) Chemistr ree (1 major) Chemistr ree (1 major) Mathema ree (1 major) Mathema ree (1 major) Computa ree (1 major) Computa	y (2010) y (2009) atics (2012) atics (2013) tional Mathematics (20	09) 12)			

Module title					Abbreviation		
Algorithm and data structures 10-I-ADS-072-m01							
Module coordinator				Module offered by			
Dean of Studies Informatik (Computer		Science)	Institute of Comput	er Science			
ECTS Method of grading		Only after succ. compl. of module(s)					
8 numerical grade							
Duration Module level		Other prerequisites					
1 semester undergraduate							
Conten	Contents						
		alysis of algorithms, recu trees, graphs, basic grap			ods, data structures, abstract da-		
Intende	ed lear	ning outcomes					
[Version 1: The students are able to independently design algorithms as well as to precisely describe and ana- lyse them. They are able to apply recursion in algorithms and data structures. The students are familiar with the three basic programming paradigms and are able to apply them in practical programs.] [Version 2: The students are able to independently design algorithms as well as to precisely describe and analyse them. The students are familiar with the basic paradigms of the design of algorithms and are able to apply them in practical programs. The students are able to estimate the run-time behaviour of algorithms and to prove their correctness.]							
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)		
V + Ü (r	no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes,							
groups of 3: 40 minutes)							
Allocation of places							
Additio	Additional information						
Workload							
Teaching cycle							
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)							
Module appears in							
Bachelor' degree (1 major) Computer Science (2007)							
Bachelor' degree (1 major) Mathematics (2008)							
Bachelor' degree (1 major) Mathematics (2007)							
Bachelor' degree (1 major) Economathematics (2009)							
Bachelor' degree (1 major) Economathematics (2008)							
	Bachelor' degree (1 major) Business Information Systems (2007)						
	Bachelor' degree (1 major) Business Information Systems (2008) Bachelor' degree (1 major) Computational Mathematics (2009)						

Module	title				Abbreviation
Automa	ation a	nd control technology			10-I-AR-072-m01
Module	coord	inator		Module offered by	1
holder	of the (	Chair of Computer Scien	ce VII	Institute of Comput	ter Science
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
8	nume	rical grade			
Duratio	n	Module level	Other prerequisites	i	
1 seme	ster	undergraduate			
Conten	ts				
tion, tra ring, au putatio	ansfer f itomata n macł	function, plant, controlle a, structure of Petri nets, nines, communication be	r types, basic feedba Petri nets for automis etween process comp	ck loop, fundamenta sation, machine-rela outers and periphery	technology, Laplace transforma- Il principles of control enginee- ted structure of processing com- devices, software for automation systems, real-time planning.
Intende	ed lear	ning outcomes			
The stu	dents i	master the fundamental	s of automation and c	control.	
Course	<b>s</b> (type	, number of weekly cont	act hours, language –	– if other than Germa	in)
V + Ü (r	no infor	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		<b>sessment</b> (type, scope, la ion on whether module o			tion offered — if not every seme-
written	examiı	nation (80 minutes)			
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cvcl	e	_		
	5 7 %				
Referre	d to in	LPOI (examination reg	ulations for teaching-	degree programmes)	
Module	appea	ars in			
Bachel	or' deg	ree (1 major) Computer S	Science (2007)		
		ree (1 major) Mathemati			
		ree (1 major) Mathemati			
Bachel	or' deg	ree (1 major) Computatio	onal Mathematics (20	09)	

Module title Abbreviation				Abbreviation	
Data bases					10-I-DB-072-m01
Module	coord	inator		Module offered by	
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	undergraduate	-		
Conten	ts				
	-	ebra and complex SQL sta gement.	atements; database p	planning and normal	forms; xml data modelling; tran-
Intende	ed learr	ning outcomes			
		oossess a knowledge abo g in XML.	out database modelli	ng and queries in SC	L, transactions as well as easy
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
		mation on SWS (weekly o			
					tion offered — if not every seme-
		on on whether module ca			
		nation (50 minutes) or ora 5 minutes)	al examination (one c	andidate each: 15 m	inutes, groups of 2: 20 minutes,
Allocat					
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	9			
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)	
Module	appea	rs in			
Bachel	or' degi	ree (1 major) Computer S	cience (2007)		
	-	ree (1 major) Mathematic			
		ree (1 major) Mathematic			
		ree (1 major) Technology			
	-	ree (1 major) Technology			
	-	ree (1 major) Business Inf			
	-	ree (1 major) Business Inf	-	-	
	-	ree (1 major) Business Inf	•		
		ree (1 major) Computation			
васнею	Bachelor' degree (1 major) Technology of Functional Materials (2006)				

Module title Abbreviation					Abbreviation		
Grapht	Graphtheoretical concepts and algorithms 10-I-GT-072-m01						
Module coordinator Module offered b			Module offered by				
holder	of the (	Chair of Computer Scienc	e l	Institute of Comput	er Science		
ECTS		od of grading	Only after succ. con	npl. of module(s)			
8	nume	rical grade					
Duratio		Module level	Other prerequisites				
1 seme	ester	undergraduate					
Conter	its						
forests work d graph with pl miliar v	and m esign a problen anar gr with ne	atroids, depth first search nd routing, planar graphs ns: we solve round trip pr aphs and find out how th	n, breadth first searcl s, graph transformati oblems, calculate ma e ranking algorithm c amples of graph prob	h, shortest paths, flo ons] [Version 2: On t aximal flows, find ma of Google works. On Ilems, for example h	all and irreducible kernel, trees, we and streams, matchings, net- he one hand, we handle typical atchings and colourings, work the other hand, we become fa- ow we model problems as linear		
-		ning outcomes		iputubicij			
[Version rithms rests, r sign ar blems the lec mate the <b>Course</b>	on 1: The paths, matroid nd routi of com ture he he run t s (type	e students master the foll cycles and components, s, depth first search, brea ng, planar graphs, graph puter science as graph pr	colourings and mate adth first search, sho transformations.] [Ve oblems. In addition, roblem algorithmical thms.] ct hours, language –	thing, transitive hull rtest path, flows and ersion 2: The student the participants are ly. In this course, stu - if other than Germa			
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-		
		nation (80 minutes) or ora o minutes)	al examination (one o	candidate each: 20 r	ninutes, groups of 2: 30 minutes,		
	tion of j						
Additio	onal inf	ormation					
//duriti							
Worklo							
WOIKI							
Taashi		•					
Teacin	ng cycl	e					
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
	e appea		• • • •				
	-	ree (1 major) Computer So ree (1 major) Mathematic					
	-	ree (1 major) Mathematic					
	-	ree (1 major) Computation		09)			

Module title Abbreviation				Abbreviation		
Information transmission					10-l-lÜ-072-m01	
Module	coord	inator		Module offered by		
holder	of the Q	Chair of Computer Scienc	e III	Institute of Compute	er Science	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
8		rical grade				
Duratio		Module level	Other prerequisites			
1 semes	ster	undergraduate				
Conten	ts					
theory,	spectr		, modulation techniq	ue, structure of digit	d fault correction, information tal transmission systems, intro-	
Intende	ed learr	ning outcomes				
		possess a technical, theo a knowledge that is nece			ucture of systems for information	
Courses	<b>s</b> (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V + Ü (n	infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)	
		s <b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
		nation (80 minutes) or ora o minutes)	al examination (one c	andidate each: 20 n	ninutes, groups of 2: 30 minutes,	
Allocati	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
Teachir	ng cycl	e				
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)		
Module	appea	in and a second s				
	-	ree (1 major) Computer S				
	0	ree (1 major) Mathematic	· /			
	-	ree (1 major) Mathematic ree (1 major) Computation				
Dachell	n uegi	iee (1 major) Computation	nativiatiteillatics (200	191		

Module title Abbreviation				Abbreviation			
Theory of complexity 10-I-KT-072-m01					10-I-KT-072-m01		
Module	coord	inator		Module offered by			
Dean of	<sup>2</sup> Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science		
ECTS		od of grading	Only after succ. com	pl. of module(s)			
8	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Content	ts						
sumptio	on vers		terminism versus ind	eterminism, hierarch	nd time classes, memory con- nical theorems, translation me- of systems.		
Intende	d learr	ning outcomes					
ments a putation complet dament on versi	and cla n time, teness al and us com , Boole	sses, general relationshi determinism versus inde problems, Turing reducti applicable knowledge in putation time, determini ean hierarchy, polynomia	ps between space an eterminism, hierarchi on, interactive proof the areas of complex sm versus indetermin	d time classes, mem cal theorems, transla systems.] [Version 2 kity measurements a nism, P-NP problem,	e areas of complexity measure- nory consumption versus com- ation methods, P-NP problem, .: The students possess a fun- and classes, memory consumpti- completeness problems, lower gorithms and complexity of pro-		
		number of weekly conta					
V + Ü (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-		
		nation (80 minutes) or ora o minutes)	al examination (one o	candidate each: 20 n	ninutes, groups of 2: 30 minutes,		
Allocati	on of p	olaces					
Additio	nal info	ormation					
Workloa	ad						
Teachin	ig cycl	9					
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module	appea	rs in					
Bachelo Bachelo Bachelo	or' degi or' degi or' degi	ree (1 major) Computer So ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Computation	s (2008) s (2007)	09)			

Module title Abbreviation				Abbreviation		
Logic for informatics				10-l-LOG-072-m01		
Module	coordinator		Module offered by			
Dean of	f Studies Informatik (Compute	Science)	Institute of Comput	er Science		
ECTS	Method of grading	Only after succ. con	npl. of module(s)			
5	numerical grade					
Duratio		Other prerequisites				
1 semes	ster undergraduate					
Conten	ts	_				
	and semantics of propositiona mula sets, syntax and semant	- ,	nd normal forms, Hoi	rn formulas, SAT, resolution, infi-		
Intende	ed learning outcomes					
	dents are proficient in the foll forms, Horn formulas, SAT, re			ositional logic, equivalence and semantics of predicate logic.		
Courses	<b>s</b> (type, number of weekly con	act hours, language –	- if other than Germa	n)		
V + Ü (n	o information on SWS (weekly	contact hours) and co	ourse language availa	able)		
ster, inf	formation on whether module	can be chosen to earn	a bonus)	tion offered — if not every seme- inutes, groups of 2: 20 minutes,		
	of 3: 25 minutes)					
Allocat	ion of places					
		_				
Additio	nal information					
Worklo	ad					
Teachir	ng cycle					
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module	Module appears in					
Bachelo Bachelo Bachelo	Bachelor' degree (1 major) Computer Science (2007) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Computational Mathematics (2009)					

				Abbreviation	
Object oriented programming					10-I-OOP-072-m01
Module	e coord	inator		Module offered by	
Dean of	f Studie	es Informatik (Computer S	Science)	Institute of Compute	er Science
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Polymo ment.	rphism	, generic programming, r	neta programming, w	eb programming, te	mplates, document manage-
Intende	ed learr	ning outcomes			
The stu their pr			ent paradigms of obj	ect-oriented progran	nming and have experience in
Course	<b>s</b> (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V + Ü (n	no infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)
ster, inf	formati	on on whether module ca	an be chosen to earn	a bonus)	tion offered — if not every seme-
		nation (50 minutes) or ora 5 minutes)	al examination (one c	andidate each: 15 m	inutes, groups of 2: 20 minutes,
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module appears in					
Bachelo Bachelo Bachelo Bachelo Bachelo	Bachelor' degree (1 major) Computer Science (2007) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Business Information Systems (2007) Bachelor' degree (1 major) Business Information Systems (2009) Bachelor' degree (1 major) Business Information Systems (2008) Bachelor' degree (1 major) Computational Mathematics (2009)				

Module title Abbreviation				Abbreviation	
Practical course in programming					10-I-PP-072-m01
Module	e coord	inator		Module offered by	
Dean of	f Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS		od of grading	Only after succ. com	pl. of module(s)	
9	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
The pro	gramm	ing language Java. Indep	endent creation of sr	nall to middle-sized,	, high-quality Java programs.
Intende	ed learı	ning outcomes			
The stu	dents a	are able to independently	develop small to mi	ddle-sized, high-qua	llity Java programs.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
		ion on SWS (weekly cont			
		essment (type, scope, la on on whether module ca			tion offered — if not every seme-
nation	(60 to <u>9</u>				al examination: written exami- utes, groups of 2: 20 minutes,
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module appears in					
Bachel	Bachelor' degree (1 major) Computer Science (2007) Bachelor' degree (1 major) Mathematics (2008)				
	Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009)				
	-	ree (1 major) Economathe ree (1 major) Economathe	-		
				(oc	
	Bachelor' degree (1 major) Computational Mathematics (2009)				

Module title Abbreviation				Abbreviation		
Computer architecture					10-I-RAK-072-m01	
Module	e coord	inator		Module offered by		
Dean of	f Studie	es Informatik (Computer S	Science)	Institute of Compute	er Science	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
5	L	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
		t architectures, commanc rector processors, multi-c	, – –	pipelining, statical a	nd dynamic instruction schedu-	
Intende	ed learı	ning outcomes				
		naster the most importar operating systems.	nt techniques to desig	gn fast computers as	s well as their interaction with	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)	
ster, inf	formati	on on whether module ca	an be chosen to earn	a bonus)	tion offered — if not every seme-	
		nation (80 minutes) or ora o minutes)	al examination (one c	andidate each: 20 n	ninutes, groups of 2: 30 minutes,	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ıg cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
-						
Module appears in						
Bachelo	Bachelor' degree (1 major) Computer Science (2007)					
	Bachelor' degree (1 major) Mathematics (2008)					
	-	ree (1 major) Mathematic		<b>`</b>		
Bachelo	Bachelor' degree (1 major) Computational Mathematics (2009)					

Module	e title				Abbreviation
Digital computer systems 10-I-RAL-072			10-I-RAL-072-m01		
Module coordinator				Module offered by	<u> </u>
Dean o	f Studi	es Informatik (Computer :	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
8	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
					nchronous and asynchronous cir- e programming, memory hierar-
Intende	ed lear	ning outcomes			
ming of	f easy r				up to the design and program- vare description languages for the
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	- if other than Germa	n)
V + Ü (r	no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
		nation (80 minutes) or or o minutes)	al examination (one o	candidate each: 20 n	ninutes, groups of 2: 30 minutes,
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
Module	e appea	urs in			
Bachel	or' deg	ree (1 major) Computer S	cience (2007)		
		ree (1 major) Mathematic			
	-	ree (1 major) Mathematic			
Bachel	or' deg	ree (1 major) Computatio	nal Mathematics (20	09)	

Module	e title				Abbreviation
Computer networks and communication systems 10-I-RK-072-m01				10-I-RK-072-m01	
Module	e coord	inator		Module offered by	<u> </u>
holder	ofthe	Chair of Computer Scienc	e III	Institute of Comput	ter Science
ECTS	1	od of grading	Only after succ. con	· · · · ·	
8	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
and str chies, o and ISO	ucture dataflo Darchi	of computer networks: no w control and traffic cont tecture models. Internet:	etwork structure, network structure, network, rol, transfer network. structure and basic n	work access, access Communication pro nechanism, TCP/IP,	roduction to method architecture methods, digital transfer hierar- tocols: fundamental principles routing, network management. ommunication systems and net-
Intend	ed lear	ning outcomes			
The stu	idents	possess an intricate know	vledge of the structur	re of computer netwo	orks and communication systems
as well	as fun	damental principles to ra	te these systems.	-	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
V + Ü (I	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		<b>sessment</b> (type, scope, la ion on whether module ca			tion offered — if not every seme-
		nation (80 minutes) or or o minutes)	al examination (one o	candidate each: 20 r	ninutes, groups of 2: 30 minutes,
Allocat	ion of	places			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)				
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Computer S	cience (2007)		
	-	ree (1 major) Mathematic			
	-	ree (1 major) Mathematic		)	
Bachel	or deg	ree (1 major) Computatio	nai Mathematics (20	09)	

Module title Abbreviation				Abbreviation	
Software technology 10-I-ST-072-m					10-I-ST-072-m01
Module	e coord	inator		Module offered by	<u>.</u>
Dean of	f Studie	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	undergraduate			
Conten	ts				
bases a	and obj		oundations of web p	rogramming (HTML,	r interfaces, foundations of data- XML), software development pro- lity assurance.
Intende	ed leari	ning outcomes			
		possess a fundamental the second s		al knowledge on the	e design and development of
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		s <b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
		nation (80 minutes) or or o minutes)	al examination (one o	candidate each: 20 r	ninutes, groups of 2: 30 minutes,
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
Module appears in					
Bachelor' degree (1 major) Computer Science (2007)					
Bachelor' degree (1 major) Mathematics (2008)					
Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economothematics (2002)					
	Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008)				
	Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Business Information Systems (2007)				
Bachelor' degree (1 major) Business Information Systems (2007) Bachelor' degree (1 major) Business Information Systems (2008)					
	Bachelor' degree (1 major) Business Information Systems (2008) Bachelor' degree (1 major) Computational Mathematics (2009)				

Module title Abbreviation					Abbreviation	
Practical course in software					10-I-SWP-072-m01	
Module coordinator				,		
				Module offered by		
		es Informatik (Computer		Institute of Comput	er Science	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
10	<u> </u>	successfully completed				
Duratio		Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
cation	of solu		ML) and milestones, (	user manual, prograi	uirements specifications, specifi- mming documentation, presenta-	
Intende	ed lear	ning outcomes				
The stu small t		possess the practical skil	lls for the design, dev	velopment and exect	ution of a software project in	
Course	<b>s</b> (type	, number of weekly conta	ict hours, language –	if other than Germa	ın)	
P (no ir	format	tion on SWS (weekly cont	act hours) and cours	e language available	2)	
					tion offered — if not every seme-	
ster, in	formati	ion on whether module ca	an be chosen to earn	a bonus)		
periodic presentations on project progress with regard to detailing problem specifications, the corresponding so- lution components (software) and the documentation of these; if project is completed in groups, proof of con- tributions made by the individual student required; software and project documentation as specified in assign- ment, final presentation (10 to 15 minutes per group)						
Allocat	· · ·					
Additic	onal inf	ormation	·			
Worklo	ad					
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
mouut	Bachelor' degree (1 major) Computer Science (2007)					
	or' deg	ree (1 major) Computer S	cience (2007)			
Bachel	-	ree (1 major) Computer S ree (1 major) Mathematic				
Bachel Bachel	or' deg		s (2008)			
Bachel Bachel Bachel	or' deg or' deg	ree (1 major) Mathematic	s (2008) s (2007)	.007)		
Bachel Bachel Bachel Bachel	or' deg or' deg or' deg	ree (1 major) Mathematic ree (1 major) Mathematic	s (2008) s (2007) formation Systems (2			

Theoretical informatics       10-I-TI-072-m01         Module cordinator       Module offered by         Dean of Studies Informatik (Computer Science)       Institute of Computer Science         ECTS       Method of grading       Only after succ. compl. of module(S)         8       numerical grade	Module title				Abbreviation		
Dean of Studies Informatik (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         1 semester       undergraduate          Contents           Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages.         Intended learning outcomes          The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, context sensitive languages.         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 can be chosen to earn a bonus)         written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes)         Aldicional information              Workload	Theoretical i	nformatics			10-l-Tl-072-m01		
ECTS       Method of grading       Only after succ. compl. of module(s)         8       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages.         Intended learning outcomes          The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, complexity of calculations and circuits, finite automata and regular sets, generative grammars, context free languages.         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 can be chosen to earn a bonus)         written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes)         Aldicional information	Module coor	dinator		Module offered by			
8       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents        Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages.         Intended learning outcomes          The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages.         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 can be chosen to earn a bonus)         written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes)         Additional information            Module language            Workload	Dean of Stud	ies Informatik (Computer	Science)	Institute of Comput	er Science		
Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents          Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages.         Intended learning outcomes          The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages.         Courses (type, number of weekly contact hours, language — if other than German)       V + Ú (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 can be chosen to earn a bonus)         written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes)         Allocation of places              Additional information			Only after succ. com	pl. of module(s)			
1 semester       undergraduate          Contents         Computability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages.         Intended lear	8 num	erical grade					
Contents         Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context-free languages, context-sensitive languages.         Intended learning outcomes         The students possess fundamental and applicable knowledge in the area of computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages.         Courses (type, number of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages.         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 can be chosen to earn a bonus)         written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes)         Allocation of places            Morkload	Duration		Other prerequisites				
Computability, decidability, countability, complexity of calculations, Boolean functions and circuits, finite auto- mata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, coun- tability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. 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 seme- ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes) Allocation of places  Additional information  Workload 	1 semester	undergraduate					
mata and regular sets, generative grammars, context-free languages, context-sensitive languages. Intended learning outcomes The students possess fundamental and applicable knowledge in the area of computability, decidability, coun- tability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. 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 seme- ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes) Allocation of places Additional information Workload	Contents						
The students possess fundamental and applicable knowledge in the area of computability, decidability, coun- tability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. <b>Courses</b> (type, number of weekly contact hours, language — if other than German) V + Ü (no information on SWS (weekly contact hours) and course language available) <b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes) <b>Allocation of places</b>  <b>Morkload</b> 							
tability, complexity of calculations, Boolean functions and circuits, finite automata and regular sets, generative grammars, context free languages, context sensitive languages. <b>Courses</b> (type, number of weekly contact hours, language — if other than German) V + Ü (no information on SWS (weekly contact hours) and course language available) <b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes) <b>Allocation of places</b>  <b>Additional information</b>  <b>Workload</b> 	Intended lea	rning outcomes					
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 seme- ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes) Allocation of places  Motkload 	tability, com	plexity of calculations, Boo	olean functions and c	ircuits, finite automa			
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes) Allocation of places  Additional information  Workload	Courses (typ	e, number of weekly conta	ct hours, language —	if other than Germa	n)		
ster, information on whether module can be chosen to earn a bonus) written examination (80 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 30 minutes, groups of 3: 40 minutes) Allocation of places Additional information Workload	V + Ü (no info	ormation on SWS (weekly	contact hours) and co	ourse language avail	able)		
groups of 3: 40 minutes) Allocation of places Additional information Workload	ster, informa	tion on whether module ca	an be chosen to earn	a bonus)			
 Additional information  Workload 			al examination (one o	andidate each: 20 n	ninutes, groups of 2: 30 minutes,		
 Workload 	Allocation of	places					
 Workload 							
	Additional in	formation					
 Teaching cycle	Workload						
Teaching cycle							
	Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)							
Module appears in	Module appe	ears in					
Bachelor' degree (1 major) Computer Science (2007)	Bachelor' de	gree (1 major) Computer S	cience (2007)				
Bachelor' degree (1 major) Mathematics (2008)		• • • •					
Bachelor' degree (1 major) Mathematics (2007)				,			
Bachelor' degree (1 major) Computational Mathematics (2009)	Bachelor' de	gree (1 major) Computatio	nal Mathematics (200	09)			

Module					Abbreviation	
Knowledge management systems and data mining			and data mining		10-I-WMS-072-m01	
Module coordinator				Module offered by	l	
		Chair of Computer Sc	ience VI	Institute of Compu	ter Science	
ECTS	1	od of grading	Only after succ. con	·		
10		rical grade				
Duratio		Module level	Other prerequisites			
Duration         Module level         Other prerequisites           1 semester         undergraduate						
Conten		undergraduate	l			
basic k poral c quisitic learnin [Versio basic k poral c tic web	nowled losures on and g algor n 2: Fo nowled losure) o.] ed lear	dge representation an s), problem classes a process models, data ithms with data mini undations in the follo dge representation an , solution methods (or ning outcomes	nd inference (rules, objec nd solution methods (dia a mining (data warehouse ng (learning of decidabili owing areas: process and nd inference (rules, objec diagnostic, construction),	ts, constraints, prob gnostic, construction e and OLAP, data pro- ty trees, rules, subg product-oriented kin ts, constraints, prob knowledge acquisi	nowledge management systems, babilistic, non-monotonous, tem on, simulation), knowledge ac- eprocessing, data visualisation) roups, clusters), semantic web.] nowledge management systems babilistic, non-monotonous, tem tion and process models, seman	
manag	ement		ning systems including k	-	lerstand and develop knowledge tion. The students also have ac-	
Course	<b>s</b> (type	, number of weekly c	ontact hours, language –	- if other than Germa	an)	
V + Ü +	Ü (no i	information on SWS (	weekly contact hours) an	id course language a	available)	
			e, language — if other tha Ile can be chosen to earn		ation offered — if not every seme	
		nation (80 minutes) o o minutes)	or oral examination (one o	candidate each: 20	minutes, groups of 2: 30 minute	
Allocat	ion of <sub>l</sub>	places				
Additio	onal inf	ormation				
Worklo	ad					
 T			_			
Teachi	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module	e appea	ars in				
Bachelor' degree (1 major) Computer Science (2007)						
	Bachelor' degree (1 major) Mathematics (2008)					
	-	ree (1 major) Mathem				
Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Business Information Systems (2007)						
Bachel	Bachelor' degree (1 major) Business Information Systems (2007) Bachelor' degree (1 major) Business Information Systems (2009)					
	or' deg			-		
Bachel	-	ree (1 major) Busines		2009)		

Module title Abbreviation					Abbreviation	
Analys	Analysis 10-M-ANA-082-m01					
Module coordinator Module offered by						
Dean	of Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
17	nume	rical grade				
Durati	on	Module level	Other prerequisites	;		
2 sem	2 semester undergraduate By way of exception, additional prerequisites are listed in the section on					e section on
assessments.						
Conte	nts					
ries, p	ower se	and completeness, bas ries, Taylor series, funda eorem); fundamental in	amental calculus in or	ne and several variab	oles (including invers	se and impli-
Intend	ed lear	ning outcomes				
mathe	matical	nows and masters the ex arguments and present methods and concepts in	them adequately in w	ritten and oral form.	He/She is acquainte	ed with the
Course	<b>es</b> (type	, number of weekly cont	act hours, language –	- if other than Germa	n)	
<ul> <li>This module comprises 3 module components. Information on courses will be listed separately for each module component.</li> <li>10-M-ANA-1-082: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>10-M-ANA-2-082: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>10-M-ANA-P-082: M (no information on SWS (weekly contact hours) and course language available)</li> <li>Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)</li> <li>Assessment in this module comprises the assessments in the individual module components as specified be-</li> </ul>						
<ul> <li>low. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component 10-M-ANA-1-o82: Analysis 1 Analysis 1 <ul> <li>8 ECTS, Method of grading: (not) successfully completed</li> <li>a) written examination (approx. 90 minutes; usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)</li> <li>Language of assessment: German, English if agreed upon with the examiner</li> <li>Other prerequisites: Modules 10-M-VKM and 10-M-PPM are recommended.</li> </ul> </li> <li>Assessment in module component 10-M-ANA-2-082: Analysis 2 Analysis 2</li> <li>7 ECTS, Method of grading: (not) successfully completed</li> <li>a) written examination (approx. 90 minutes; usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)</li> <li>Language of assessment: German, English if agreed upon with the examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)</li> <li>Language of assessment: German, English if agreed upon with the examiner</li> <li>Other prerequisites: Modules 10-M-VKM and 10-M-PPM are recommended; in addition, module component 10-M-ANA-1 is recommended for module component 10-M-ANA-2.</li> </ul> <li>Assessment in module component 10-M-ANA-Po82: Examination in Analysis <ul> <li>2 ECTS, Method of grading: numerical grade</li> <li>oral examination of one candidate each (approx. 30 minutes)</li> </ul> </li> <li>Language of assessment: German, English if agreed upon with the examiner</li> <li>Only after successful completion of module components: Successful completion of any one of the module components 10-M-ANA-1, 10-M-ANA-2, 10-M-ANL-2 is a prerequisite for participation in module component 10-M-ANA-P.</li>						
Alloca	tion of	places				
Bachelor': (2009)	s with 1 ma	jor Computational Mathematics		enerated 26-Aug-2024 • exan D ECTS) Computational Mathe	-	page 52 / 125

### Additional information

# Workload

#### --

## Teaching cycle

## ---

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

§ 73 (1) 1. Mathematik Analysis

## Module appears in

Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

Thesis	~		Module title Abbreviation					
	Thesis Computational Mathematics (Bachelor Thesis)       10-M-BAC-092-m01							
Module	e coord	inator		Module offered by	1			
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)				
10	nume	rical grade						
Duratio	on	Module level	Other prerequisites	5				
1 seme	ster	undergraduate	Registration for ass	essment: as specifie	ed.			
Conten	ts							
Indepe	ndently	y researching and writi	ng on a topic in mather	natics selected in co	nsultation with the supervisor.			
Intende	ed lear	ning outcomes						
	during	his/her studies in the			pply the skills and methods ob- vn the result of his/her work in a			
Course	<b>s</b> (type	, number of weekly co	ntact hours, language –	- if other than Germa	an)			
(no info	ormatio	on on SWS (weekly con	tact hours) and course	language available)				
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)								
written Langua		ssessment: German, E	nglish if agreed upon w	vith the examiner				
Allocat	ion of p	olaces						
Additio	onal inf	ormation						
Workload								
Teaching cycle								
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)								
Module	annes	ars in						
			tional Mathematics (20	00)				

Module title Abbreviation						
Defens	Defense of Bachelor Thesis in Computational Mathematics       10-M-BAKC-092-m01					
Modul	e coord	inator		Module offered by		
Dean o	f Studi	es Mathematik (Mathem	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
3	nume	rical grade		•		
Duratio	on	Module level	Other prerequisites	;		
1 seme	ster	undergraduate				
Conter	Its					
The stu ons on			on the topic and resul	lts of his/her Bachel	or's thesis and answers questi-	
Intend	ed lear	ning outcomes				
	e talk o				/She is able to give a short and d question the scientific activities	
Course	<b>s</b> (type	, number of weekly cont	act hours, language –	- if other than Germa	an)	
A (no i	nforma	tion on SWS (weekly cor	tact hours) and cours	e language available	e)	
		sessment (type, scope, l ion on whether module o			tion offered — if not every seme-	
talk (a	oprox. 1	15 minutes) with subseq	uent discussion (appi	rox. 15 minutes)		
Allocat	ion of	places				
Additio	onal inf	ormation				
Worklo	ad					
Tooching cyclo						
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
		•				
Modul						
Bachel	or' deg	ree (1 major) Computatio	onal Mathematics (20	09)		

Module title Abbreviation					Abbreviation	
Seminar in Analysis					10-M-BSA-072-m01	
Module	e coord	inator		Module offered by		
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
A selec	ted top	ic in analysis.				
Intende	ed learr	ning outcomes				
of a giv	en topi				sters elaboration and structuring /She is able to participate active-	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
S (no in	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	e)	
	<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)					
Assess	talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner					
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
§ 73 (1)	§ 73 (1) 1. Mathematik Analysis					
Module appears in						
Bachelor' degree (1 major) Mathematics (2008)						
	Bachelor' degree (1 major) Mathematics (2007)					
	-	ree (1 major) Economathe	-			
	-	ree (1 major) Economathe				
	-	ree (1 major) Mathematic				
	-	ree (1 major) Computatio		-		
		gree (1 major, 1 minor) Ma				
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2009)		

Module title Abbreviation					Abbreviation	
Seminar in Complex Analysis					10-M-BSC-072-m01	
Module	e coord	inator		Module offered by		
		es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		od of grading	Only after succ. com			
5		rical grade				
Duratio		Module level	Other prerequisites			
1 seme		undergraduate				
Conten	ts					
A selec	ted top	vic in complex analysis.				
		ning outcomes				
of a giv ly in a s	en topi scientif	c using selected literatur ic discussion.	e, and prepares a tal	k on the subject. He	sters elaboration and structuring /She is able to participate active-	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	in)	
S (no ir	format	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)						
talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner Allocation of places						
Additio	nal inf	ormation				
Worklo	ad					
Workload						
 Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
§ 73 (1) 1. Mathematik Analysis						
Module appears in						
Bachelor' degree (1 major) Mathematics (2008)						
	Bachelor' degree (1 major) Mathematics (2007)					
	Bachelor' degree (1 major) Economathematics (2009)					
	-	ree (1 major) Economathe				
	-	ree (1 major) Mathematic	• •			
	-	ree (1 major) Computatio		•		
		gree (1 major, 1 minor) Ma				
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2009)		

Module title					Abbreviation	
Seminar in Discrete Mathematics					10-M-BSD-072-m01	
Module	coord	inator		Module offered by		
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Content	ts					
A select	ted top	ic in discrete mathematio	cs <b>.</b>			
Intende	ed learn	ning outcomes				
of a give	en topi				sters elaboration and structuring /She is able to participate active-	
Courses	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
S (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	e)	
		e <b>ssment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
talk (ap	prox. 6	io minutes)				
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	Workload					
Teachin	Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						

Module title Abbreviation					Abbreviation	
Seminar in Algebra					10-M-BSE-072-m01	
Module	e coordi	nator		Module offered by		
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS	Metho	d of grading	Only after succ. com	pl. of module(s)		
5	numer	ical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
A selec	ted top	ic in algebra.				
Intende	ed learn	ing outcomes				
of a giv	en topi				sters elaboration and structuring /She is able to participate active-	
Course	<b>s</b> (type,	number of weekly conta	ct hours, language —	if other than Germa	n)	
S (no in	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
	<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)					
Assess	talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner					
Allocat	ion of p	laces				
Additio	onal info	ormation				
Worklo	ad					
Teachir	ng cycle	9				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
§ 73 (1)	§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie					
Module appears in						
Bachelor' degree (1 major) Mathematics (2008)						
Bachel	Bachelor' degree (1 major) Mathematics (2007)					
Bachel	or' degr	ee (1 major) Economathe	ematics (2009)			
	-	ee (1 major) Economathe				
Bachel	or' degr	ee (1 major) Mathematic	al Physics (2009)			
	-	ee (1 major) Computatio		-		
		gree (1 major, 1 minor) Ma				
First sta	ate exar	mination for the teaching	degree Gymnasium	Mathematics (2009)		

Module title					Abbreviation	
Seminar in Functional Analysis					10-M-BSF-072-m01	
Module	coord	inator		Module offered by		
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Conten	ts					
A select	ted top	ic in functional analysis.				
Intende	ed learn	ning outcomes				
of a giv	en topi				sters elaboration and structuring /She is able to participate active-	
Courses	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
S (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	e)	
		essment (type, scope, la on on whether module ca			tion offered — if not every seme-	
talk (ap	prox. 6	io minutes)				
Allocati	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
Teachir	Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						

Module title					Abbreviation		
Seminar in Geometry					10-M-BSG-072-m01		
Module	e coord	inator		Module offered by			
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics		
ECTS		od of grading	Only after succ. com	pl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
A selec	ted top	ic in geometry or differen	itial geometry.				
Intende	ed learn	ning outcomes					
of a giv	en topi				sters elaboration and structuring /She is able to participate active-		
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)		
S (no ir	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	2)		
ster, in	<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)						
Assess	ment o	oo minutes) ffered: in the semester in ssessment: German, Eng					
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
§ 73 (1) 4. Mathematik Geometrie							
Module appears in							
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)							

Module	e title				Abbreviation
Semina	ar in Lir	near Algebra			10-M-BSL-072-m01
Module	o coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	natics
ECTS	r	od of grading	Only after succ. com		
5		rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
A selec	ted top	oic in linear algebra.			
Intend	ed lear	ning outcomes			
of a giv ly in a s	en top scientif	ic using selected literatur ic discussion.	e, and prepares a tal	k on the subject. He	sters elaboration and structuring /She is able to participate active-
		, number of weekly conta			
		tion on SWS (weekly cont			
		<b>sessment</b> (type, scope, la ion on whether module ca			tion offered — if not every seme-
Assess	ment o ge of a	50 minutes) ffered: in the semester in ssessment: German, Eng			
AllUCal		JIACES			
 •		ormation			
Αααιτιά	nat m	ormation			
	- d				
Worklo	au				
Teachi	ng cvcl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 73 (1)	2. Mat	hematik Lineare Algebra	, Algebra und Elemen	te der Zahlentheorie	2
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Mathematic	s (2008)		
		ree (1 major) Mathematic			
	-	ree (1 major) Economathe	-		
		ree (1 major) Economathe			
	-	ree (1 major) Mathematic		<b>`</b>	
		ree (1 major) Computatio			
		gree (1 major, 1 minor) Ma			
FIIST ST	ate exa	mination for the teaching	s degree Gymnasium	mathematics (2009)	)

Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         5       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           A selected topic in numerical mathematics.           Intended learning outcomes           The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion.         Courses (type, number of weekly contact hours, language — if other than German)       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 can be chosen to earn a bonus)         talk (approx. 6 o minutes)          Assessment offered: in the semester in which the course is offered Language of assessment. German, English if agreed upon with the examiner         Aldication of places	Module title				Abbreviation	
Dean of Studies Mathematik (Mathematics)       Institute of Mathematiks         ECTS       Method of grading       Only after succ. compl. of module(s)         5       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           A selected topic in numerical mathematics.           Intended learning outcomes           The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion.         Courses (type, number of weekly contact hours, language – if other than German)       S         S (no information on SWS (weekly contact hours) and course language available)         Method of sasessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus)         talk (approx. 60 minutes)       Assessment offered:         Assessment Orfered: In the semester in which the course is offered         Language of assessment: German, English if agreed upon with the examiner         Aldication of places              Workload      <	Seminar in N	Numerical Mathematics			10-M-BSN-072-m01	
Dean of Studies Mathematik (Mathematics)       Institute of Mathematiks         ECTS       Method of grading       Only after succ. compl. of module(s)         5       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           A selected topic in numerical mathematics.           Intended learning outcomes           The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion.         Courses (type, number of weekly contact hours, language – if other than German)       S         S (no information on SWS (weekly contact hours) and course language available)         Method of sasessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus)         talk (approx. 60 minutes)       Assessment offered:         Assessment Orfered: In the semester in which the course is offered         Language of assessment: German, English if agreed upon with the examiner         Aldication of places              Workload      <	Module coordinator			Module offered by		
Method of grading       Only after succ. compl. of module(s)         5       numerical grade       -         Duration       Module levet       Other prerequisites         1 semester       undergraduate          Contents           A selected topic in numerical mathematics.           Intended learning outcomes           The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion.         Courses (type, number of weekly contact hours, language — if other than German, examination offered — if not every semester, 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 can be chosen to earn a bonus)         talk (approx. 60 minutes)         Assessment offered: in the semester in which the course is offered         Language of assessment: German, English if agreed upon with the examiner         Aldottional information               Korkload               Referred to in LPO I (examination regulations for teaching-degree programmes) </td <td colspan="3"></td> <td></td> <td>atics</td>					atics	
5       numerical grade          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           A selected topic in numerical mathematics.           Intended learning outcomes           The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion.         Courses (type, number of weekly contact hours, language – if other than German)       S         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 can be chosen to earn a bonus)         talk (approx. 60 minutes)			· · ·			
a semester       undergraduate						
a semester       undergraduate	Duration	Module level	Other prerequisites			
A selected topic in numerical mathematics. Intended learning outcomes The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion. Courses (type, number of weekly contact hours, language — if other than German) 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 seme- ster, information on whether module can be chosen to earn a bonus) talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner Allocation of places	1 semester					
Intended learning outcomes The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion. Courses (type, number of weekly contact hours, language — if other than German) 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 seme- ster, information on whether module can be chosen to earn a bonus) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner Allocation of places	Contents	•				
Intended learning outcomes The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion. Courses (type, number of weekly contact hours, language — if other than German) 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 seme- ster, information on whether module can be chosen to earn a bonus) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner Allocation of places	A selected to	opic in numerical mathema	tics.			
The student gains first experience with independent scientific work. He/She masters elaboration and structuring of a given topic using selected literature, and prepares a talk on the subject. He/She is able to participate active ly in a scientific discussion. Courses (type, number of weekly contact hours, language — if other than German) 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 can be chosen to earn a bonus) talk (approx. 6 on inutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner Allocation of places		•				
Courses (type, number of weekly contact hours, language — if other than German) 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 seme- ster, information on whether module can be chosen to earn a bonus) talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner Allocation of places	of a given to	pic using selected literatur				
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 seme- ster, information on whether module can be chosen to earn a bonus)  talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner  Allocation of places	/		ct hours, language —	if other than Germa	n)	
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner Allocation of places 		· · · · · · · · · · · · · · · · · · ·				
Workload            Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)         § 73 (1) 5. Mathematik Angewandte Mathematik         Module appears in         Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Mathematics (2007)         Bachelor' degree (1 major) Economathematics (2009)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Omputational Mathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Mathematics (2009)	talk (approx Assessment Language of	. 60 minutes) offered: in the semester in assessment: German, Eng	which the course is	offered		
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 (1) 5. Mathematik Angewandte Mathematik Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major, 1 minor) Mathematics (Minor, 2008)	Additional in	nformation				
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 (1) 5. Mathematik Angewandte Mathematik Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Referred to in LPO I (examination regulations for teaching-degree programmes)         § 73 (1) 5. Mathematik Angewandte Mathematik         Module appears in         Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Mathematics (2007)         Bachelor' degree (1 major) Economathematics (2009)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
§ 73 (1) 5. Mathematik Angewandte Mathematik <b>Module appears in</b> Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Teaching cy	cle				
§ 73 (1) 5. Mathematik Angewandte Mathematik <b>Module appears in</b> Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Referred to i	in LPO I (examination regu	lations for teaching-c	legree programmes)		
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	§ 73 (1) 5. M	athematik Angewandte Ma	thematik			
Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Module app	ears in				
Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Bachelor' degree (1 major) Mathematics (2007)					
Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
				•		
FILST STATE EXAMINATION TO THE LEACHING OPPOPER GYMNASTOM MATTEMATICS (2000)						

Module title					Abbreviation
Seminar in Operation Research					10-M-BSO-072-m01
Module coordinator				Module offered by	
		es Mathematik (Mathema		Institute of Mathem	atics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
A select	ted top	ic in operations research			
Intende	ed learn	ning outcomes			
of a give	en topi				sters elaboration and structuring /She is able to participate active-
Courses	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
S (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	2)
		e <b>ssment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
talk (ap	prox. 6	50 minutes)			
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachin	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module appears in					
Bachelo Bachelo Bachelo Bachelo Bachelo	Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)				

Module	e title				Abbreviation
Semina	ar in Ste	ochastics			10-M-BSS-072-m01
Module coordinator				Module offered by	
Dean of Studies Mathematik (Mathematics)			itics)	Institute of Mathem	natics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
A selec	ted top	ic in stochastics.			
Intende	ed learı	ning outcomes			
of a giv	en topi				sters elaboration and structuring /She is able to participate active-
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	ın)
S (no ir	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	2)
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
Assess	, ment o ge of a	oo minutes) ffered: in the semester in ssessment: German, Eng <b>places</b>			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
§ 73 (1)	3. Mat	hematik Stochastik			
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Mathematic	s (2008)		
	-	ree (1 major) Mathematic			
		ree (1 major) Economathe			
	-	ree (1 major) Economathe			
		ree (1 major) Mathematic		,	
	-	ree (1 major) Computation		•	
		gree (1 major, 1 minor) Ma			
FIRST Sta	ate exa	mination for the teaching	degree Gymnasium	iviathematics (2009)	

Module	title				Abbreviation
Semina	Seminar in Ordinary Differential Equations				10-M-BSW-072-m01
Module	coord	inator		Module offered by	<u> </u>
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	natics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5		rical grade		E	
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
A selec	ted top	oic in the theory of ordina	ry differential equation	ons.	
Intende	ed lear	ning outcomes			
of a giv	en topi				sters elaboration and structuring /She is able to participate active-
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
S (no ir	format	tion on SWS (weekly cont	act hours) and cours	e language available	e)
ster, in talk (ap	formati prox. 6	ion on whether module ca 60 minutes)	an be chosen to earn	a bonus)	ition offered — if not every seme-
	ge of a	ffered: in the semester in ssessment: German, Eng			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
	-3 -9 -0	-			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
		hematik Analysis			
Module					
		ree (1 major) Mathematic	s (2008)		
	-	ree (1 major) Mathematic			
Bachel	or' deg	ree (1 major) Economathe	ematics (2009)		
	-	ree (1 major) Economathe			
		ree (1 major) Mathematic			
	-	ree (1 major) Computatio		•	
		gree (1 major, 1 minor) Ma			
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2009)	)

Module	e title				Abbreviation
Semina	Seminar in Number Theory				10-M-BSZ-072-m01
Module coordinator Module offered by			I		
Dean o	f Studie	es Mathematik (Mathema	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 seme	ster	undergraduate			
Conten	ts				
A selec	ted top	ic in number theory.			
Intende	ed learı	ning outcomes			
of a giv	en topi				sters elaboration and structuring /She is able to participate active-
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
S (no ir	nformat	ion on SWS (weekly cont	act hours) and course	e language available	e)
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
Assess	, ment o ge of a	50 minutes) ffered: in the semester in ssessment: German, Eng <b>blaces</b>			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 73 (1)	2. Mat	hematik Lineare Algebra,	Algebra und Elemen	te der Zahlentheorie	<u> </u>
Module	e appea	irs in			
	-	ree (1 major) Mathematic			
	-	ree (1 major) Mathematic			
		ree (1 major) Economathe			
	-	ree (1 major) Economathe			
	-	ree (1 major) Mathematic	•	,	
	-	ree (1 major) Computation		•	
		gree (1 major, 1 minor) Ma			
FIRST Sta	ate exa	mination for the teaching	aegree Gymnasium	iviathematics (2009)	

Module title				Abbreviation	
Computerorie	nted Mathematics			10-M-COM-082-mo	1
Module coord	•		Mandalla affanad baa		
			Module offered by		
	es Mathematik (Mathema		Institute of Mathem	atics	
	od of grading	Only after succ. com	ipl. of module(s)		
	successfully completed				
		Other prerequisites	•• •	1 11 1	<u> </u>
1 semester	undergraduate	Admission prerequis (attendance monito sence).	red, a maximum of o	-	
Contents					
merical comp 10-M-ANL) and	o modern mathematical s utation (e. g. Matlab) to s d 10-M-LNA). Computer-b and integral calculus; vi	upplement the basic ased solution of prob	modules in analysis lems in linear algeb	and linear algebra	((10-M-ANA or
Intended lear	ning outcomes				
	earns the use of advanced cation to solve mathema		cal software package	es, and is able to as	sess their
Courses (type	, number of weekly conta	ict hours, language –	· if other than Germa	n)	
V + Ü (no info	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
	<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not	every seme-
Assessment o	form of programming exe ffered: once a year, sumr ssessment: German, Eng	ner semester		ne course)	
Allocation of J	olaces				
Additional inf	ormation				
Workload					
Teaching cycl	۵				
Referred to in	LPOI (examination regu	lations for teaching-c	legree programmes)		
§ 73 (1) 5. Mat	hematik Angewandte Ma	thematik			
Module appea	urs in				
Bachelor' deg	ree (1 major) Computer S	cience (2010)			
-	ree (1 major) Mathematic				
-	ree (1 major) Physics (20				
-	ree (1 major) Physics (20	•			
Bachelor' degree (1 major) Physics (2012)					
-	ree (1 major) Physics (20)				
-	ree (1 major) Technology ree (1 major) Technology		-		
	ree (1 major) Technology ree (1 major) Nanostructu				
	ree (1 major) Kanostructu ree (1 major) Economathe		,		
-	ree (1 major) Economathe	-			
	or Computational Mathematics		nerated 26-Aug-2024 • exan	n. reg. data re-	page 68 / 125
(2009)			ECTS) Computational Mathe	-	, , , ,,

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Master's degree (1 major) Physics (2010) 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) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Modul				-	Abbreviation
Compu	Itationa	al Mathematics, advance	d		10-M-COMg-082-m01
Modul	e coord	inator		Module offered by	ļ
		es Mathematik (Mathema	· · · · · · · · · · · · · · · · · · ·		natics
ECTS	1	od of grading	Only after succ. con		
4		successfully completed			
		Module level	Other prorequisites		
1 seme		undergraduate	Other prerequisites		regular attendance of exercises
1 Seine	ster	undergraduate			one incident of unexcused ab-
Conter	nts				
merica 10-M-A	l comp NL and	utation (e. g. Matlab) to s	supplement the basic ased solution of prob	modules in analysis lems in linear algebr	Mathematica or Maple) and nu- s and linear algebra (10-M-ANA, ra, geometry, analysis, in particu
Intend	ed lear	ning outcomes			
		earns the use of advance cation to solve mathema		cal software package	es, and is able to assess their
Course	<b>es</b> (type	, number of weekly conta	act hours, language –	- if other than Germa	ın)
Ü + V (	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme
beginn Assess	ing of t ment o	form of programming exe he course) ffered: once a year, sum ssessment: German, Eng	mer semester		e specified by the lecturer at the
Allocat	tion of <sub>l</sub>	places			
			-		
Additio	onal inf	ormation			
			-		
Worklo	bad				
Teachi	ng cycl	e			
	"5 cycl	•			
Deferm		IDO L (overningtion	lations for to him -		
		LPOI (examination regu		legree programmes)	
		hematik Angewandte Ma	athematik		
	e appea		· · · ·		
		ree (1 major) Mathematic			
Bachelor' degree (1 major) Nanostructure Technology (2010)					
	-	ree (1 major) Economath	-		
	-	ree (1 major) Economathe			
	-	ree (1 major) Mathematic ree (1 major) Computatio		00)	
	-	ee (1 major) Technology (		•	
	-	gree (1 major, 1 minor) M		-	
		mination for the teaching			)
			<u>, , , , , , , , , , , , , , , , , , , </u>		

Module				Abbreviation
Ordina	ry Differential Equations a	nd Complex Analysis		10-M-DFT-082-m01
Module	e coordinator		Module offered by	
	f Studies Mathematik (Mat	thematics)		
ECTS	Method of grading	Only after succ. cor		indico.
13	numerical grade		<u> </u>	
Duratio	on Module level	Other prerequisites	5	
2 semester undergraduate By way of				isites are listed in the section or
Conten	ts			
stems ( ons, ba functio	of linear diffferential equat isic notions in the qualitati ns, meromorphic functions	ions, introduction to the p ive theory of ordinary diffe s and conformal maps, ba	problem of systems of erential equations, b sic proof methods in	ons, solution theorems on sy- of nonlinear differential equati- asic properties of holomorphic n differential equations and com- and other fields of mathematics.
Intende	ed learning outcomes			
equatio	•	ions. He/she is able to inf	terconnect these cor	heory of ordinary differential ncepts and realises the advanta-
Course	<b>s</b> (type, number of weekly	contact hours, language –	– if other than Germa	an)
ster, in Assess low. Ur	formation on whether mod ment in this module comp	lule can be chosen to earn rises the assessments in t	n a bonus) the individual modu	ation offered — if not every seme le components as specified be- successful completion of all ind
ons	ECTS, Method of grading: written examination (appro eplaced by an oral examin roups (groups of 2, approx anguage of assessment: G other prerequisites: Certair urer will inform students a he course will be consider batined the qualification for out their registration for ass ssessment in the current of ave to obtain the qualificat	(not) successfully complet x. 90 minutes); if announ- ation of one candidate ea x. 30 minutes) terman, English if agreed to prerequisites must be m about the respective deta red a declaration of will to or admission to assessme sessment into effect. Stud or in the subsequent sem tion for admission to asse	eted ced by the lecturer, t ach (approx. 20 minu- upon with the exami- tet to qualify for adm ils at the beginning o seek admission to ent over the course o ents who meet all pr ester. For assessme essment anew.	nission to assessment. The lec- of the course. Registration for assessment. If students have f the semester, the lecturer will rerequisites will be admitted to nt at a later date, students will
Analysi • 7 • w r	s ECTS, Method of grading: vritten examination (appro eplaced by an oral examin	(not) successfully comple x. 90 minutes); if announ ation of one candidate ea	ted ced by the lecturer, t	nalysis Introduction to Complex the written examination can be utes) or an oral examination in
	roups (groups of 2, approx	k. 30 minutes) Ferman, English if agreed i	upon with the over	<b>n</b> o <i>t</i>

• Language of assessment: German, English if agreed upon with the examiner

Bachelor's with 1 major Computational Mathematics	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-	page 71 / 125
(2009)	cord Bachelor (180 ECTS) Computational Mathematics - 2009	

Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details 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 over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

Assessment in module component 10-M-DFT-P-082: Examination in Ordinary Differential Equations and Complex Analysis

- 2 ECTS, Method of grading: numerical grade
- oral examination of one candidate each (approx. 30 minutes)
- Language of assessment: German, English if agreed upon with the examiner
- Only after successful completion of module components: Successful completion of module component 10-M-DFT-1 or module component 10-M-DFT-2 is a prerequisite for participation in module component 10-M-DFT-P.

### Allocation of places

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### Additional information

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Workload

Teaching cycle

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

§ 73 (1) 1. Mathematik Analysis

## Module appears in

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

Bachelor' degree (1 major) Mathematical Physics (2009)

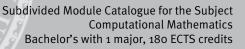
Bachelor' degree (1 major) Computational Mathematics (2009)

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)

Bachelor's with 1 major Computational Mathematics (2009)

Module title					Abbreviation	
Introdu	uction t	o Discrete Mathematics			10-M-EDM-072-m01	
Module	e coord	inator		Module offered by		
Dean o	of Studio	es Mathematik (Mathem	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. compl. of module(s)			
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites	;		
1 seme	ester	undergraduate	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details			letails
					ion for the course will be o	
					nission to assessment. If s	
					or admission to assessmer	
					will put their registration f	
					et all prerequisites will be a	
					e subsequent semester. F	
					ave to obtain the qualifica	
			admission to asses			
Conten	nts					
		om combinatorics, intro	duction to graph theo	ry (including applica	tions), cryptographic meth	10ds,
error-co	orrectin	g codes.				
Intend	ed lear	ning outcomes				
levant	proof te		oly methods from nun		e mathematics, masters th bra to discrete mathemati	
		, number of weekly cont		- if other than Germa	ın)	
		mation on SWS (weekly				
		essment (type, scope, l on on whether module o			tion offered — if not every	seme-
by an c 2, appr	oral exa rox. 30		ate each (approx. 20 r	ninutes) or an oral ex	ten examination can be re xamination in groups (grou	
	tion of p		glishin agreed upon w			
		haces	_			
Additio	onal inf	ormation				
Worklo	bad					
Teachi	ng cycl	e	_			
 Referre	ed to in	LPO I (examination reg	ulations for teaching-	degree programmes)		
	-	hematik Lineare Algebra				
	e appea				-	
		ree (1 major) Computer S	Science (2007)			
	-	ree (1 major) Computer S				
	-	ree (1 major) Mathemati				
Bachelor's 2009)	with 1 ma	or Computational Mathematics		enerated 26-Aug-2024 • exan o ECTS) Computational Mathe		73 / 125



Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module	e title				Abbreviation
Introdu	ction t	o Number Theory			10-M-EZT-072-m01
Module	e coord	linator		Module offered by	<u> </u>
Dean of	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
me test	ts and		, structure of the resi	due class rings, the	ation, modular arithmetics, pri- ory of quadratic remainder, qua-
Intende	ed lear	ning outcomes			
		s acquainted with the fun these methods to practic			entary number theory. He/She is
Course	<b>s</b> (type	, number of weekly conta	ict hours, language –	- if other than Germa	in)
V + Ü (r	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		<b>sessment</b> (type, scope, la ion on whether module ca			tion offered — if not every seme
		mination (90 minutes; us nination in groups (group		ral examination of o	ne candidate each (20 minutes)
Allocat	ion of	places			
Additio	nal inf	ormation			
Worklo	ad		-		
Teachir	ng cvcl	e			
	5,0				
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)	
Module	e appea	ars in			
		ree (1 major) Computer S	cience (2007)		
	-	ree (1 major) Economathe			
		ree (1 major) Computatio			
Bachel	or's de	gree (1 major, 1 minor) M	athematics (Minor, 2	008)	

Module	e title				Abbreviation	
Introduction to Functional Analysis					10-M-FAN-072-m01	
Module coordinator				Module offered by		
Dean o	fStudie	es Mathematik (Mathem	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. compl. of module(s)			
5	<u> </u>	rical grade				
Duratio	'n	Module level	Other prerequisites			
1 semester undergraduate		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		,			
Banach	ı space	s and Hilbert spaces, bo	unded operators, prim	nciples of functional	analysis.	
	· ·	ning outcomes	,	<u></u>		
broad a Course V + Ü (r Methoo ster, ini written by an o 2, appr	applica s (type, no infor d of ass formati examin oral exa fox. 30 age of a	ole to apply methods fro bility of the theory to oth , number of weekly conta mation on SWS (weekly cessment (type, scope, la on on whether module c nation (approx. 90 minut mination of one candida minutes) ssessment: German, Eng	er branches of mathe act hours, language – contact hours) and co anguage — if other tha an be chosen to earn res); if announced by te each (approx. 20 n	matics. - if other than Germa ourse language avail an German, examina a bonus) the lecturer, the writ ninutes) or an oral ex	n) able) tion offered — if not ten examination car	every seme-
Allocat	ion of p	Diaces	_			
Additio		ormation				
Teachi	ng cvcl	e				
	0 // 1					
Referre	d to in	LPOI (examination regu	lations for teaching-	legree programmes)		
		hematik Analysis				
		•				
Module appears in         Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Mathematics (2007)         Bachelor' degree (1 major) Technology of Functional Materials (2009)         Bachelor' degree (1 major) Technology of Functional Materials (2010)         Bachelor's with 1 major Computational Mathematics         JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-         page 76 / 125						
(2009)				ECTS) Computational Mathe	-	Puge / 0 / 123

Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) 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) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009) Bachelor' degree (1 major) Technology of Functional Materials (2006)

	e title				Abbreviation
Geome	etric An	alysis and Partial Diffe	rential Equations		10-M-GAP-092-m01
Modul	e coord	inator		Module offered by	<u> </u>
Dean of Studies Mathematik (Mathematics)			matics)	Institute of Mathen	natics
ECTS		od of grading	Only after succ. con		
13	1	rical grade			
Durati		Module level	Other prerequisites		
2 sem	ester	undergraduate			isites are listed in the section on
			assessments.		
Conter	nts		•		
applica unique	ations i eness tl	n vector calculus and to	opology, examples of fi	irst order partial diffe	forms, Stoke's theorem and its erential equations, existence and le theorems, maximum principle
Intend	ed lear	ning outcomes			
partial and ca	differe in prese oncepts	ntial equations. He/She ent them adequately in	e is able to perform ma written and oral form. I	thematical argumen He/She is able to ap	ctor analysis on manifolds and ts in this field independently, ply the central proof methods s about their analytic back-
Course	<b>es</b> (type	, number of weekly con	tact hours, language –	- if other than Germa	an)
• 1 Metho	10-M-G	AP-P-092: M (no informa	ation on SWS (weekly o language — if other th	contact hours) and c an German, examina	d course language available) ourse language available) ation offered — if not every seme-
low. U		ated otherwise, succes			e components as specified be- successful completion of all indi-
		<b>n module component 10</b> Method of grading: (no			etric Analysis
(		n examination (approx.			
		. 20 minutes) or c) oral ge of assessment: Germ rerequisites: Modules 1	examination in groups nan, English if agreed u	(groups of 2, approx pon with the examin	ner
• ( Assess	Other p <b>sment i</b> 4 ECTS <b>,</b>	ge of assessment: Germ rerequisites: Modules 1 <b>n module component 10</b> Method of grading: (no	examination in groups nan, English if agreed u o-M-ANA and 10-M-LN <b>o-M-GAP-2-092:</b> Partia t) successfully comple	(groups of 2, approx ipon with the examin A are recommended I Differential Equation ted	x. 30 minutes) ner ons Partial Differential Equations
• ( Assess • 2 • 2 • 2 • 2 • 2	Other p <b>sment i</b> 4 ECTS, a) writte (approx Langua	ge of assessment: Germ rerequisites: Modules 1 <b>n module component 10</b> Method of grading: (no en examination (approx. . 20 minutes) or c) oral ge of assessment: Germ	examination in groups nan, English if agreed u o-M-ANA and 10-M-LNA <b>o-M-GAP-2-092:</b> Partia t) successfully comple 90 minutes; usually ch examination in groups nan, English if agreed u	(groups of 2, approx upon with the examin A are recommended. I Differential Equation ted nosen) or b) oral examin (groups of 2, approx upon with the examin	x. 30 minutes) her ons Partial Differential Equations nination of one candidate each x. 30 minutes) her
• ( Assess • 2 • 2 • 2 • 2 • 2 • 2 • 2 • 2 • 2 • 2	Other p sment i 4 ECTS, a) writte (approx Langua Other p sment i	ge of assessment: Germ rerequisites: Modules 1 <b>n module component 10</b> Method of grading: (no en examination (approx. . 20 minutes) or c) oral ge of assessment: Germ rerequisites: Modules 1	examination in groups nan, English if agreed u o-M-ANA and 10-M-LNA <b>o-M-GAP-2-092:</b> Partia t) successfully comple 90 minutes; usually ch examination in groups nan, English if agreed u o-M-ANA and 10-M-LNA	(groups of 2, approxipon with the examined are recommended. I Differential Equation ted (groups of 2, approxipon with the examined are recommended.	x. 30 minutes) her ons Partial Differential Equations nination of one candidate each x. 30 minutes) her

Bachelor's with 1 major Computational Mathematics	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-	page 78 / 125
(2009)	cord Bachelor (180 ECTS) Computational Mathematics - 2009	

## Allocation of places

### Additional information

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## Workload

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# Teaching cycle

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

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## Module appears in

Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009)

Module title					Abbreviation	
Introduction to Geometry					10-M-GEO-082-m01	
Module	e coord	inator		Module offered by		
Dean o	of Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate	By way of exception, additional prerequisites are listed in the section on assessments.			
Contents						
Introduction to topics in geometry: axiomatic introduction of projective spaces, coordinates, fundamental theo- rems, relations to linear algebra and algebra, curves and hypersurfaces in Euclidean spaces, curvature.						

## Intended learning outcomes

The student is acquainted with the fundamental concepts and methods of geometry.

**Courses** (type, number of weekly contact hours, language — if other than German)

This module has 2 components; information on courses listed separately for each component.

- 10-M-GEO-1-082: V + Ü (no information on language and number of weekly contact hours available)
- 10-M-GEO-2-082: V + Ü (no information on language and number of weekly contact hours available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

This module has the following 2 assessment components. To pass the module as a whole students must pass one of the two assessment components.

Assessment component to module component 10-M-GEO-1-082: Einführung in die Projektive Geometrie

- 8 ECTS credits, method of grading: numerical grade
- written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: English, German if agreed upon with the examiner
- Other prerequisites: Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details 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 over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

Assessment component to module component 10-M-GEO-2-082: Einführung in die Differentialgeometrie

- 8 ECTS credits, method of grading: numerical grade
- written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: English, German if agreed upon with the examiner
- Other prerequisites: Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details 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 over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

Bachelor's with 1 major Computational Mathematics	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-	page 80 / 125
(2009)	cord Bachelor (180 ECTS) Computational Mathematics - 2009	

### **Allocation of places**

### Additional information

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## Workload

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## Teaching cycle

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

§ 73 (1) 4. Mathematik Geometrie

## Module appears in

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

Bachelor' degree (1 major) Mathematical Physics (2009)

Bachelor' degree (1 major) Computational Mathematics (2009)

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)

Module title					Abbreviation
Linear Algebra 10-M-LNA-082-m01					
Modu	e coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	atics
ECTS	Meth	od of grading	Only after succ. compl. of module(s)		
14	nume	rical grade		•	
Durati	on	Module level	Other prerequisites	;	
2 sem	ester	undergraduate	By way of exception assessments.	, additional prerequi	sites are listed in the section on
Conte	nts		С		
(subsp image eigens forms;	oaces, q , kernel spaces, Euclide	uotient spaces, linear ino , rank); matrix calculus; s diagonalisability (includi	dependency, basis, c ystems of linear equ ng characteristic pol	limension); linear ma ations, determinants ynomial, minimal pol	nomial rings); vector spaces aps (isomorphism theorem, s, eigenvalues, eigenvectors and lynomial), normal forms, bilinear ncipal axis transformation).
			· · · ·		
perfor He/Sh	m easy e is abl	mathematical arguments	independently, and	can present them ad	ear algebra. He/She is able to equately in written and oral form. a and knows about their alge-
Course	<b>es</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)
• Metho ster, in	10-M-LN 10-M-LN 10-M-LN od of ass nformat	A-2-082: V + Ü (no inform A-P-082: M (no informati <b>cessment</b> (type, scope, la on on whether module ca	nation on SWS (week on on SWS (weekly c inguage — if other th an be chosen to earn	ly contact hours) and contact hours) and co an German, examina a bonus)	d course language available) d course language available) ourse language available) tion offered — if not every seme-
low. U vidual	nless st assess	ated otherwise, successf	ul completion of the	module will require s	successful completion of all indi-
• • • •	7 ECTS, written replace groups Languag Other p turer wi the cou obtaine put thei assessr have to <b>sment i</b> n 5 ECTS,	Method of grading: (not) examination (approx. 90 d by an oral examination (groups of 2, approx. 30 r ge of assessment: Germa rerequisites: Certain prer Il inform students about rse will be considered a d the qualification for about r registration for assessment in the current or in t obtain the qualification for <b>n module component 10-1</b> Method of grading: (not)	successfully comple- minutes); if annound of one candidate ea ninutes) n, English if agreed u equisites must be may the respective detai declaration of will to mission to assessme nent into effect. Study the subsequent seme or admission to asses <b>M-LNA-2-082:</b> Linear successfully comple	ted ced by the lecturer, the ced by the lecturer, the ch (approx. 20 minu- appon with the examina- tet to qualify for admi- cls at the beginning of o seek admission to nt over the course of ents who meet all pro- ester. For assessment essment anew. Algebra 2 Linear Alg- ted	he written examination can be ttes) or an oral examination in her ission to assessment. The lec- of the course. Registration for assessment. If students have the semester, the lecturer will erequisites will be admitted to at at a later date, students will
	replace groups		of one candidate ea ninutes)	ch (approx. 20 minu	tes) or an oral examination in

Bachelor's with 1 major Computational Mathematics	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-	page 82 / 125
(2009)	cord Bachelor (180 ECTS) Computational Mathematics - 2009	

Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details 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 over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

Assessment in module component 10-M-LNA-P-082: Examination in Linear Algebra

- 2 ECTS, Method of grading: numerical grade
- oral examination of one candidate each (approx. 30 minutes)
- Language of assessment: German, English if agreed upon with the examiner
- Only after successful completion of module components: Successful completion of module component 10-M-LNA-1 or module component 10-M-LNA-2 is a prerequisite for participation in module component 10-M-LNA-P.

### Allocation of places

--

Additional information

--

Workload

--

**Teaching cycle** 

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

§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie

### Module appears in

Bachelor' degree (1 major) Computer Science (2010)

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

Bachelor' degree (1 major) Mathematical Physics (2009)

Bachelor' degree (1 major) Computational Mathematics (2009)

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)

Module	e title				Abbreviation
Modell	ing and	l Computational Science			10-M-MWR-092-m01
Module coordinator Module c			Module offered by		
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
8	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
scaling	the mondame	odelling, asymptotic serie ntal methods for numeric	es, classical methods	for solving ordinary	inciples of modelling, aspects of and partial differential equati- ns and the resulting systems of li-
Intende	ed lear	ning outcomes			
		asters the fundamental r ng sciences on a comput		ds and techniques to	simulate processes from natural
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)
V + Ü (r	no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-
		mination (approx. 90 min tes) or c) oral examinatio			ion of one candidate each (ap- utes)
Allocat	ion of <b>j</b>	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-o	degree programmes)	
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Nanostructu	re Technology (2010)	)	
	-	ree (1 major) Mathematic			
Bachel	or' deg	ree (1 major) Computatio	nal Mathematics (20	09)	

Module title	9			Abbreviation	
Non-Linear	Dynamics			10-M-NLD-072-m01	
Module coo	rdinator		Module offered by		
	dies Mathematik (Mathem	atics)	Institute of Mathem	atics	
	hod of grading	r <sup>′</sup>	Only after succ. compl. of module(s)		
	nerical grade		1		
Duration	Module level	Other prerequisites			
1 semester	undergraduate	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.			
Contents	1				
Basic notion dixson, cha	ns in stability theory, Lyapu otic dynamics; application				
	arning outcomes	<u>.</u>			
	is acquainted with the fur whe is able to apply these r				eir proof me-
Courses (typ	pe, number of weekly contained	act hours, language –	- if other than Germa	n)	
V + Ü (no in	formation on SWS (weekly	contact hours) and co	ourse language avail	able)	
	<b>issessment</b> (type, scope, la ation on whether module o			tion offered — if not	every seme-
by an oral e 2, approx. 3	nination (approx. 90 minu xamination of one candida o minutes) f assessment: German, Eng	ite each (approx. 20 n	ninutes) or an oral ex		
Allocation o		<u> </u>			
	<u> </u>				
Additional i	nformation				
Workload					
Teaching cy	cle				
Referred to	in LPO I (examination reg	ulations for teaching-o	degree programmes)		
§ 73 (1) 1. M	athematik Analysis				
Module app	ears in				
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008)					
Bachelor's with 1 (2009)	major Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mathe	-	page 85 / 125

Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module	title				Abbreviation	
Numerical Mathematics 1     10-M-NM1-082-m01						
Module	coord	nator		Module offered by		
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS	Metho	d of grading	Only after succ. compl. of module(s)			
8	numei	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semester undergraduate		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 assess	sment anew.		
Conten	ts					
ons, int	terpola	stems of linear equations tion with polynomials, sp <b>iing outcomes</b>				s of equati-
		acquainted with the fun oblems and knows about			erical mathematics, a	applies them
		number of weekly conta			n)	
		mation on SWS (weekly o				
		essment (type, scope, la				avani sama-
		on on whether module ca				every seme-
by an o 2, appro	ral exa ox. 30 i	nation (approx. 90 minut mination of one candidat ninutes) ssessment: German, Eng	te each (approx. 20 n	ninutes) or an oral ex		
Allocati	-					
Additio	nal info	ormation				
Workloa	ad					
Teachin	ng cycl	9				
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)		
§ 73 (1)	5. Mat	hematik Angewandte Ma	thematik			
Module	e appea	rs in				
Bachelo Bachelo	Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2009)					
Bachelor's v (2009)	with 1 maj	or Computational Mathematics		enerated 26-Aug-2024 • exam • ECTS) Computational Mathe		page 87 / 125

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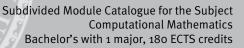
Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Technology of Functional Materials (2009) Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) 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) Technology of Functional Materials (2009) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module ofDean of SECTSM5rDuration		Only after succ. com  Other prerequisites Certain prerequisite sessment. The lectu at the beginning of t sidered a declaratio	s must be met to qua rer will inform stude		1	
Dean of S ECTS / 5 r Duration	Studies Mathematik (Mathem Method of grading numerical grade Module level	Only after succ. com  Other prerequisites Certain prerequisite sessment. The lectu at the beginning of t sidered a declaratio	Institute of Mathem npl. of module(s) s must be met to qua rer will inform stude			
ECTSM5rDuration	Method of grading numerical grade Module level	Only after succ. com  Other prerequisites Certain prerequisite sessment. The lectu at the beginning of t sidered a declaratio	n <b>pl. of module(s)</b> s must be met to qua rer will inform stude			
5 r Duration	numerical grade Module level	 Other prerequisites Certain prerequisite sessment. The lectu at the beginning of t sidered a declaratio	s must be met to qua rer will inform stude	alify for admission to		
Duration	Module level	Certain prerequisite sessment. The lectu at the beginning of t sidered a declaratio	s must be met to qua rer will inform stude	alify for admission to		
		Certain prerequisite sessment. The lectu at the beginning of t sidered a declaratio	s must be met to qua rer will inform stude	alify for admission to		
1 semest	er undergraduate	sessment. The lectu at the beginning of t sidered a declaratio	rer will inform stude	alify for admission to		
		1 semesterundergraduateCertain prerequisites must be met to qualify for admission sessment. The lecturer will inform students about the resp at the beginning of the course. Registration for the course sidered a declaration of will to seek admission to assess dents have obtained the qualification for admission to as the course of the semester, the lecturer will put their regis sessment into effect. Students who meet all prerequisites ted to assessment in the current or in the subsequent ser sessment at a later date, students will have to obtain the		ion for the course win nission to assessment r admission to assest will put their registra t all prerequisites wing e subsequent semest	ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-	
		admission to assess	sment anew.			
Contents						
	methods and applications for erential equations, boundary		s, linear programmin	g, initial value probl	ems for ordi-	
Intended	learning outcomes					
The student is able to draw a distinction between the different concepts of numerical mathematics and knows about their advantages and limitations concerning the possibilities of application in different fields of natural and engineering sciences and economics.						
Courses	(type, number of weekly conta	act hours, language —	- if other than Germa	n)		
V + Ü (no	information on SWS (weekly	contact hours) and co	ourse language avail	able)		
	of assessment (type, scope, la rmation on whether module c			tion offered — if not	every seme-	
by an ora 2, approx	xamination (approx. 90 minut al examination of one candida ĸ. 30 minutes) e of assessment: German, Eng	te each (approx. 20 n	ninutes) or an oral ex			
	n of places					
Addition	al information					
 Workload	d					
	-					
Teaching	g cycle					
Referred	to in LPO I (examination regu	ulations for teaching-o	degree programmes)			
§ 73 (1) 5	. Mathematik Angewandte Ma	athematik				
Module a	appears in					
	' degree (1 major) Mathematio ' degree (1 major) Physics (20					
	' degree (1 major) Physics (20					
Bachelor's wi	th 1 major Computational Mathematics		enerated 26-Aug-2024 • exan • ECTS) Computational Mathe		page 89 / 125	

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Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Technology of Functional Materials (2009) Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) 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) Technology of Functional Materials (2009) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module	Module title Abbreviation					
Operations Research					10-M-ORS-072-m01	
Module coordinator				Module offered by	<u> </u>	
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		d of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semesterundergraduateCertain prerequisites must be met to qualify for admissi sessment. The lecturer will inform students about the re at the beginning of the course. Registration for the cours sidered a declaration of will to seek admission to assess dents have obtained the qualification for admission to a the course of the semester, the lecturer will put their reg sessment into effect. Students who meet all prerequisite ted to assessment in the current or in the subsequent se sessment at a later date, students will have to obtain th		nts about the respection for the course win ission to assessment r admission to asses will put their registra t all prerequisites wint e subsequent semes	tive details Il be con- nt. If stu- ssment over ition for as- ill be admit- ster. For as-			
			admission to assess	sment anew.		
Conten						
		nming, duality theory, tra	insport problems, int	egral linear program	ming, graph theoreti	c problems.
Intende	ed learr	ning outcomes				
problen Courses	The student is acquainted with the fundamental methods in operations research, as required as a central tool for solving many practical problems especially in economics. He/She is able to apply these methods to practical problems, both theoretically and numerically.  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	d of ass	<b>essment</b> (type, scope, la on on whether module ca	nguage — if other tha	an German, examina		every seme-
written by an o 2, appre	examir ral exa ox. 30	nation (approx. 90 minut mination of one candida ninutes) ssessment: German, Eng	es); if announced by te each (approx. 20 n	the lecturer, the writ ninutes) or an oral ex		
Allocati	-					
Additio	nal info	ormation				
Worklo	ad					
Teachir	ng cycl	9				
Referre	d to in	LPOI (examination regu	lations for teaching-o	degree programmes)		
§ 73 (1) 5. Mathematik Angewandte Mathematik						
Module	e appea	rs in				
Bachelor' degree (1 major) Computer Science (2007) Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007)						
Bachelor's v (2009)	achelor's with 1 major Computational Mathematics JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re- cord Bachelor (180 ECTS) Computational Mathematics - 2009					



Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module title Abbreviation					Abbreviation	
Propae	deutics	s of Mathematics	10-M-PPM-082-m01			
Module coordinator Module offered by						
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
2	(not) s	successfully completed		•		
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate			regular attendance of courses (as	
			specified at the beg	inning of the course)	).	
Conten	ts					
		proof methods and quest g. by reference to its histo			les of abstract concepts of ma- ic and deduction.	
Intende	ed learı	ning outcomes				
	asy mat				nematics. He/She is able to per- y and reasonably in written and	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	ın)	
V + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)						
Assess	project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course) Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner					
Allocat	ion of p	olaces	·			
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)		
Module	e appea	urs in				
		ree (1 major) Mathematic	s (2008)			
Bachel	or' deg	ree (1 major) Economathe	ematics (2009)			
	-	ree (1 major) Economathe				
		ree (1 major) Mathematic		、 、		
		ree (1 major) Computatio				
		gree (1 major, 1 minor) M			)	
riist sta	First state examination for the teaching degree Gymnasium Mathematics (2009)					

Module title				Abbreviation	
Programming	course for students of <b>N</b>	Mathematics and othe	r subjects	10-M-PRG-082-m01	
Module coord	linator	Module offered by	<u> </u>		
			Institute of Mathem	natics	
ECTS     Method of grading     Only after succ. compl. of module(s)					
	successfully completed				
Duration	Module level				
1 semester         undergraduate         Admission prerequisite to assessment: regular attenda           monitored, a maximum of one incident of unexcused al         monitored, a maximum of one incident of unexcused al			•	ice	
Contents					
	· · · · · · · · · · · · · · · · · · ·		<b></b>		
Basics of a m matics.	odern programming lang	uage (e. g. C or Fortra	n) taking into accour	nt the particular needs in ma	the-
Intended lear	ning outcomes	_			
The student is in mathemati	•	ently on small program	nming exercises and	standard programming prob	lems
	, number of weekly cont				
P (no informa	tion on SWS (weekly con	tact hours) and cours	e language available	2)	
	<b>sessment</b> (type, scope, l ion on whether module o			tion offered — if not every se	me-
	form of programming ex			ne course)	
Language of a	assessment: German, En	glish if agreed upon w	ith the examiner		
Allocation of	places				
Additional inf	ormation				
Workload					
Teaching cycl	۵				
Teaching cycl					
	LPOI (examination reg		legree programmes)		
<u>§ 73 (1) 5. Ma</u>	thematik Angewandte M	athematik			
Module appea	ars in				
Bachelor' deg	ree (1 major) Mathemati	cs (2008)			
Bachelor' deg	ree (1 major) Physics (20	010)			
Bachelor' deg	ree (1 major) Physics (20	009)			
Bachelor' deg	ree (1 major) Physics (20	012)			
Bachelor' deg	ree (1 major) Physics (20	008)			
Bachelor' deg	ree (1 major) Technology	of Functional Materia	als (2009)		
Bachelor' deg	ree (1 major) Technology	of Functional Materia	als (2010)		
Bachelor' deg	ree (1 major) Nanostruct	ure Technology (2010)	)		
-	ree (1 major) Economath	-			
-	ree (1 major) Economath				
Bachelor' deg	ree (1 major) Mathemati				
Bachelor' degree (1 major) Computational Mathematics (2009)					
-			09)		
Master's degr	ee (1 major) Physics (20	10)	-		
Master's degr Master's degr	ree (1 major) Physics (20 ree (1 major) Technology	10) of Functional Material	s (2010)		
Master's degr Master's degr Master's degr	ee (1 major) Physics (20 ee (1 major) Technology ee (1 major) Technology	10) of Functional Material of Functional Material	s (2010) s (2009)		
Master's degr Master's degr Master's degr	ree (1 major) Physics (20 ree (1 major) Technology	10) of Functional Material of Functional Material JMU Würzburg • ge	s (2010)		/ 125



Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module	e title				Abbreviation				
Programming course for students of Mathematics and other subjects, simple					10-M-PRGk-082-m01				
Module coordinator Module offered by					·				
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)					
2	(not) s	successfully completed		-					
Duratio	n	Module level	Other prerequisites						
1 seme	ster	undergraduate	1	site to assessment:	regular attendance (attendance				
		_	monitored, a maxim	um of one incident o	of unexcused absence).				
Conten	ts								
Basics matics.		odern programming lang	uage (e. g. C or Fortrar	n) taking into accour	nt the particular needs in mathe-				
Intende	ed lear	ning outcomes							
The stu in math		-	ntly on small program	nming exercises and	standard programming problems				
Course	<b>s</b> (type	, number of weekly conta	act hours, language —	· if other than Germa	ın)				
P (no ir	format	tion on SWS (weekly cont	tact hours) and course	e language available	2)				
-			-	~ ~	tion offered — if not every seme-				
		ion on whether module c							
project in the form of programming exercises (type and expenditure of time to be specified by the lecturer at the beginning of the course) Language of assessment: German, English if agreed upon with the examiner									
_			gisti ii agreed upoli w						
Allocat	ion of p	DIACES							
Additio	nal inf	ormation							
	- 4								
Worklo	ad		_						
 Taaabii		-							
Teachi	ng cycl	e							
 D (									
		LPOI (examination regu		legree programmes)					
	-	hematik Angewandte Ma	athematik						
Module									
	-	ree (1 major) Mathematic							
	-	ree (1 major) Nanostructu		)					
	-	ree (1 major) Economath	-						
		ree (1 major) Economath							
		ree (1 major) Mathematic							
	-			Bachelor' degree (1 major) Computational Mathematics (2009)					
Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)									
		mination for the teaching							

Module title Abbreviation					
Readin	Reading Course Discrete Mathematics       10-M-RCD-082-m01				
Module coordinator Module offered					<u> </u>
Dean o	f Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
4	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
Basics	in disc	rete mathematics.			
Intend	ed lear	ning outcomes			
		able to work independe se standard literature.	ntly on a given scient	ific topic. He or she	can tackle a simple mathematical
Course	<b>s</b> (type	, number of weekly conta	act hours, language –	- if other than Germa	ın)
A (no ii	nforma	tion on SWS (weekly con	tact hours) and cours	e language available	e)
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-
a) talk	(approx	x. 30 minutes) or b) writte	en elaboration (appro	ox. 5 to 10 pages)	
Allocat	ion of	olaces			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)	
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Mathematio	cs (2008)		
	-	ree (1 major) Mathematio			
Bachel	or' deg	ree (1 major) Computatio	nal Mathematics (20	09)	

Module title Abbreviation					Abbreviation	
Reading Course Functional Analysis 10-M-RCF-082-m01						
Module	Module coordinator Modu					
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
4	nume	rical grade				
Duratio	on	Module level	evel Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Basics	in func	tional analysis.				
Intend	ed learı	ning outcomes				
		able to work independer se standard literature.	ntly on a given scient	ific topic. He or she o	can tackle a simple mathematical	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
A (no ir	nformat	ion on SWS (weekly cont	act hours) and course	e language available	)	
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)						
a) talk	(approx	k. 30 minutes) or b) writte	en elaboration (appro	x. 5 to 10 pages)		
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
		ree (1 major) Mathematic	s (2008)			
		ree (1 major) Mathematic				
Bachelor' degree (1 major) Computational Mathematics (2009)						

Module title Abbreviation					
Readir	Reading Course Operations Research   10-M-RCO-082-m01				
Module coordinator				Module offered by	<u> </u>
Dean o	of Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
4	nume	rical grade			
Durati	on	Module level	Other prerequisites	<b>i</b>	
1 seme	ester	undergraduate			
Conte	nts				
Basics	in ope	rations research.			
Intend	ed lear	ning outcomes			
		able to work independe se standard literature.	ntly on a given scien	tific topic. He or she	can tackle a simple mathematical
Course	<b>es</b> (type	, number of weekly conta	act hours, language –	– if other than Germa	n)
A (no i	nforma	tion on SWS (weekly con	tact hours) and cours	e language available	e)
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)					
a) talk	(appro	x. 30 minutes) or b) writte	en elaboration (appro	ox. 5 to 10 pages)	
Alloca	tion of	places	-		
Additi	onal inf	ormation			
Workle	oad				
Teachi	ing cycl	e			
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Modul	e appea	ars in			
		ree (1 major) Mathematic	cs (2008)		
	-	ree (1 major) Mathematic			
Bache	lor' deg	ree (1 major) Computatio	onal Mathematics (20	09)	

Module title Abbreviation					Abbreviation	
Reading Course Optimisation 10-M-RCP-082-m01					10-M-RCP-082-m01	
Module	e coord	inator		Module offered by		
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
4	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Basics	in optiı	nization.				
Intende	ed leari	ning outcomes				
		able to work independer se standard literature.	ntly on a given scient	ific topic. He or she o	can tackle a simple mathematical	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)	
A (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
		e <b>ssment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
a) talk	(approx	. 30 minutes) or b) writte	n elaboration (appro	x. 5 to 10 pages)		
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ng cycl	e				
-						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module	Module appears in					
Bachel	or' deg	ree (1 major) Mathematic	s (2008)			
	-	ree (1 major) Mathematic				
Bachelor' degree (1 major) Computational Mathematics (2009)						

Module title Abbreviation					Abbreviation	
Reading Course Stochastics 10-M-RCS-082-m01					10-M-RCS-082-m01	
Module coordinator M				Module offered by		
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
4	L	rical grade				
Duratio		Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Advanc	ed top	ics in stochastics.				
Intende	ed leari	ning outcomes				
		able to work independer se standard literature.	ntly on a given scient	ific topic. He or she o	can tackle a simple mathematical	
Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
A (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	))	
		s <b>essment</b> (type, scope, la on on whether module ca			tion offered — if not every seme-	
a) talk (	(approx	k. 30 minutes) or b) writte	en elaboration (appro	x. 5 to 10 pages)		
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachel	or' deg	ree (1 major) Mathematic	s (2008)			
	-	ree (1 major) Mathematic				
Bachelor' degree (1 major) Computational Mathematics (2009)						

Module	Module title Abbreviation					
Readin	Reading Course Dynamical Systems   10-M-RCY-082-m01					
Module coordinator Module offered by					<u> </u>	
Dean o	f Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
4	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Basics	in dyna	amical systems and nonl	inear dynamics.			
Intend	ed lear	ning outcomes				
		able to work independe se standard literature.	ntly on a given scient	ific topic. He or she	can tackle a simple mathematical	
Course	<b>s</b> (type	, number of weekly conta	act hours, language –	- if other than Germa	an)	
A (no ii	nforma	tion on SWS (weekly con	tact hours) and cours	e language available	e)	
		s <b>essment</b> (type, scope, la ion on whether module c			tion offered — if not every seme-	
a) talk	(approx	x. 30 minutes) or b) writte	en elaboration (appro	ox. 5 to 10 pages)		
Allocat	ion of	places				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Module	e appea	ars in				
Bachel	or' deg	ree (1 major) Mathematio	cs (2008)			
	-	ree (1 major) Mathematio				
Bachel	or' deg	ree (1 major) Computatio	nal Mathematics (20	09)		

Module title Abbreviation					Abbreviation	
Stochastics 1					10-M-ST1-082-m01	
Module coordinator				Module offered by		
Dean of Studies Mathematik (Mathematics)			ematics)	Institute of Mathem	natics	
ECTS	1	od of grading	Only after succ. compl. of module(s)			
8		rical grade				
Duratio	on .	Module level	Other prerequisites	i i i i i i i i i i i i i i i i i i i		
1 semester undergraduate		sessment. The lectur 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		<u> </u>				
variance Intende The stur practice <b>Course</b> V + Ü (r <b>Methoo</b> ster, in written by an o 2, appr	continuous distributions: normal distribution, random variable, distribution function, product measures and sto- chastic independence, elementary conditional probability, characteristics of distributions: expected value and variance, limit theorems: law of large numbers, central limit theorem. Intended learning outcomes The student is acquainted with fundamental concepts and methods in stochastics, applies these methods to practical problems and knows about the typical fields of application. 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 seme- ster, information on whether module can be chosen to earn a bonus) written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)					
Allocat			English if agreed upon w			
AUUCAL						
Additio	nalinf	ormation				
Auuitio	nat III					
Worklo	ad					
Workload						
 Teaching cycle						
reachi	ing cycl	e				
 Doforr-	d to in	IDOL (oversidentiation	rogulations for tooshing	dograa programmes		
	-		regulations for teaching-	uegree programmes)		
	-	hematik Stochastik				
	Module appears in					
Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Mathematics (2008)						

Bachelor's with 1 major Computational Mathematics	
(2009)	

Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module title					Abbreviation		
Stochastics 2					10-M-ST2-082-m01		
Module coordinator				Module offered by			
		es Mathematik (Mathema	atics)	Institute of Mathematics			
ECTS	r	d of grading	Only after succ. com		Iducs		
5	·	ical grade					
⊃ Duratio	·	-					
		Module level undergraduate	Other prerequisites				
1 semester		undergraduate	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 assess	sment anew.			
Conten	ts						
Elemen	nts of da	ata analysis, statistics of	data in normal and o	ther distributions, e	lements of multivar	iate statistics.	
Intende	ed learr	ing outcomes					
		acquainted with fundam and knows about the ty			, applies these met	hods to prac-	
Course	<b>s</b> (type,	number of weekly conta	ict hours, language —	if other than Germa	ın)		
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
		<b>essment</b> (type, scope, la on on whether module ca			tion offered — if not	t every seme-	
by an o 2, appr	oral exa ox. 30 i	nation (approx. 90 minut mination of one candidat ninutes) ssessment: German, Eng	te each (approx. 20 m	ninutes) or an oral ex			
Allocat							
Allocal		laces					
Additio	onal info	ormation					
Worklo	ad						
Teachir	ng cycl	2					
		LPOI (examination regu	lations for teaching-c	legree programmes)			
	-	hematik Stochastik					
Module							
Bachelor' degree (1 major) Mathematics (2008)							
Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008)							
nachel(	-	'ee (1 major) Economathe 'ee (1 major) Mathematic					
		ce (1 major) mathematic	αι Γπγοιζό (2009)				
Bachelo		ree (1 major) Computatio		9)			



Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Module	e title			Abbreviation			
Advanced Analysis					10-M-VAN-082-mo:	1	
Module coordinator				Module offered by			
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS		d of grading	Only after succ. com	pl. of module(s)			
8	numei	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semester		undergraduate	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.				
<u> </u>			aumission to assess				
Conten Lebesg		gral in several variables,	including theorems of	on convergence and	Fubini's theorem, L <sup>4</sup>	^p-spaces	
		y Fourier theory in L^2, (	Gauss's theorem.				
		ning outcomes	- <u></u>				
		acquainted with advanc understand the construc				egral, he or	
Course	<b>s</b> (type,	number of weekly conta	act hours, language —	· if other than Germa	an)		
Ü + V (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		<b>essment</b> (type, scope, la on on whether module c			ition offered — if not	every seme-	
by an o 2, appr	ral exa ox. 30 i	nation (approx. 90 minut mination of one candida ninutes) ssessment: German, Eng	te each (approx. 20 n	ninutes) or an oral ex			
Allocati			<u></u>				
Additio	nal info	ormation					
Worklo	ad						
			·				
Teachir	ng cycl	9					
Referre	d to in	LPOI (examination regu	llations for teaching-o	legree programmes)			
§ 73 (1)	1. Mat	nematik Analysis					
Module	e appea	rs in					
Bachelor' degree (1 major) Mathematics (2008)							
Bachelor' degree (1 major) Economathematics (2009)							
Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009)							
Sachelor's	with 1 maj	or Computational Mathematics		enerated 26-Aug-2024 • exan ECTS) Computational Mathe	-	page 107 / 125	

Bachelor' degree (1 major) Computational Mathematics (2009) 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) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Preparatory Course Mathematics       10-M-VKM-082-m01         Module coordinator       Module offered by         Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ.compl. of module(s)         1       (not) successfully completed	Module title Abbreviation					Abbreviation
Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         1       (not) successfully completed          Duration       Module level       Other preequisites         1 semester       undergraduate       Admission prerequisite to assessment: regular attendance of courses ( specified at the beginning of the course).         Contents       Introduction to the basic techniques in mathematics; approach to sets, propositions, propositional logic.         Intendel learning outcomes       The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme.         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 sem ster, information on whether module can be chosen to earn a bonus)         project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester         Language of assessment: German, English if agreed upon with the examiner         Additional information	Prepara	atory C	ourse Mathematics			10-M-VKM-082-m01
ECTS       Method of grading       Only after succ. compl. of module(s)         1       (not) successfully completed          Duration       Module level       Other prerequisites         1 semester       undergraduate       Admission prerequisite to assessment: regular attendance of courses ( specified at the beginning of the course).         Contents       Introduction to the basic techniques in mathematics; approach to sets, propositions, propositional logic.         Intended learning outcomes       The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme.         Courses (type, number of weekly contact hours, language — if other than German)       V + Û (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 sem ster, information on whether module can be chosen to earn a bonus)         project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester         Language of assessment: German, English if agreed upon with the examiner         Allocation of places               Module appears in         Referred to in LPO 1 (examination regulations for teaching-degree programmes)            Bachelor' degree (1 major) Mathematics (200	Module coordinator Module offered by					
1       (not) successfully completed	Dean of	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	atics
Duration         Module level         Other prerequisites           1 semester         undergraduate         Admission prerequisite to assessment: regular attendance of courses ( specified at the beginning of the course).           Contents         Introduction to the basic techniques in mathematics; approach to sets, propositions, propositional logic.           Intended learning outcomes         The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme.           Courses (type, number of weekly contact hours, language — if other than German)         V + Û (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 sem- ster, information on whether module can be chosen to earn a bonus)           project assignments (fype and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester           Language of assessment: German, English if agreed upon with the examiner           Aldication of places                 Module appears in           Bachelor' degree (1 major) Mathematics (2008)           Bachelor' degree (1 major) Compathematics (2009)           Bachelor' degree (1 major) Compathematics (2009)           Bachelor' degree (1 major) Compathematics (2009)           Bachelor' degree (1 major) Compathematics (200	ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
1 semester       undergraduate       Admission prerequisite to assessment: regular attendance of courses (specified at the beginning of the course).         Contents       Introduction to the basic techniques in mathematics; approach to sets, propositions, propositional logic.         Intendel learning outcomes       The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme.         Courses (type, number of weekly contact hours, language — if other than German)       V + Û (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 semister, information on whether module can be chosen to earn a bonus)         project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester         Language of assessment: German, English if agreed upon with the examiner         Allocation of places               Morkload               Morkload               Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Economathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (Minor, 2008) <td>1</td> <td>(not) s</td> <td>successfully completed</td> <td></td> <td></td> <td></td>	1	(not) s	successfully completed			
specified at the beginning of the course).         Contents         Introduction to the basic techniques in mathematics; approach to sets, propositions, propositional logic.         Intended learning outcomes         The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme.         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 semster, information on whether module can be chosen to earn a bonus)         project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester         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)            Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Conomathematics (2009)         Bachelor' degree (1 major) Comomathematics (2009)	Duratio	n	Module level			
Introduction to the basic techniques in mathematics; approach to sets, propositions, propositional logic. Intended learning outcomes The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme. 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 sems ster, information on whether module can be chosen to earn a bonus) project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner Allocation of places	1 seme	ster	undergraduate			
Intended learning outcomes The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme. 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 semster, information on whether module can be chosen to earn a bonus) project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner Allocation of places	Conten	ts				
The student gets acquainted with the basic working techniques which are prerequisites for the further courses the Bachelor's degree study programme. 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 semister, information on whether module can be chosen to earn a bonus) project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester 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 Bachelor' degree (1 major) Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computation	Introdu	ction t	o the basic techniques in	mathematics; appro	ach to sets, proposi	tions, propositional logic.
the Bachelor's degree study programme. 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 semi- ster, information on whether module can be chosen to earn a bonus) project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester 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 Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Mathematics (2009)	Intende	ed lear	ning outcomes			
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 semi- ster, information on whether module can be chosen to earn a bonus) project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner Allocation of places 		•	•		ues which are prere	quisites for the further courses in
Method of assessment (type, scope, language — if other than German, examination offered — if not every semi ster, information on whether module can be chosen to earn a bonus) project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner Allocation of places 	Course	<b>s</b> (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
ster, information on whether module can be chosen to earn a bonus) project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course Assessment offered: once a year, winter semester 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 Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major, 1 minor) Mathematics (Minor, 2008)	V + Ü (r	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner Allocation of places  Additional information  Workload  Teaching cycle  Teaching cycle  Referred to in LPO I (examination regulations for teaching-degree programmes)  Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2009) Bachelor' degree (1 major) Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2009)	ster, inf	formati	ion on whether module c	an be chosen to earn	a bonus)	,
Additional information            Workload            Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Economathematics (2009)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor's degree (1 major, 1 minor) Mathematics (2009)	Assess Langua	ment o ge of a	ffered: once a year, winte ssessment: German, Eng	er semester		
Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Allocat	ion of <sub>l</sub>	olaces			
Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Additio	nal inf	ormation			
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Economathematics (2009)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Worklo	ad				
Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         Bachelor' degree (1 major) Mathematics (2008)         Bachelor' degree (1 major) Economathematics (2009)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Economathematics (2008)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
 Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)	Teachir	ıg cycl	e			
 Module appears in Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
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Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
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Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)		-		-		
Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)		-				
Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)						
						1

Module title Abbreviation						
Number Theory and Algebra 10-M-ZAL-082-mo1						
Module	coord	inator		Module offered by		
Dean of	Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
1		od of grading	Only after succ. con	npl. of module(s)		
l3	nume	rical grade				
Duration	n	Module level	Other prerequisites			
2 semes	ster	undergraduate		, additional prerequi	sites are listed in th	e section on
			assessments.			
Content	S					
discussi	ion of	o number theory, algebra properties of integers and cture (residue class rings	d rational numbers (a			
ntende	d learr	ning outcomes				
s able t ches in i	o inter mathe		d realises the advan	tages of thinking acr	oss the borders of d	
Courses	(type	, number of weekly conta	ct hours, language —	- if other than Germa	n)	
<b>Nethod</b> ster, info	<b>of ass</b> ormati	L-P-082: M (no information <b>cessment</b> (type, scope, la on on whether module ca on this module comprises	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme
<ul> <li>low. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.</li> <li>Assessment in module component 10-M-ZAL-1-082: Introduction to Number Theory Introduction to Number Theory <ul> <li>4 ECTS, Method of grading: (not) successfully completed</li> <li>written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)</li> <li>Language of assessment: German, English if agreed upon with the examiner</li> <li>Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details 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 over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to</li> </ul> </li> </ul>						
		nent in the current or in t obtain the qualification f	•		i al a ialei uale, Sll	MUCHIES WILL
<ul> <li>have to obtain the qualification for admission to assessment anew.</li> <li>Assessment in module component 10-M-ZAL-2-082: Introduction to Algebra Introduction to Algebra</li> <li>7 ECTS, Method of grading: (not) successfully completed</li> <li>written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)</li> <li>Language of assessment: German, English if agreed upon with the examiner</li> </ul>						
tu th	rer wil e cour	rerequisites: Certain prere Il inform students about rse will be considered a or Computational Mathematics	the respective detai declaration of will to JMU Würzburg • ge	ls at the beginning o	of the course. Regis assessment. If stuc	tration for

obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

Assessment in module component 10-M-ZAL-P-082: Examination in Number Theory and Algebra

- 2 ECTS, Method of grading: numerical grade
- oral examination of one candidate each (approx. 30 minutes)
- Language of assessment: German, English if agreed upon with the examiner
- Only after successful completion of module components: Successful completion of module component 10-M-ZAL-1 or module component 10-M-ZAL-2 is a prerequisite for participation in module component 10-M-ZAL-P.

## **Allocation of places**

Additional information

--

Workload

--

Teaching cycle

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

§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie

## Module appears in

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

Bachelor' degree (1 major) Mathematical Physics (2009)

Bachelor' degree (1 major) Computational Mathematics (2009)

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)

Module title Abbreviation					
Experimental Physics 3 (Optics, Quantum Phenomena, Introduction Atomic					11-E3-072-m01
Physic	:s)				
Modul	e coord	inator		Module offered by	
Manag	ging Dir	ector of the Institute of Ap	oplied Physics	Faculty of Physics	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
8	nume	rical grade			
Durati	on	Module level	Other prerequisites	i	
1 seme	ester	undergraduate			
Conter	nts				
Physic	al laws	of optics, quantum phen	omena, introduction	to Atomic Physics.	
Intend	ed lear	ning outcomes			
The stu	udents		asic contexts and prin	nciples of optics, qu	antum phenomena and Atomic
Physic Course		, number of weekly conta	ct hours, language –	- if other than Germa	an)
		rmation on SWS (weekly o			
					ation offered — if not every seme-
		ion on whether module ca			allon oncica in not every selle
writter	n exami	nation (approx. 120 minu	tes)		
Alloca	tion of	places			
Additi	onal inf	ormation			
Worklo	oad				
Teachi	ing cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes	)
Modul	e appea	ars in			
Bache	lor' deg	ree (1 major) Mathematic	s (2008)		
	-	ree (1 major) Mathematic			
	-	ree (1 major) Physics (200			
	-	ree (1 major) Physics (200			
	-	ree (1 major) Physics (200			
	-	ree (1 major) Nanostructu			
	-	ree (1 major) Nanostructu			
	-	ree (1 major) Computatio		09)	
Bache	lor's de	gree (1 major, 1 minor) Ph	ysics (Minor, 2008)		

Modul	Module title Abbreviation					
Experi	mental	Physics 5 (Introduction t	o Solid State Physics	5)	11-E5-082-m01	
Modul	e coord	inator		Module offered by		
Manag	ging Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
8	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conte	nts					
		of solids: Bonding and s lectron gas)	tructure, lattice dyna	mics, thermal prope	rties, principles of electronic pro-	
Intend	ed lear	ning outcomes				
		have knowledge of the ba properties, principles of			nding and structure, lattice dyna-	
Course	<b>es</b> (type	, number of weekly conta	act hours, language –	- if other than Germa	an)	
V + Ü (	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-	
		nation (approx. 120 minu				
	tion of <b>j</b>	· · ·	· ·			
۵dditi	onal inf	ormation				
Workle	oad		-			
Teachi	ing cycl	e				
	0.77					
Referr	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Modul	e appea	ars in				
Bache	lor' deg	ree (1 major) Physics (20	08)			
	Bachelor' degree (1 major) Nanostructure Technology (2008)					
	-	ree (1 major) Computatio		09)		
Bache	lor's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2008)			

Module title				Abbreviation	
Introduction to Physics fo	or Students o	f Non-physics-relate	d Minor Subjects	11-EFNF-072-m01	
Module coordinator			Module offered by		
Managing Director of the			Faculty of Physics a	and Astronomy	
ECTS Method of gradin	g	Only after succ. con	npl. of module(s)		
7 numerical grade					
Duration Module lev		Other prerequisites	5		
2 semester undergrad	uate				
Contents					
Mechanics, vibration theo	ory, thermody	namics, optics, scier	nce of electricity, Ato	mic and Nuclear Ph	iysics.
Intended learning outcom	nes				
The students have knowle		rinciples of Physics.			
Courses (type, number of			- if other than Germa	un)	
V + V (no information on S					
Method of assessment (ty		5 5		ition offered — if no	ot every seme-
ster, information on whet			a DOHUS)		
written examination (app	rox. 120 minu	ites)			
Allocation of places					
Only as part of pool of gen	neral key skil	ls (ASQ): 10 places. F	laces will be allocate	ed by lot.	
Additional information					
Workload					
Teaching cycle					
reaching cycle					
Referred to in LPO I (exar	nination regu	llations for teaching-	degree programmes)		
Module appears in					
Bachelor' degree (1 major	) Biochemist	ry (2011)			
Bachelor' degree (1 major	) Biochemist	ry (2013)			
Bachelor' degree (1 major					
Bachelor' degree (1 major					
Bachelor' degree (1 major					
Bachelor' degree (1 major					
Bachelor' degree (1 major					
Bachelor' degree (1 major					
Bachelor' degree (1 major	•				
Bachelor' degree (1 major					
Bachelor' degree (1 major					
Bachelor' degree (1 major Bachelor' degree (1 major					
Bachelor' degree (1 major					
Bachelor' degree (1 major	•				
Bachelor' degree (1 major	•				
Bachelor' degree (1 major					
Bachelor' degree (1 major					
	) Mathematic	cs (2014)			
Bachelor' degree (1 major Bachelor's with 1 major Computationa		JMU Würzburg • g	enerated 26-Aug-2024 • exan 5 ECTS) Computational Mathe	-	page 114 / 125

Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Biomedicine (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2014) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Module	e title				Abbreviation
Introdu	ction t	o Physics Part 1 for stude	ents of Physics Relat	ed Minor Subjects	11-ENNF1-062-m01
Module	coord	inator		Module offered by	
		· · · · · · · · · · · · · · · · · · ·		· · · ·	
		ector of the Institute of Ap		Faculty of Physics a	ind Astronomy
ECTS		od of grading rical grade	Only after succ. con	ipi. of module(s)	
7	L	-			
Duratio		Module level undergraduate	Other prerequisites		
		undergraduate			
Conten					
Mechar	nics, vi	pration theory, thermody	namics.		
Intende	ed leari	ning outcomes			
The stu	dents l	nave basic knowledge of	physics for engineeri	ing students.	
Courses	<b>s</b> (type	number of weekly conta	ct hours, language –	- if other than Germa	n)
V + Ü (n	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
					tion offered — if not every seme-
		on on whether module ca			····· , ····
written	exami	nation (approx. 120 minu	tes)		
Allocati					
		f pool of general key skill	s (ASO)· 20 places P	Places will be allocat	ed by lot
· · · · ·		ormation	5 (10 Q). 20 places. 1		
Auditio	inat init				
Worklo	ad				
Teachir	ng cycl	9			
Referre	d to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
Module	e appea	rs in			
Bachelo	or' deg	ree (1 major) Mathematic	s (2008)		
Bachelo	or' deg	ree (1 major) Mathematic	s (2014)		
Bachelo	or' deg	ree (1 major) Mathematic	s (2012)		
Bachelo	or' deg	ree (1 major) Mathematic	s (2013)		
Bachelo	or' deg	ree (1 major) Mathematic	s (2007)		
	-	ree (1 major) Technology		als (2009)	
	-	ree (1 major) Technology			
		ree (1 major) Computatio			
	-	ree (1 major) Computatio		•	
Bachelo	or' deg	ree (1 major) Computatio	nal Mathematics (20	12)	
		ree (1 major) Computatio			
	-	ree (1 major) Aerospace (		-	
	-	ree (1 major) Aerospace (	•	-	
		ree (1 major) Aerospace (			
	-	ree (1 major) Functional N		,	
	Bachelor' degree (1 major) Technology of Functional Materials (2002)				
Bachen				···· \ /	

	e title				Abbreviation			
Introdu	uction t	o Physics Part 2 for stud	ents of Physics Relat	ed Minor Subjects	11-ENNF2-062-m01			
Modul	e coord	inator		Module offered by				
Manag	ing Dire	ector of the Institute of A	oplied Physics	Faculty of Physics a	and Astronomy			
ECTS		od of grading	Only after succ. con					
7		rical grade						
, Duratio		Module level	Other prerequisites					
1 seme		undergraduate						
Conten	nts		<u> </u>					
		ctricity, magnetism, opti	rs Atomic Physics					
		ning outcomes	cs, Atomic i hysics.					
		have basic knowledge of	é é é é é é é é é é é é é é é é é é é					
		, number of weekly conta						
V + Ü (I	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)			
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-			
		nation (approx. 120 minu						
	tion of							
		f pool of general key skil	(ASO): 20 places	laces will be allocat	ed by lot			
		<u> </u>	15 (ASQ). 20 places. P					
Additio	onal Inf	ormation						
	_							
Worklo	bad							
Teachi	ng cycl	е						
Poforra								
NCICIL	εα το π	LPO I (examination regu	lations for teaching-o	degree programmes)				
		LPOI (examination regu	lations for teaching-o	degree programmes)				
			lations for teaching-o	degree programmes)				
 Module	e appea	ars in		degree programmes)				
 <b>Module</b> Bachel	<b>e appea</b> lor' deg			degree programmes)				
 <b>Module</b> Bachel Bachel	<b>e appea</b> lor' deg lor' deg	a <b>rs in</b> ree (1 major) Mathematic	rs (2008) rs (2014)	degree programmes)				
 <b>Module</b> Bachel Bachel Bachel	<b>e appea</b> lor' deg lor' deg lor' deg	<b>ars in</b> ree (1 major) Mathematic ree (1 major) Mathematic	rs (2008) rs (2014) rs (2012)	degree programmes)	,			
 <b>Modul</b> e Bachel Bachel Bachel Bachel	<b>e appea</b> lor' deg lor' deg lor' deg lor' deg	a <b>rs in</b> ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Mathematic	rs (2008) rs (2014) rs (2012) rs (2013)	degree programmes)				
 <b>Module</b> Bachel Bachel Bachel Bachel	<b>e appea</b> lor' deg lor' deg lor' deg lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Mathematic	rs (2008) rs (2014) rs (2012) rs (2013) rs (2007)					
 Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Mathematic	s (2008) s (2014) s (2012) s (2013) s (2007) of Functional Materia	als (2009)				
 <b>Modul</b> Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology	rs (2008) rs (2014) rs (2012) rs (2013) rs (2007) of Functional Materia of Functional Materia	als (2009) als (2010)				
 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology ree (1 major) Technology	s (2008) s (2014) s (2012) s (2013) s (2007) of Functional Materia of Functional Materia	als (2009) als (2010) 09)				
 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology ree (1 major) Computatio	es (2008) es (2014) es (2012) es (2013) es (2007) of Functional Materia of Functional Materia nal Mathematics (20 nal Mathematics (20	als (2009) als (2010) 09) 14)				
 <b>Module</b> Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology ree (1 major) Technology ree (1 major) Computatio ree (1 major) Computatio	s (2008) s (2014) s (2012) s (2013) s (2007) of Functional Materia of Functional Materia nal Mathematics (20 nal Mathematics (20 nal Mathematics (20	als (2009) als (2010) 09) 14) 12)				
 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology ree (1 major) Technology ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Computatio	s (2008) s (2014) s (2012) s (2013) of Functional Materia of Functional Materia nal Mathematics (20 nal Mathematics (20 nal Mathematics (20 nal Mathematics (20 nal Mathematics (20	als (2009) als (2010) 09) 14) 12) 13)				
 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology ree (1 major) Technology ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Computatio	es (2008) es (2014) es (2012) es (2013) of Functional Materia of Functional Materia nal Mathematics (20 nal Mathematics (20 nal Mathematics (20 nal Mathematics (20 Computer Science (20	als (2009) als (2010) 09) 14) 12) 13) 009)				
 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology ree (1 major) Technology ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Aerospace (1	s (2008) (2014) (2012) (2013) (2013) (2007) of Functional Materia of Functional Materia nal Mathematics (20 nal Mathematics (20 nal Mathematics (20 nal Mathematics (20 nal Mathematics (20 Computer Science (20 Computer Science (20 Computer Science (20)	als (2009) als (2010) 09) 14) 12) 13) 009) 014)				
 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg	ars in ree (1 major) Mathematic ree (1 major) Technology ree (1 major) Technology ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Computatio ree (1 major) Aerospace (1 ree (1 major) Aerospace (1	s (2008) (s (2014) (s (2012)) (s (2013)) (of Functional Materia (of Functional Materia (al Mathematics (20) (al Mathematics (20) (al Mathematics (20) (al Mathematics (20) (20) (20) (20) (20) (20) (20) (20)	als (2009) als (2010) 09) 14) 12) 13) 009) 014)				

Module	e title				Abbreviation
Measu	rement	s and Data Analysis			11-PFR-072-m01
Module	e coord	inator		Module offered by	
Manag	ing Dir	ector of the Institute of Ap	plied Physics	Faculty of Physics a	ind Astronomy
ECTS		od of grading	Only after succ. com		
2	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
		, error approximation and oution functions, significa			average values and standard de- lications.
Intende	ed lear	ning outcomes			
		e, the students acquire su error propagation and the			ave knowledge of practical experi-
Course	<b>s</b> (type	, number of weekly conta	ct hours, language –	- if other than Germa	in)
V + Ü (r	no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
ster, in	format exami	ion on whether module ca nation (approx. 120 minu	an be chosen to earn		tion offered — if not every seme-
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Mathematic	s (2008)		
	-	ree (1 major) Mathematic			
	-	ree (1 major) Physics (200			
	-	ree (1 major) Physics (200	•		
	-	ree (1 major) Physics (200		)	
		ree (1 major) Nanostructu			
	-	ree (1 major) Nanostructu ree (1 major) Computatio			
	-	gree (1 major, 1 minor) Ph		09)	
Dachel	oi s ue	gree (1 major, 1 mmor) Pr	$y_{\text{SUCS}}(w_{\text{HIII}}), 2008)$		

Module title Abbreviation							
Practic	al Cour	se			11-PG-IAF-072-m01		
Module	e coord	inator		Module offered by			
Managi	ng Dire	ector of the Institute of	titute of Applied Physics Faculty of Physics and Astronomy				
ECTS		od of grading	Only after succ. compl. of module(s)				
4	<u> </u>	successfully completed					
Duratio		Module level	Other prerequisites				
1 seme		undergraduate	Module 11-PFR recor	nmended.			
Conten							
			lynamics, optics, scien sic measuring methods				
Intende	ed learr	ning outcomes					
are abl	e to ind		kills of physical measur conduct experiments in				
Course	<b>s</b> (type,	, number of weekly cor	ntact hours, language –	- if other than Germa	n)		
BAM): F Klassis Elektriz Wellen Atom- u	P (2 we che Phy itätslel optik (F und Ker	ekly contact hours) ysik (Classical Physics nre und Schaltungen (f Physical Optics, WOP): nphysik (Atomic and N	e und Elektrik (Example , KLP): P (2 weekly cont Electricity and Circuits, P (2 weekly contact ho luclear Physics, AKP): P ters and Measurement	act hours) ELS): P (2 weekly cor urs) (2 weekly contact ho	ntact hours) ours)		
Method	d of ass	essment (type, scope,	language — if other the	an German, examina	tion offered — if not	every seme-	
ster, in	formati	on on whether module	can be chosen to earn	a bonus)			
1. Lab c ly co phys 2. Lab c ly co	course i mplete ics-rela course i mplete	d if a Testat (exam) is p ted contents of the co in part 2: a) Preparing, d if a Testat (exam) is p	sment components performing and evaluat bassed. b) Talk (with di urse (approx. 30 minute performing and evalua bassed. b) Talk (with di urse (approx. 30 minute	scussion) to test the es). ting the experiments scussion) to test the	students' understan will be considered s	nding of the successful-	
Studen nent, th To pass Studen	ts will l ney mus s this m ts mus	be offered one opportu st pass both elements odule, students must t attend BAM, KLP or E	nt components 1 and 2 nity to retake element a a) and b). successfully complete t LS courses prior to atte pass both assessment	a) and/or element b) two out of the six counding WOP, AKP or C	. To pass an assessr Irses. MT courses.	nent compo-	
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	9					
	5 3,50	-					
Referre	d to in	<b>IPOI</b> (examination re	gulations for teaching-o	legree programmes)			
				regree programmes)			
Bacheloric	with 1 mai	or Computational Mathematics	MILWürzburg e g	enerated 26-Aug-2024 • exam	reg data re-	page 119 / 125	
(2009)				ECTS) Computational Mathe	-	puge 119 / 123	

## Module appears in

Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Computational Mathematics (2009)

Module	e title				Abbreviation	
Physics	Physics Laboratory Course for students of Physics Related			Minor Subjects	11-PNNF-062-m01	
Module	Module coordinator Module offered by					
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. com			
3		successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme		undergraduate				
Conten	ts					
Mechar Physics		bration theory, thermody	namics, optics, X-ray	s, nuclear magnetic	resonance, Atomic and Nuclear	
Intende	ed learı	ning outcomes				
The stu	dents l	know the principles of Ph	ysics.			
Course	s (type	, number of weekly conta	ct hours, language –	· if other than Germa	an)	
P (no ir	format	ion on SWS (weekly cont	act hours) and course	e language available	2)	
		· · · · ·			tion offered — if not every seme-	
		on on whether module ca			,	
a) oral	test (ap	prox. 15 minutes) during	experiment and b) u	ngraded written exa	mination (approx. 90 minutes)	
Allocat	ion of p	olaces				
Only as	part o	f pool of general key skill	s (ASQ): 15 places. Pl	laces will be allocate	ed by lot.	
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)		
Module	e appea	irs in				
Bachel	or' deg	ree (1 major) Mathematic	s (2008)			
Bachel	or' deg	ree (1 major) Mathematic	s (2014)			
Bachel	or' deg	ree (1 major) Mathematic	s (2012)			
Bachel	or' deg	ree (1 major) Mathematic	s (2013)			
Bachel	or' deg	ree (1 major) Mathematic	s (2007)			
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	ıls (2009)		
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	lls (2010)		
Bachel	or' deg	ree (1 major) Computatio	nal Mathematics (200	09)		
	-	ree (1 major) Computatio		•		
		ree (1 major) Computatio				
		ree (1 major) Computatio		13)		
	-	ree (1 major) Functional N				
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	lls (2006)		

Module title	9			Abbreviation
Theoretical	Physics 1 (Theoretical Mec	hanics)		11-T1-072-m01
Module coo	rdinator		Module offered by	<u> </u>
Managing D and Astropl	irector of the Institute of Th sysics	neoretical Physics	Faculty of Physics a	and Astronomy
ECTS Me	hod of grading	Only after succ. con	npl. of module(s)	
8 nur	nerical grade			
Duration	Module level	Other prerequisites		
1 semester	undergraduate			
Contents				
Newtonian	mechanics, Lagrangian me	chanics, Hamiltonian	equation of motion,	, conservation laws.
Intended le	arning outcomes			
The studen methods.	s have knowledge of the p	inciples of classical	theoretical mechanic	cs and the required calculation
Courses (ty	pe, number of weekly conta	ict hours, language –	- if other than Germa	in)
V + Ü (no in	formation on SWS (weekly	contact hours) and co	ourse language avail	able)
written examination of a second secon	nformation	tes)		
Module app				
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Physics (2007) Bachelor' degree (1 major) Physics (2009) Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Nanostructure Technology (2008) Bachelor' degree (1 major) Nanostructure Technology (2007) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)				

Module title				Abbreviation
Theoretical P	hysics 2 (Theoretical Ele	ctrostatics and Electi	rodynamics)	11-T2-072-m01
Module coord	dinator		Module offered I	by
Managing Dir and Astrophy	rector of the Institute of T rsics	heoretical Physics	Faculty of Physic	s and Astronomy
ECTS Meth	od of grading	Only after succ. cor	npl. of module(s)	
8 nume	erical grade			
Duration	Module level	Other prerequisites	5	
1 semester	undergraduate			
Contents				
Electrostatics	, magnetostatics, Maxwe	ell equations, covaria	nt formulation, ele	ectrodynamics and matter.
Intended lea	rning outcomes			
The students thods.	have knowledge of the p	rinciples of classical	electrodynamics a	and the required calculation me-
Courses (type	e, number of weekly cont	act hours, language -	– if other than Ger	man)
V + Ü (no info	ormation on SWS (weekly	contact hours) and c	ourse language av	vailable)
	-			
Workload				
Teaching cyc	le			
Referred to in	LPOI (examination reg	ulations for teaching-	degree programm	es)
 Module appe	ars in			
	gree (1 major) Mathemati	cs (2008)		
	gree (1 major) Mathemati			
	gree (1 major) Physics (20	• ·		
	gree (1 major) Physics (20	•		
	gree (1 major) Physics (20			
	gree (1 major) Nanostruct			
	gree (1 major) Nanostruct			
	gree (1 major) Computatio		09)	
Bachelor's de	egree (1 major, 1 minor) P	nysics (Minor, 2008)		

Module title			Abbreviation				
Theoretical	Physics 3 (Theoretical (		11-T3-072-m01				
Module coordinator			Module offered by				
Managing Director of the Institute of Theoretical Physics and Astrophysics			Faculty of Physics and Astronomy				
ECTS Method of grading Only after succ. co			npl. of module(s)				
8 num	erical grade						
Duration	Module level	Other prerequisites	isites				
1 semester	undergraduate						
Contents							
Limits of classical physics, Schrödinger equation, mathematical foundations of quantum mechanics, harmonic oscillator, angular momentum and spin, hydrogen atom, many-particle systems.							
Intended learning outcomes							
The students have knowledge of the principles of quantum mechanics and the required calculation methods.							
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)							
V + Ü (no inf	ormation on SWS (week	(ly contact hours) and co	ourse language avail	able)			
Allocation o		inutes)					
Additional information							
Workload							
Teaching cy	cle						
		aulations for to a him					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)							
 Module ann	ears in						
Module appears in Bachelor' degree (1 major) Mathematics (2008)							
Bachelor' degree (1 major) Mathematics (2008) Bachelor' degree (1 major) Mathematics (2007)							
Bachelor' degree (1 major) Physics (2007)							
Bachelor' degree (1 major) Physics (2009)							
Bachelor' degree (1 major) Physics (2008)							
Bachelor' degree (1 major) Nanostructure Technology (2008)							
Bachelor' degree (1 major) Nanostructure Technology (2007)							
Bachelor' degree (1 major) Computational Mathematics (2009)							
Bachelor's d	Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)						

Module title			Abbreviation				
Theoretical Physics 4 (Theoretical Thermodynamics and Statistics)11-T4-072-m01							
Module coordinator			Module offered by				
Managing Director of the Institute of Theoretical Physics and Astrophysics			Faculty of Physics and Astronomy				
ECTS Meth	od of grading	npl. of module(s)					
8 nume	erical grade						
Duration	Module level	Other prerequisites	r prerequisites				
1 semester	undergraduate						
Contents							
Principles of thermodynamics, fundamental theorems, thermodynamic potentials, principles of statistical me- chanics.							
Intended lear	ning outcomes						
The students have knowledge of the principles of thermodynamics and statistical mechanics and the required calculation methods.							
Courses (type	e, number of weekly conta	ct hours, language –	- if other than Germa	in)			
	rmation on SWS (weekly						
		· · · ·	0 0	tion offered — if not every seme-			
	ion on whether module ca			and oncirca in not every serie			
	nation (approx. 120 minu						
Allocation of							
Additional in	formation	·					
Workload							
workload							
Teaching cyc	le						
Referred to in	LPOI (examination regu	lations for teaching-	degree programmes)				
Module appears in							
Bachelor' degree (1 major) Mathematics (2008)							
Bachelor' degree (1 major) Mathematics (2007)							
Bachelor' degree (1 major) Physics (2007)							
Bachelor' degree (1 major) Physics (2009)							
Bachelor' degree (1 major) Physics (2008)							
Bachelor' degree (1 major) Nanostructure Technology (2008)							
Bachelor' degree (1 major) Nanostructure Technology (2007) Bachelor' degree (1 major) Computational Mathematics (2009)							
	Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)						
Dachelor 5 degree (1 major, 1 mmor) Enysics (1000)							