

Subdivided Module Catalogue for the Subject

Mathematics

as vertieft studiertes Fach (studied with a focus on the scientific discipline) with the degree "Erste Staatsprüfung für das Lehramt an Gymnasien"

> Examination regulations version: 2023 Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Mathematics

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:

LASPO2015

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

31-Jan-2023 (2023-7)

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.

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The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	page
Scientific Discipline (92 B	CTS credits)			
Compulsory Courses (46	6 ECTS credits)			
10-M-MDAL-152-m01	Introduction into Mathematical Thinking and Working for Tea- ching Degree (German Gymnasium)	5	B/NB	36
10-M-LNL-Ü-191-m01	Overview Linear Algebra for Teaching Degree (German Gymna- sium)	13	NUM	35
10-M-ANL-Ü-191-m01	Overview Analysis for Teaching Degree (German Gymnasium)	16	NUM	11
10-M-DFL-Ü-191-m01	Overview Differential Equations and Complex Analysis for Tea- ching Degree (German Gymnasium)	12	NUM	17
Compulsory Electives (4	6 ECTS credits)		1	
Subfield Basics in Line	ar Algebra (5 ECTS credits)			
10-M-LNL1-191-m01	Linear Algebra 1 for Teaching Degree (German Gymnasium)	5	B/NB	33
10-M-LNL2-191-m01	Linear Algebra 2 for Teaching Degree (German Gymnasium)	5	B/NB	34
Subfield Basics in Ana			I	
10-M-ANL1-191-m01	Analysis 1 for Teaching Degree (German Gymnasium)	5	B/NB	9
10-M-ANL2-191-m01	Analysis 2 for Teaching Degree (German Gymnasium)	5	B/NB	10
Subfield Basics in High	her Analysis (5 ECTS credits)		1	
10-M-DGLL-191-m01	Ordinary Differential Equations for Teaching Degree (German Gymnasium)	5	B/NB	19
10-M-FTHL-191-m01	Introductory Complex Analysis for Teaching Degree (German Gymnasium)	5	B/NB	29
Subfield Stochastics a	nd Basics in Algebra and Applied Mathematics (11 ECTS credits)			
	ora and Applied Mathematics (5 ECTS credits)			4
10-M-ALGL-191-m01	Introductory Algebra for Teaching Degree (German Gymnasi- um)	5	B/NB	8
10-M-AALL-191-m01	Applied Algebra for Teaching Degree (German Gymnasium)	5	B/NB	6
10-M-NUL1-191-m01	Numerical Mathematics 1 for Teaching Degree (German Gymna- sium)	5	B/NB	38
Focus Stochastics (6	ECTS credits)			<u>I</u>
10-M-STL-191-m01	Stochastics for Teaching Degree (German Gymnasium)	6	NUM	51
10-M-STOL-191-m01	Stochastics 1 for Teaching Degree (German Gymnasium)	6	NUM	52
Subfield Geometrie (10	ECTS credits)			
10-M-EGEL-191-m01	Elementary Geometry for Teaching Degree (German Gymnasi- um)	10	NUM	27
10-M-DGEL-191-m01	Introductory Differential Geometry for Teaching Degree (Ger- man Gymnasium)	10	NUM	18
10-M-PGEL-191-m01	Introductory Projective Geometry for Teaching Degree (German Gymnasium)	10	NUM	40
Subfield Overview Algo	ebra and Applied Mathematics (10 ECTS credits)		I	I
10-M-AALL-Ü-191-m01	Overview Algebra and Applied Algebra for Teaching Degree	10	NUM	7
10-M-ANUL-Ü-191- m01	Overview Algebra and Numerical Mathematics 1 for Teaching Degree (German Gymnasium)	10	NUM	12
			l	
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Teaching (10 ECTS credit	s)					
Compulsory Courses (10	ECTS credits)					
10-M-DGY1-232-m01	Didactics of Mathematics: Algebra and Analysis (German Gym- nasium)	6	NUM	20		
10-M-DGY2-191-m01	Didactics of Mathematics: Geometry (German Gymnasium)	4	NUM	21		
Paper (4 ECTS credits)						
gy (studienbegleitendes fach Fach (subject studied with a regulations for teaching-degr ECTS credits obtained are co	ing degree Gymnasium must complete a practical training in did didaktisches Praktikum) which refers to one of the subjects they focus on the scientific discipline) pursuant to Section 34 Subsec ee programmes). The obligatory accompanying tutorial is offered unted in the subject Erziehungswissenschaften pursuant to Sect tion regulations for teaching-degree programms).	selected a tion 1 No. 1	as vertieft stud 4 LPO I (examir spective subjec	iertes ation :t. The		
10-M-SFDPGY-152-m01	10-M-SFDPGY-152-m01 Practical Training in Classroom Teaching including Theory (German Gymnasium)					
Teaching degree students mu ject-specific electives) (Section To achieve the required number Freier Bereich interdisciplir nex "Ergänzende Bestimmun Mathematics	ell as subject-specific electives) ust take modules worth a total of 15 ECTS credits in the area Freie on 9 LASPO (general academic and examination regulations for t ber of ECTS credits, students may take any modules from the are nary: The interdisciplinary additional offer for a teaching degree of gen für den "Freien Bereich" im Rahmen des Studiums für ein Le well as subject-specific electives) subject specific)	eaching-de as below. an be four	egree program	nes)).		
Module group Mathematic	s and Didactics of Mathematics					
10-M-SCH-152-m01	School Mathematics from a Higher Perspective	5	B/NB	47		
10-M-DCMU-152-m01	Computers in Mathematical Teaching	3	B/NB	15		
10-M-PRM1-152-m01	Introduction to Hands-on Mathematics	3	B/NB	44		
10-M-PRM2-152-m01	Practical Course Hands-on Mathematics	3	B/NB	45		
10-M-PRA-152-m01	Hands-on Seminar Mathematics	3	B/NB	41		
10-M-GES-152-m01	Selected Topics in History of Mathematics	5	B/NB	30		
10-M-MSC-152-m01	Mathematical Writing	5	B/NB	37		
10-M-SEM-152-m01	Seminar Mathematics	5	NUM	49		
10-M-COM-152-m01	Computational Mathematics	4	B/NB	13		
10-M-PRG-152-m01	Programming course for students of Mathematics and other subjects	3	B/NB	42		
10-M-TuKo-152-m01	Exercise tutor or proof-reading in Mathematics	5	B/NB	53		
10-M-FAN-152-m01	Introduction to Functional Analysis	9	B/NB	28		
10-M-ORS-152-m01	Operations Research	9	B/NB	39		
10-M-DVGY-191-m01	Advanced Didactics of Mathematics (German Gymnasium)	2	B/NB	24		
10-M-REPL-191-m01	Review Course for Teaching Degree (German Gymnasium)	3	B/NB	46		
10-M-KRY-232-m01	Mathematical Aspects of Modern Cryptography	5	B/NB	32		
10-M-DGYSTO-232-m01	Didactics of Mathematics: Stochastics	3	B/NB	23		
10-M-DGYAGE-232-m01	Didactics of Mathematics: Analytic Geometry	3	B/NB	22		
Module group Virtual Cour			I			
	E-Learning and Blended Learning in Mathematical Teaching		D /::-			
10-M-DVHB-152-m01	(virtual Course)	3	B/NB	25		
10-M-VHBAri-152-m01	Basics in Arithmetics (virtual course)		B/NB	55		
10-M-VHBGeo-152-mo1	Basics in School Geometry (virtual course)	2	B/NB	68		
10-M-VHBSto-152-mo1	Stochastics in Sekundarstufe I (virtual course)	2	B/NB	80		
10-M-VHBM10-152-m01	Mathematics in grade 10 (virtual course)	2	B/NB	71		
10-M-VHBDG-191-m01	School Mathematics from a Didactical Point of View: Geometry online (virtual course)	2	B/NB	61		
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10-M-VHBDAL-191-m01	School Mathematics from a Didactical Point of View: Algebra online (virtual course)	2	B/NB	59
10-M-VHBDAN-191-m01	School Mathematics from a Didactical Point of View: Analysis online (virtual course)	2	B/NB	60
10-M-VHBDST-191-m01	Didactics of Stochastics (virtual course)	2	B/NB	63
10-M-VHBEx-191-m01	Exam Tutorial Didactics of Mathematics (virtual course)	3	B/NB	64
10-M-VHBExA-191-m01	Exam Tutorial Algebra (virtual course)	3	B/NB	65
10-M-VHBMa1-152-m01	Mathematics 1 (virtual course)	2	B/NB	73
10-M-VHBMa2-152-m01	Mathematics 2 (virtual course)	2	B/NB	75
10-M-VHBCom-152-m01	Computer and Mathematics (virtual course)	2	B/NB	58
10-M-VHBBr-152-m01	Start-up Tutorial Mathematics (virtual course)	2	B/NB	57
10-M-VHBFT-191-m01	Exam Tutorial Complex Analysis (virtual course)	3	B/NB	66
10-M-VHBDGL-191-m01	Exam Tutorial Ordinary Differential Equations (virtual course)	3	B/NB	62
10-M-VHBHM-191-m01	History of Mathematics (virtual course)	5	B/NB	70
10-M-VHBMa3-232-m01	Mathematics 3 (virtual course)	3	B/NB	77
10-M-VHBMa4-232-m01	Mathematics 4 (virtual course)	3	B/NB	78
10-M-VHBZGA-232-m01	Accesses to the Foundations of Analysis (virtual course)	2	B/NB	82
10-M-VHBMM-232-m01	Mathematical Modelling (virtual course)	3	B/NB	79
10-M-VHBGAH-232-m01	Fundamentals of Applied University Mathematics (virtual cour- se)	5	B/NB	67
teaching-degree programmes State Examination). In accorc um may write this thesis in o scientific discipline) or in the	arbeit (thesis) in accordance with the provisions of Section 29 L b) is a prerequisite for teaching degree students to be admitted to lance with the provisions of Section 29 LPO I, students studying ne of the subjects they selected as vertieft studiertes Fach (subje subject Erziehungswissenschaften (Educational Science). Pursu ay also choose to write an interdisciplinary thesis.	o the Erste for a teach ect studied	Staatsprüfung ing degree Gyn with a focus o	(First nnasi- n the

Julius-Maximilians-UNIVERSITÄT WÜRZBURG

10-M-HMGY-152-m01	Thesis in Mathematics (Teaching Degree at German Gymnasi- um)	10	NUM	31	
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Applie	Module title				Abbreviation		
Applied Algebra for Teaching Degree (German Gymnasium)			German Gymnasium)		10-M-AALL-191-m01		
Module	e coord	inator		Module offered by	<u> </u>		
Dean o	of Studi	es Mathematik (Mathem	atics)	Institute of Mather	natics		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
5	(not)	successfully completed					
Duratio	on	Module level	Other prerequisites	j			
1 seme	ster	undergraduate					
Conten	nts						
theory,	, solvat	l theory (particularly alge pility of equations, cyclot of algebra and number th	omic fields, finite fiel	ds).	s constructions, basics in Galois computer algebra).		
Intende	ed lear	ning outcomes					
	uainted				ebra and its applications. He/Sh ndamental proof methods inde-		
Course	s (type	, number of weekly conta	act hours, language –	– if other than Germa	an)		
Ü (2)							
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-		
(15 to 3	30 minu age of a	utes) or c) oral examinations or c) oral examinations or c) oral examinations of the second sec	on in groups (groups		kamination of one candidate each es per candidate)		
Allocat	tion of	places					
Allocat	tion of	places					
		places					
	onal inf						
 Additio	onal inf						
 Additio Worklo 150 h	onal inf oad	ormation					
 Additio Worklo	onal inf oad	ormation					
 Additio Worklo 150 h Teachin 	onal inf oad ng cycl	ormation	lations for teaching.	degree programmes			
 Additio 150 h Teachin Referre	onal inf oad ng cycl	ormation e LPOI (examination regu	lations for teaching-o	degree programmes)		
 Additio 150 h Teachin Referre § 73 N	onal inf oad ng cycl ed to in	e LPOI (examination regu	lations for teaching-0	degree programmes)		
 Additio 150 h Teachin Referre § 73 N Module	onal inf oad ng cycl ed to in √r. 2 (2 e appea	e LPOI (examination regu					

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Module	e title				Abbreviation	
		bra and Applied Algebra	for Teaching Degree	(German Gymnasi-	10-M-AALL-Ü-191-m01	
um)	•					
Module	e coord	inator		Module offered by		
Dean o	Dean of Studies Mathematik (Mathematics)			Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade		•		
Duratio	on	Module level	Other prerequisites			
2 seme	ster	undergraduate				
Conten	ts					
phism	theorer				b- and factorgroups, isomor- ic groups, alternating and sym-	
Topics	in ring	theory (particularly ideals	s, divisibility, polynor	mial rings, irreducibi	lity of polynomials).	
		ber theory (particularly E em, residue class rings a			m, Euler's theorem, Chinese re- ngs).	
		theory (particularly algel ility of equations, cycloto			constructions, basics in Galois	
Applica	ations o	f algebra and number th	eory (e.g., coding the	ory, cryptography, co	omputer algebra).	
Intende	ed learr	ning outcomes				
thods,	so that		c notions of algebra a		working as well as of proof me- and can apply them to elementary	
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (4) +	V (4) +	Ü (2)				
		e ssment (type, scope, la on on whether module ca			tion offered — if not every seme-	
Langua	ige of a	on of one candidate each ssessment: German and,	or English			
		ill have reference to the	contents of modules	10-M-ALGL und 10-M	I-AALL	
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
300 h						
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)		
§731N	lr. 2 (5 l	_P), § 73 Nr. 5 (5 LP)				
Module						
First sta	ate exa	mination for the teaching mination for the teaching				
		-		-		

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Modul					Abbreviation
Introdu	uctory A	Algebra for Teaching Deg	ree (German Gymnas	sium)	10-M-ALGL-191-m01
Module	e coord	inator		Module offered by	•
Dean of Studies Mathematik (Mathemati		atics)	Institute of Mathen	natics	
ECTS		od of grading	Only after succ. com	npl. of module(s)	
5 (not) successfully completed					
Duratio		Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
phism metric Topics Topics mainde Intende The stu the cer Course Ü (2) Metho ster, in a) writt	theoren groups in ring in num er theor ed lear udent k ntral co es (type d of ass formation	ms, solvability, group ope , dihedral groups). theory (particularly ideal ber theory (particularly ideal rem, residue class rings a ning outcomes nows and masters the es ncepts in this field, and i , number of weekly conta sessment (type, scope, la ion on whether module comination (approx. 90 to 1	erations, Sylow theore s, divisibility, polynor uclidean algorithm, F and their unit groups, sential methods and s able to apply the fu ct hours, language — inguage — if other tha an be chosen to earn 80 minutes, usually o	ems; examples: cycl mial rings, irreducib ermat's little theore quadratic number r basic notions in alg ndamental proof me - if other than Germa an German, examina a bonus) chosen) or b) oral ex	m, Euler's theorem, Chinese re- ings). gebra. He/She is acquainted with ethods independently. an) ation offered — if not every seme- camination of one candidate eacl
Langua		ites) or c) oral examinatic ssessment: German and bonus		of 2, 10 to 15 minute	s per candidate)
Allocat	ion of _l	places			
Additio	onal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-c	degree programmes))
\$73 N	lr. 2 (2	LP), § 73 Nr. 5 (3 LP)			
Modul	e appea	ars in			
		mination for the teaching			
First st	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2022))

Modul					Abbreviation
Analys	is 1 for	Teaching Degree (Germa	n Gymnasium)		10-M-ANL1-191-m01
Modul	e coord	inator		Module offered by	1
Dean of Studies Mathematik (Mathematics)		atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. compl. of module(s)		
5	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conten	nts				
ries; po	ower se		sics in differential ca		livergence of sequences and se- le; basics of integral calculus in
Intend	ed lear	ning outcomes			
central	proof	methods in analysis and	can employ them to s	olve easy problems	He/She is acquainted with the . He/she is able to perform easy ts precisely and clearly in written
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
Ü (2)					
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme
exercis	ses eac			n exercises (approx.	10 exercise sheets with approx.
Allocat	tion of	places			
Additic	onal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cvcl	e			
	0.9				
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
§731N					
_	e appea	ars in			
		mination for the teaching			
			r degree (vmnasium)	Mathematics (2010)	

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Modul	Module title Abbreviation				
Analys	sis 2 for	Teaching Degree (Germa	ın Gymnasium)		10-M-ANL2-191-m01
Modul	e coord	linator		Module offered by	
Dean c	of Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	(not)	successfully completed			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
		ogical considerations, bas on theorem.	sics in differential cal	culus in several vari	ables, inverse function theorem,
Intend	led lear	ning outcomes			
centra	l proof i	methods in analysis and	can employ them to s	solve easy problems	He/She is acquainted with the . He/she is able to perform easy ts precisely and clearly in written
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
Ü (2)					
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-
exercis	ses eac			n exercises (approx.	10 exercise sheets with approx. 4
	tion of				
Additio	onal inf	ormation			
Worklo	oad				
150 h					
-	ing cycl	e			
		-			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§7311					
	e appea	ars in			
First st	tate exa	mination for the teaching mination for the teaching		-	

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Modul	e title				Abbreviation
Overvi	ew Ana	lysis for Teaching Degre	e (German Gymnasiu	m)	10-M-ANL-Ü-191-m01
Modul	e coord	inator		Module offered	l by
Dean c	of Studi	es Mathematik (Mathem	atics)	Institute of Ma	thematics
ECTS	Meth	od of grading	Only after succ. com	pl. of module(s)
16	nume	rical grade			
Durati	on	Module level	Other prerequisites		
2 seme	ester	undergraduate			
Conter	nts				
ries, di	ifferent		in one variable, furthe		nd divergence of sequences and se- nsiderations, differential calculus
Intend	ed lear	ning outcomes			
lytic ba ten an	ackgrou d oral fo	ind and geometric interport.	retation, and can inte	rconnect them a	s and concepts of analysis, their and and express them adequately in writ
		, number of weekly conta	act hours, language —	- if other than G	erman)
V (4) +	V (4) +	Ü (2)			
		sessment (type, scope, la ion on whether module c			mination offered — if not every seme
Langua	age of a	ion of one candidate eac ssessment: German and vill have reference to the	/or English	10-M-ANL1 und	10-M-ANL2
Alloca	tion of	places			
Additio	onal inf	ormation			
Worklo	oad				
480 h					
	ng cycl	e			
Referre	ed to in	LPOI (examination regu	llations for teaching-o	degree program	mes)
§7311	-				
	e appea	ars in			
First st	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2	019)

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Module					Abbreviation
	-	bra and Numerical Math	ematics 1 for Teaching	g Degree (German	10-M-ANUL-Ü-191-m01
Gymna					
Module coordinator				Module offered by	
	f Studie	es Mathematik (Mathema	I	Institute of Mathem	natics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
10	L	rical grade			
Duratio		Module level	Other prerequisites		
2 seme		undergraduate	-		
Conten					
phism	theorer				ib- and factorgroups, isomor- ic groups, alternating and sym-
Topics	in ring	theory (particularly ideals	s, divisibility, polynon	nial rings, irreducibi	ility of polynomials).
		ber theory (particularly E em, residue class rings a			m, Euler's theorem, Chinese re- ings).
	ons and	l systems of equations, in			urve fitting problems, nonlinear nd trigonometric functions, nume
Intende	ed learı	ning outcomes			
She is a ders of	able to differe	relate these concepts wi nt branches in mathemat	th one another, and re tics.	ealises the advantag	and numerical mathematics. He/ ges of thinking across the bor-
		, number of weekly conta	ct hours, language —	if other than Germa	in)
V (4) +	V (4) +	Ü (2)			
		essment (type, scope, la on on whether module ca			tion offered — if not every seme
Langua	ge of a	ion of one candidate eac ssessment: German and, rill have reference to the	or English	.o-M-ALGL und 10-N	1-NUL1
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
300 h					
Teachi		9			
	Scyce	0			
Referre	d to in	LPO I (examination regu	lations for teaching-d	egree programmes)	
§731N	lr. 2 (5	LP), § 73 Nr. 5 (5 LP)			
Module	e appea	urs in			
			g degree Gymnasium N	Mathematics (2019)	
	First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)				

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				Abbreviation					
Computation	al Mathematics			10-M-COM-152-m01					
Madula asaw	lington		Madula offered by						
Module coord			Module offered by						
	es Mathematik (Mathem	<u>,</u>							
	od of grading	Only after succ. con	Only after succ. compl. of module(s)						
, , ,	successfully completed								
Duration	Module level	Other prerequisites							
1 semester	undergraduate								
Contents									
Introduction to modern mathematical software for symbolic computation (e. g. Mathematica or Maple) and nu- merical computation (e. g. Matlab) to supplement the basic modules in analysis and linear algebra (10-M-ANA-G and 10-M-LNA-G). Computer-based solution of problems in linear algebra, geometry, analysis, in particular diffe- rential and integral calculus; visualisation of functions.									
Intended lear	ning outcomes								
	earns the use of advance cation to solve mathem		cal software package	es, and is able to ass	ess their				
Courses (type	, number of weekly cont	act hours, language –	- if other than Germa	n)					
V (1) + Ü (2)									
Method of as	sessment (type, scope,	anguage — if other th	an German, examina	tion offered — if not	every seme-				
	ion on whether module				,				
	form of programming ex		25 hours)						
	offered: Once a year, win								
	ssessment: German and	l/or English							
Allocation of	places								
		_							
Additional in	ormation								
Workload									
120 h					Workload				
120 h									
	e	_							
Teaching cyc	e								
Teaching cyc		ulations for teaching.	lagraa programmes)						
Teaching cyc Referred to ir	e LPOI (examination reg	ulations for teaching-o	legree programmes)						
Teaching cyc Referred to ir § 22 II Nr. 3 f)	LPOI (examination reg	ulations for teaching-o	degree programmes)						
Teaching cyc Referred to ir § 22 Nr. 3 f) Module appe	LPOI (examination reg		degree programmes)						
Teaching cyc Referred to ir § 22 II Nr. 3 f) Module appe Bachelor' deg	LPOI (examination reg ars in gree (1 major) Mathemati	cs (2015)	degree programmes)						
Teaching cyc Referred to ir § 22 II Nr. 3 f) Module appe Bachelor' deg Bachelor' deg	LPO I (examination reg ars in gree (1 major) Mathemati gree (1 major) Physics (20	cs (2015) 015)							
Teaching cyc Referred to ir § 22 II Nr. 3 f) Module appe Bachelor' deg Bachelor' deg Bachelor' deg	LPO I (examination reg ars in gree (1 major) Mathemati gree (1 major) Physics (20 gree (1 major) Nanostruct	cs (2015) 015) :ure Technology (2015)							
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Bachelor' degree (1 major) Mathematical Physics (2020) Bachelor' degree (1 major) Functional Materials (2021) Bachelor' degree (1 major) Quantum Technology (2021) Bachelor' degree (1 major) Economathematics (2021) Bachelor' degree (1 major) Economathematics (2022) Bachelor' degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor' degree (1 major) Mathematics (2023) Bachelor' degree (1 major) Mathematics (2023) Bachelor' degree (1 major) Economathematics (2023) Bachelor' degree (1 major) Economathematics (2024) Bachelor' degree (1 major) Economathematics (2024)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 14 / 82
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Module	e title				Abbreviation	
Compu	iters in Mathen	natical Teaching			10-M-DCMU-152-m	01
Modula	e coordinator			Modulo offered by		
		omotile (Mother	(action)	Module offered by	ation	
ECTS		ematik (Mathem	-	Institute of Mathem	latics	
3	Method of gra	fully completed	Only after succ. con			
Duratio	1 · · · · · · · · · · · · · · · · · · ·	, ,	Other prerequisites			
1 seme		graduate				
Conten	¥					
Discussion of possible ways to use computers in teaching mathematics as well as discussion of common com-						
puter to	ools.					
Intende	ed learning out	tcomes				
	,		possibilities for the en limitations of comput		ters in the teaching	of mathema-
Course	es (type, numbe	er of weekly cont	act hours, language –	· if other than Germa	n)	
V (2)						
			anguage — if other th		tion offered — if not	every seme-
			can be chosen to earn	a bonus)		
	t (10 to 15 page sment offered: I		winter semester			
	tion of places					
Additio	onal informatio	n				
Worklo	ad					
90 h						
Teachi	ng cycle					
Referre	ed to in LPO I(examination reg	ulations for teaching-	legree programmes)		
§ 22						
§ 22	Nr. 1 h					
§ 22						
	e appears in					
			g degree Realschule A			
			g degree Gymnasium			
First sta (2015)	ate examinatio	n for the teachir	g degree Sonderpäda	gogik Didactics in M	athematics (Middle	School)
	ate examinatio	n for the teachir	g degree Mittelschule	Mathematics (2015)		
						ol) (2015)
First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015) First state examination for the teaching degree Gymnasium Mathematics (2019)						
First state examination for the teaching degree Mittelschule Mathematics (2020 (Prüfungsordnungsversion 2015))						
First sta	First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))					
		-	g degree Sonderpäda	gogik Didactics in M	athematics (Middle	School)
(2020 ((Prüfungsordnı	ungsversion 201 athematics (202	5))			
			<i></i>			
LA Gymnas	sien Mathematics (20	23)	-	• generated 30-Mär-2024 • e ehramt Gymnasien Mathemat	-	page 15 / 82
				,		



First state examination for the teaching degree Gymnasium Mathematics (2023)

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	data record Lehramt Gymnasien Mathematik - 2023	

a numerical grade buration Module level Other prerequisites semester undergraduate contents complex differentiability and Cauchy-Riemann differential equations, path integrals and Cauchy integral theo- ems, isolated singularities, meromorphic functions and Laurent series, residue theorem and applications, We rstraß product theorem and theorem of Mittag-Leffler, conformal maps; existence and uniqueness theorem, ontinuous dependence of solutions on initial values, systems of linear differential equations, matrix exponen l series, linear differential equations of higher order. thended learning outcomes he student is acquainted with fundamental concepts and methods in complex analysis and the theory of ordi ary differential equations. He/She is able to relate these concepts with one another, and realises the advanta es of thinking across the borders of different branches in mathematics. iourses (type, number of weekly contact hours, language — if other than German) ((a) + V (a) + Ü (2) Alethod of assessment (type, scope, language — if other than German, examination offered — if not every sem ter, information on whether module can be chosen to earn a bonus) rate examination of one candidate each (20 to 40 minutes) anguage of assessment: German and/or English ussessment will have reference to the contents of modules 10-M-DGLL und 10-M-FTHL Ulccation of places	Modul					Abbreviation
Indule coordinator Module offered by ican of Studies Mathematik (Mathematics) Institute of Mathematics CTS Method of grading Only after succ. compl. of module(s) a numerical grade - uration Module level Other prerequisites semester undergraduate iontents omplex differentiability and Cauchy-Riemann differential equations, path integrals and Cauchy integral theo- ems, isolated singularities, meromorphic functions and Laurent series, residue theorem and applications, We ristraß product theorem and theorem of Mittag-Leffler, conformal maps; existence and uniqueness theorem, ontinuous dependence of solutions on initial values, systems of linear differential equations, matrix exponen l series, linear differential equations of higher order. theded learning outcomes he student is acquainted with fundamental concepts and methods in complex analysis and the theory of ordi ary differential equations. He/She is able to relate these concepts with one another, and realises the advanta es of thinking across the borders of different branches in mathematics. ourses (type, number of weekly contact hours, language — if other than German) '(a) + V (a) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every sem ter, information on whether module can be chosen to e	Overvi	iew Diff	erential Equations and Co	omplex Analysis for 1	Feaching Degree	10-M-DFL-Ü-191-m01
rean of Studies Mathematik (Mathematics) Institute of Mathematics CTS Method of grading Only after succ. compl. of module(s) a numerical grade variation Module level Other prerequisites semester undergraduate contents contents contents continuous dependence of solutions on initial values, systems of linear differential equations, matrix exponen Iseries, linear differential equations on initial values, systems of linear differential equations, matrix exponen l series, linear differential equations of higher order. tended learning outcomes he student is acquainted with fundamental concepts and methods in complex analysis and the theory of ordi ary differential equations, He/She is able to relate these concepts with one another, and realises the advanta es of thinking across the borders of different branches in mathematics. courses (type, number of weekly contact hours, language — if other than German) (4) + V (4) + Ü (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every sem ter, information on whether module can be chosen to earn a bonus)		-				
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ems, isolated singularities, meromorphic functions and Laurent series, residue theorem and applications, We rstraß product theorem and theorem of Mittag-Leffler, conformal maps; existence and uniqueness theorem, ontinuous dependence of solutions on initial values, systems of linear differential equations, matrix exponen l series, linear differential equations of higher order. Intended learning outcomes the student is acquainted with fundamental concepts and methods in complex analysis and the theory of ordi ary differential equations. He/She is able to relate these concepts with one another, and realises the advanta es of thinking across the borders of different branches in mathematics. Jourses (type, number of weekly contact hours, language — if other than German) (4) + V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every sem ter, information on whether module can be chosen to earn a bonus) ral examination of one candidate each (20 to 40 minutes) anguage of assessment: German and/or English assessment will have reference to the contents of modules 10-M-DGLL und 10-M-FTHL Lilocation of places Vorkload 60 h eaching cycle Liferent to in LPO 1 (examination regulations for teaching-degree programmes) 73 l Nr. 1 Module appears in irst state examination for the teaching degree Gymnasium Mathematics (2019)	Conte	nts				
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ter, information on whether module can be chosen to earn a bonus) ral examination of one candidate each (20 to 40 minutes) anguage of assessment: German and/or English assessment will have reference to the contents of modules 10-M-DGLL und 10-M-FTHL allocation of places						
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Vorkload 60 h feaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) 73 Nr. 1 Module appears in irst state examination for the teaching degree Gymnasium Mathematics (2019)						
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60 h eaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) 73 Nr. 1 Module appears in irst state examination for the teaching degree Gymnasium Mathematics (2019)	Workle	oad				
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Referred to in LPO I (examination regulations for teaching-degree programmes) 73 Nr. 1 Module appears in irst state examination for the teaching degree Gymnasium Mathematics (2019)	-		۵			
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irst state examination for the teaching degree Gymnasium Mathematics (2019)			are in			
				dogroo Cumposium	Mathamatics (acts)	
irst state examination for the teaching degree Gymnasium Mathematics (2023)			-		-	

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	data record Lehramt Gymnasien Mathematik - 2023	

Introdu	e title				Abbreviation
Introductory Differential Geometry for Teaching Degree (G				erman Gymnasium)	10-M-DGEL-191-m01
Module	e coord	linator		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)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	nts				
particu	ılar) in I		ture of hypersurfaces,		bmanifolds (hypersurfaces in es, main theorem on local sur-
Intend	ed lear	ning outcomes			
	ed with				erential geometry. He/She is ac- ental proof methods indepen-
Course	s (type	, number of weekly cont	act hours, language –	- if other than Germa	in)
V (4) +	Ü (2)				
ster, in		sessment (type, scope, l ion on whether module o			tion offered — if not every seme
30 min Langua Assess quent s	utes) o age of a sment o semest	r c) oral examination in ssessment: German and offered: Only when annot er	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	e candidate each (approx. 15 to candidate) es are offered and in the subse-
30 min Langua Assess quent s credita	utes) o age of a sment o semest ible for	r c) oral examination in s assessment: German and offered: Only when annot er bonus	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s	utes) o age of a sment o semest ible for	r c) oral examination in s assessment: German and offered: Only when annot er bonus	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat	utes) o age of a sment o semest ble for t ion of [or c) oral examination in subsessment: German and offered: Only when annoter bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat	utes) o age of a sment o semest ble for t ion of [r c) oral examination in s assessment: German and offered: Only when annot er bonus	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat	utes) o age of a sment o semest ble for t ion of [or c) oral examination in subsessment: German and offered: Only when annoter bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat	utes) o age of a sment o semest ble for tion of p	or c) oral examination in subsessment: German and offered: Only when annoter bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat Additio	utes) o age of a sment o semest ble for tion of p	or c) oral examination in subsessment: German and offered: Only when annoter bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat Additio Worklo	utes) o age of a sment o semest ble for tion of p onal inf	or c) oral examination in subsessment: German and offered: Only when annouser bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat Additio Worklo 300 h	utes) o age of a sment o semest ble for tion of p onal inf	or c) oral examination in subsessment: German and offered: Only when annouser bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English	al examination of one o to 15 minutes per c	candidate)
30 min Langua Assess quent s credita Allocat Worklo 300 h Teachin 	utes) o age of a sment o semest ble for tion of pnal inf pad	or c) oral examination in subsessment: German and offered: Only when annouser bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English unced in the semester	al examination of one o to 15 minutes per o r in which the course	candidate)
30 min Langua Assess quent s credita Allocat Additio 300 h Teachin Referre	utes) o age of a sment o semest ble for tion of onal inf oad ng cycl	er c) oral examination in subsessment: German and offered: Only when annoteer bonus places	180 minutes) or b) ora groups (groups of 2, 1 l/or English unced in the semester	al examination of one o to 15 minutes per o r in which the course	candidate)
30 min Langua Assess quent s credita Allocat Worklo 300 h Teachin Referre § 73 l N	utes) o age of a sment o semest ble for tion of p onal inf onal inf oad ng cycl	er c) oral examination in g assessment: German and offered: Only when annot er bonus places formation	180 minutes) or b) ora groups (groups of 2, 1 l/or English unced in the semester	al examination of one o to 15 minutes per o r in which the course	candidate)
30 min Langua Assess quent s credita Allocat Additio 300 h Teachin Referre § 73 N Module	utes) o age of a sment o semest ble for tion of p onal inf onal inf oad ng cycl ed to in vr. 4 e appea	er c) oral examination in g assessment: German and offered: Only when annot er bonus places formation	180 minutes) or b) ora groups (groups of 2, 1 l/or English unced in the semester ulations for teaching-o	al examination of one o to 15 minutes per o r in which the course degree programmes)	candidate) es are offered and in the subse-

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	data record Lehramt Gymnasien Mathematik - 2023	

Module title Abbreviation					Abbreviation
Ordina	ry Diffe	erential Equations for Tea	ching Degree (Germa	n Gymnasium)	10-M-DGLL-191-m01
Module coordinator /				Module offered by	y
Dean of	f Studi	es Mathematik (Mathema	atics)	Institute of Mathe	matics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
		uniqueness theorem; co tions, matrix exponentia			nitial values, systems of linear dif- higher order.
		ning outcomes			
		s acquainted with the fun e/she is able to apply the			theory of ordinary differential
Course	s (type	, number of weekly conta	ict hours, language —	if other than Germ	nan)
Ü (2)					
		sessment (type, scope, la ion on whether module c			nation offered — if not every seme-
(15 to 3	o minu ige of a	ites) or c) oral examinations or c) oral examinations or c) oral examinations of the second sec	on in groups (groups o		examination of one candidate each res per candidate)
Allocat	ion of _l	places			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ng cycl	e			
			-		
Referre	ed to in	LPOI (examination regu	llations for teaching-d	egree programme	s)
		LPOI (examination regu	llations for teaching-d	egree programme	s)
Referre § 73 N Module	lr. 1		llations for teaching-d	egree programme	s)

LA Gymnasien Mathematics (2023)	JMU Würzburg ● generated 30-Mär-2024 ● exam. reg.	page 19 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module	e title				Abbreviation
Didacti	ics of N	lathematics: Algebra an	d Analysis (German G	ymnasium)	10-M-DGY1-232-m01
Module	e coord	inator		Module offered by	<u> </u>
Dean o	f Studi	es Mathematik (Mathem	natics)	Institute of Mather	natics
ECTS	Methe	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
2 seme	ester	undergraduate			
Conten	ts				
kundar	rstufe I)		rstufe II) as well as dis		the examples of algebra (Se- ties of implementation in the
Intende	ed lear	ning outcomes			
ceptior matics,	n of ma , maste	thematical topics, He/S rs different strategies fo	he knows different as r teaching and learnin	pects of planning ar ng und can assess tl	
		, number of weekly cont	act hours, language –	- If other than Germa	an)
		V (2) + Ü (2)			
		sessment (type, scope, l ion on whether module			ation offered — if not every seme-
cises e didacti	ach fro cs of a age of a	m the didactics of algeb nalysis) ssessment: German and	ra and approx. 10 exe		ercise sheets with approx. 3 exer- prox. 3 exercises each from the
Allocat	ion of	olaces			
Additio	onal inf	ormation			
Worklo	ad				
180 h			-		
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination reg	ulations for teaching-	degree programmes)
§731N	-				
Module		ars in			

LA Gymnasien Mathematics (2023)	JMU Würzburg ● generated 30-Mär-2024 ● exam. reg.	page 20 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Modul	e title				Abbreviation
Didact	ics of N	lathematics: Geomet	ry (German Gymnasium)		10-M-DGY2-191-m01
Modul	e coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)			ematics)	Institute of Mather	natics
ECTS		od of grading	Only after succ. con	npl. of module(s)	
4	nume	rical grade			
Duratio	on	Module level	Other prerequisites	i	
1 seme	ester	undergraduate			
Conter	nts				
	as wel				example of geometry (Sekundar- n, also including modern techno-
Intend	ed lear	ning outcomes			
field of topics, strateg	f geome He/Sh gies for	etry in Sekundarstufe e knows important as teaching and learning	I) and is able to take into pects of planning and a gund can assess them.	o account the studer nalysing teaching of	ng techniques (in particular in the nts'perception of mathematical mathematics, masters different
		, number of weekly co	ontact hours, language –	- if other than Germa	an)
V (2) +					
			e, language — if other th le can be chosen to earn		ation offered — if not every seme-
nutes) Langua	or c) or	al examination in gro ssessment: German a	ups (groups of 2, 10 to 1		e candidate each (approx. 30 mi- date)
Allocat	tion of _l	olaces			
Additio	onal inf	ormation			
Worklo	bad				
120 h					
	ng cycl	e			
Referre	ed to in	LPOI (examination r	egulations for teaching-	degree programmes)
§731N					
	e appea	ars in			
			hing degree Gymnasium	Mathematics (2010)
		gram Mathematics (20		······································	
First st	ate exa	mination for the teacl	hing degree Gymnasium	Mathematics (2023)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 21 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module title				Abbreviation	
Didacti	Didactics of Mathematics: Analytic Geometry				10-M-DGYAGE-232-m01
Module	e coord	inator		Module offered by	
				Institute of Mathem	natics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme					
Conten	ts				
Intende	ed learı	ning outcomes			
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	in)
V (2)					
ster, in	formati	sessment (type, scope, la on on whether module ca nination (approx. 60 to 9	an be chosen to earn	a bonus)	tion offered — if not every seme-
b) oral c) oral	examin examin ment o semeste	ation of one candidate e ation in groups (groups c ffered: Only when annou er	ach (15 to 20 minutes of 2, approx. 10 minut	s) or tes per candidate)	s are offered and in the subse-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cycl	e			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22	Nr. 3 f)				
Module	e appea	irs in			
exchan	ge prog	gram Mathematics (2023))		
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2023)	

Module title				Abbreviation	
Didactics of Mathematics: Stochastics					10-M-DGYSTO-232-m01
Module	e coord	inator		Module offered by	
				Institute of Mathem	atics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio		Module level	Other prerequisites		
1 seme	ster				
Conten	ts				
Intende	ed learı	ning outcomes			
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (2)					
ster, in	formati	on on whether module ca	an be chosen to earn	a bonus)	tion offered — if not every seme-
b) oral c) oral (examin examin ment o semesto	er	ach (15 to 20 minutes of 2, approx. 10 minut	s) or es per candidate)	s are offered and in the subse-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachir	ng cycl	9			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22	Nr. 3 f)				
Module	e appea	in in			
		gram Mathematics (2023)			
First sta	First state examination for the teaching degree Gymnasium Mathematics (2023)				

Modul	e title				Abbreviation
Advan	ced Did	actics of Mathematics (G	erman Gymnasium)		10-M-DVGY-191-m01
Modul	Module coordinator			Module offered by	<u> </u>
Dean c	of Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
2	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
lar mat	themat		analyses, contempo		unt different aspects, in particu- mathematics didactics as well as
Intend	ed lear	ning outcomes			
		able to discuss central to sidering subject-specific,			cs in high school (German Gym-
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
S (2)					
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
Langua	age of a	60 minutes) Issessment: German Iffered: Once a year, sumi	mer term		
	tion of	· · · · · · · · · · · · · · · · · · ·			
Additio	onal inf	ormation			
Worklo	oad				
60 h					
	ing cycl	e			
	0.,.				
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
§ 22	-				
	e appea	ars in			
First st exchar	ate exa	mination for the teaching gram Mathematics (2023))	-	
First st	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2023)	

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	data record Lehramt Gymnasien Mathematik - 2023	

Module				Abbreviation	
E-Learr	ning and Blended Learning in	n Mathematical Teaching	g (virtual Course)	10-M-DVHB-152-mc)1
Module	e coordinator		Module offered by		
				latics	
ECTSMethod of gradingOnly after succ. compl. of module(s)3(not) successfully completed					
3					
Duratio		Other prerequisites			
1 seme					
Conten					
	urse offered by Virtuelle Hoc ques in e-learning and blend			acquainted with and	reflects on
Intend	ed learning outcomes				
	udent is acquainted with bas their potentials and limitation		and blended learning	ng in teaching methe	ematics, as
Course	es (type, number of weekly co	ontact hours, language –	- if other than Germa	ın)	
Ü (2)					
• •	e type: eLearning, mostly Virt	uelle Hochschule Bayern	(vhb)		
	d of assessment (type, scope formation on whether modu			ition offered — if not	every seme-
	t (web-based, 15 to 20 hours)				
Assess	ment offered: Once a year, w	vinter semester			
Allocat	tion of places				
Additio	onal information				
	A				
Worklo	oad				
90 h					
Teachi	ng cycle				
Referre	ed to in LPO I (examination r	egulations for teaching-	degree programmes)	I	
	Nr. 1 h)				
§ 22 § 22 § 22	Nr. 2 f)				
	e appears in				
	ate examination for the teac	ning degree Grundschule	Mathematics (2015)	
	ate examination for the teach				ool) (2015)
	ate examination for the teacl			,	· · J/
	ate examination for the teacl				
First sta (2015)	ate examination for the teac	ning degree Sonderpäda	gogik Didactics in M	athematics (Primary	School)
(2015)	ate examination for the teac				School)
	ate examination for the teac				
	ate examination for the teac				ol) (2015)
	ate examination for the teacl		-		
First sta 2015))	ate examination for the teac	ning degree Mittelschule	Mathematics (2020	Prutungsordnungs	version
		1			·
LA Gymnas	sien Mathematics (2023)	-	• generated 30-Mär-2024 • o ehramt Gymnasien Mathema	-	page 25 / 82
			,,		

First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Gymnasium Mathematics (2023)

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	data record Lehramt Gymnasien Mathematik - 2023	

Module	e title				Abbreviation
Elemer	itary G	eometry for Teaching Deg	gree (German Gymna	sium)	10-M-EGEL-191-m01
Module	e coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)		Institute of Mathem	natics		
ECTS		od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Congru	ence g ss and	eometry, transformation ruler constructions, selec	geometry, similarity g	eometry, elementar	idean geometry with discussion. y analytic geometry, geometric ted topics in affine and/or pro-
Intend	ed lear	ning outcomes			
thods, tuition	so that and sti	he/she masters the basi	c notions of geometr	y. He realizes the m	working as well as of proof me- utual stimulation of geometric in- imagination, and implicitly learn
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	an)
V (4) +	Ü (2)				
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
30 min	utes) o Ige of a	r c) oral examination in g ssessment: German and	roups (groups of 2, 10		e candidate each (approx. 15 to candidate)
Allocat	ion of j	olaces			
Additio	onal inf	ormation			
Worklo	ad				
300 h					
Teachi	ng cvcl	e			
	0.95				
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§731N					
Module		ars in			
		mination for the teaching	degree Gymnasium	Mathematics (2019)	
		gram Mathematics (2023)			
	ato ova	mination for the teaching			

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Module	e title				Abbreviation
Introdu	iction t	o Functional Analysis			10-M-FAN-152-m01
Module	e coord	inator		Module offered by	·
Dean of Studies Mathematik (Mathematics)		Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
9	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Banach	1 space	s and Hilbert spaces, bo	unded operators, prir	ciples of functional	analysis.
		ning outcomes	, F, F		
method broad a	ds, is al applica	ble to apply methods from bility of the theory to oth	n linear algebra and a er branches of mathe	analysis to functiona matics.	sis as well as the pertinent proof al analysis, and realises the
		, number of weekly conta	ct hours, language —	if other than Germa	an)
V (4) +	Ü (2)				
ster, in	formati	ion on whether module ca	an be chosen to earn	a bonus)	ation offered — if not every seme-
(15 to 3	o minu ige of a ble for	ites) or c) oral examinatic ssessment: German and, bonus	on in groups (groups o		
Additio	onal inf	ormation			
Worklo	ad				
270 h					
		•			
Teachi	ig tytt	τ			
		LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22	Nr. 3 f)				
Module					
	-	ree (1 major) Mathematic			
	-	ree (1 major) Mathematic	• •	`	
	-	ree (1 major) Computatio		-	
		mination for the teaching		Mathematics (2015)	
	-	ree (1 major) Mathematic			
		mination for the teaching		-	
		mination for the teaching		Mathematics (2023))
Bachel	or' deg	ree (1 major) Mathematic	s (2023)		

Module	e title				Abbreviation
Introdu	ictory (Complex Analysis for Tea	ching Degree (Germa	in Gymnasium)	10-M-FTHL-191-m01
Module	e coord	linator		Module offered by	<u> </u>
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathe	matics
ECTS	TS Method of grading Only after succ. compl. of module(s)				
5	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
rems, is	solated		hic functions and La	urent series, residu	egrals and Cauchy integral theo- le theorem and applications, Wei-
Intende	ed lear	ning outcomes			
		s acquainted with the fun nethods to practical probl		nd methods in con	nplex analysis. He/she is able to
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germ	nan)
Ü (2)					
		sessment (type, scope, la ion on whether module ca			nation offered — if not every seme-
(15 to 3	o minu Ige of a	utes) or c) oral examinations or c) oral examinations or c) oral examinations of the comparison of the	on in groups (groups		examination of one candidate each es per candidate)
Allocat	ion of	places			
Additio	onal inf	ormation			
Worklo	ad				
150 h	uu				
Teachi		0			
reatiill	ing cycl				
 Dof			lation o fonte le :		
		LPOI (examination regu	tations for teaching-(legree programme	5)
§731N		•			
Module					
		mination for the teaching			
FIRST Sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (202	3)

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	data record Lehramt Gymnasien Mathematik - 2023	

Module	e title				Abbreviation
Selecte	ed Topi	cs in History of Mathema	atics		10-M-GES-152-m01
Module	a coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)		Institute of Mathem	atics		
		Only after succ. com		latics	
5		successfully completed			
Duratio	<u> </u>	Module level	Other prerequisites		
1 seme		undergraduate			
Conten	ts		<u> </u>		
Historio the fun	cal and damer		oarticular in its relatio		more in-depth discussion of and humanities as well as to the
Intende	ed lear	ning outcomes			
tical the audien	eories ce.	and their social relevance	e. He/she is able to p	resent mathematica	and cultural genesis of mathema- l ideas and concepts to a general
		, number of weekly conta	act hours, language —	It other than Germa	n)
V (2) +					
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-
	ige of a	offered: In the semester in Issessment: German and places		offered and in the su	ıbsequent semester
Additio	onal inf	ormation			
 Worklo	had				
	au				
150 h					
Teachi	ng cyci	e	_		
	d #a !c	IDO L (overside the second	lations for togetime		
Referre	ea to in	LFUI (examination regu			
	N ^	``` `		legree programmes)	
§ 22	-			legree programmes)	
§ 22 Module	e appea			legree programmes)	
§ 22 II I Module Bachele Bachele First sta Bachele First sta Bachele exchan First sta	e appea or' deg or' deg ate exa or' deg ate exa or' deg or' deg or' deg or' deg or' deg or deg	ars in	es (2015) cal Physics (2015) nal Mathematics (202 g degree Gymnasium cal Physics (2016) g degree Gymnasium cal Physics (2020) cal Data Science (2022) g degree Gymnasium	15) Mathematics (2015) Mathematics (2019) 2)	

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	data record Lehramt Gymnasien Mathematik - 2023	

Modul	e title				Abbreviation
Thesis	in Mat	hematics (Teaching Degr	ee at German Gymna	sium)	10-M-HMGY-152-m01
Modul	e coord	linator		Module offered by	
Dean of Studies Mathematik (Mathematics)		atics)	Institute of Mathe	matics	
ECTS	Meth	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Durati	on	Module level	Other prerequisites		
		undergraduate			
Conter	nts				
		y researching and writing supervisor.	on a topic in mathen	natics or mathemat	ics didactics selected in consulta
Intend	ed lear	ning outcomes			
tained work i	during n a suit	his/her studies in the tea able form, incorporating a	aching degree progra aspects of the didacti	mme. He/She can cs of mathematics	
		, number of weekly conta	ict hours, language –	· if other than Germ	ian)
Νο cou	irses as	ssigned to module			
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-
to 300 Langua	hours) age of a		-	-	eaching-degree programmes) (250
Alloca	tion of	places			
Additi	onal inf	ormation			
Worklo	oad				
300 h					
-	ing cycl	e			
	0 - , 0				
Referr	ed to in	LPOI (examination regu	lations for teaching of	legree programme	5)
§ 29					-/
	e appe	ars in			
		mination for the teaching	g degree Gymnasium	Mathematics (2015	;)
		mination for the teaching		-	
		mination for the teaching	,,		• •

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	data record Lehramt Gymnasien Mathematik - 2023	

Module title					Abbreviation	
Mathe	matica	l Aspects of Modern Cryp		10-M-KRY-232-m01		
Module coordinator				Module offered by	•	
Dean o	of Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	(not)	successfully completed				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate		<u> </u>		
Conte	nts					
		s of elementary number t zation algorithm, post-qu			ematics of quantum computers,	
Intend	led lear	ning outcomes				
		nows the essential methory of the second s			mber theory, their application in htum computers.	
Course	es (type	e, number of weekly conta	act hours, language –	- if other than Germa	an)	
V (3) +	Ü (1)					
b) oral c) oral Langua Assess quent credita	l examin examin age of a	er bonus	each (15 to 30 minute of 2, 10 to 15 minutes /or English	s) or per candidate)	es are offered and in the subse-	
Additi	onal inf	formation				
Auuiti						
Workle	oad					
150 h						
	ing cyc	le				
Referr	ed to in	LPOI (examination regu	lations for teaching-	degree programmes))	
Modul	e appe	ars in				
First st Bache	tate exa lor' deg	gram Mathematics (2023 amination for the teaching gree (1 major) Mathematic gree (1 major) Mathematic	g degree Gymnasium ss (2023)	Mathematics (2023))	

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	data record Lehramt Gymnasien Mathematik - 2023	

Module title Abbreviation						
Linear Algebra 1 for Teaching Degree (German Gymnasium) 10-M-LNL1-191-m01						
Module coo	rdinator		Module offered by	1		
Dean of Stu	dies Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS Met	hod of grading	Only after succ. con	npl. of module(s)			
5 (not) successfully completed					
Duration	Module level	Other prerequisites				
1 semester	undergraduate					
Contents						
Basic notior terminants.	is and structures; vector sp	baces, linear maps, sy	ystems of linear equ	ations; theory of matrices and de-		
Intended lea	arning outcomes					
ted with the	central proof methods in l	inear algebra and car	n apply them to solve	ear algebra. He/She is acquain- e easy problems. He/She is able em adequately in written form.		
Courses (typ	e, number of weekly conta	ict hours, language –	- if other than Germa	an)		
Ü (2)						
	ssessment (type, scope, la ation on whether module c			ation offered — if not every seme-		
exercises ea			n exercises (approx.	10 exercise sheets with approx. 4		
Allocation o	fplaces					
Additional i	nformation					
Workload						
150 h	150 h					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
§ 73 Nr. 2						
Module app	ears in					
First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)						

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Module title Abbreviation						
Linear A	Linear Algebra 2 for Teaching Degree (German Gymnasium) 10-M-LNL2-191-m01					
Module	coord	inator		Module offered by	<u> </u>	
Dean of	Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	(not) s	successfully completed				
Duration	1 I	Module level	Other prerequisites			
1 semes	ter	undergraduate				
Content	s					
Eigenva	lue the	eory, bilinear forms, Eucli	dean and unitary veo	ctor spaces, diagona	lisability and Jordan normal form.	
Intende	d learr	ning outcomes				
with the	centra	al proof methods in linea	r algebra, and can ap	oply them to solve ea	ear algebra. He/She is acquainted asy problems. He/She is able to adequately in written form.	
Courses	(type	, number of weekly conta	ct hours, language –	- if other than Germa	an)	
Ü (2)						
		e ssment (type, scope, la on on whether module ca			ition offered — if not every seme-	
exercise	s each			n exercises (approx.	10 exercise sheets with approx. 4	
Allocatio						
Addition	nal info	ormation				
Workloa	d					
150 h						
Teachin	g cvcl	9				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
§ 73 Nr			0			
Module		ars in				
First stat	te exa	mination for the teaching mination for the teaching				

Module title					Abbreviation	
Overvi	ew Line	ear Algebra for Teaching	Degree (German Gym	nasium)	10-M-LNL-Ü-191-m01	
Module coordinator				Module offered by	y	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathe	matics	
ECTS	Methe	od of grading	Only after succ. com	pl. of module(s)		
13	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
2 seme	ester	undergraduate				
Conten	ts					
determ		; eigenvalue theory; bilin			r equations; theory of matrices and spaces; diagonalisability and Jor-	
Intend	ed lear	ning outcomes				
knows them a	about dequat	their algebraic and geom ely in written and oral for	etric background, is a m.	ble to relate them	s and methods of linear algebra, to each other and can present	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germ	nan)	
V (4) +	V (4) +	Ü (2)				
		sessment (type, scope, la ion on whether module ca			nation offered — if not every seme-	
Langua	age of a	ion of one candidate eac ssessment: German and, vill have reference to the	/or English	10-M-LNL1 und 10-	M-LNL2	
Allocat	ion of _l	places				
Additio	onal inf	ormation				
Worklo	ad					
390 h						
	ng cycl	e				
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programme	s)	
§ 73 N	-					
	e appea	ars in				
moaule						
		mination for the teaching	g degree Gymnasium	Mathematics (2010	a)	

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg. data record Lehramt Gymnasien Mathematik - 2023	page 35 / 82
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Module title Abbreviation						
Introduction into Mathematical Thinking and Working for Teaching Degree 10-M-MDAL-152-m01						
(Germa	an Gym	nasium)				
Modul	e coord	inator		Module offered by		
Dean o	of Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	nts					
		ations of mathematical p and functions; basic tecl			ion; basic concepts in mathema- matical writing.	
		ning outcomes	•			
form ea oral for	asy ma rm.	thematical arguments inc	lependently and pres	sent them adequate	hematics. He/She is able to per- ly and reasonably in written and	
		, number of weekly conta	ct nours, language –	- If other than Germa	an)	
		V (1) + Ü (1)				
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-	
		15 pages) ssessment: German and,	/or English			
Allocat	tion of	places				
Additio	onal inf	ormation				
Additic period		ormation on module dura	tion: includes block	taught sessions pric	or to the beginning of the lecture	
Worklo						
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regu	lations for teaching-o	degree programmes)	
§731N	Vr. 3 (2	ECTS credits) ECTS credits) ECTS credits)				
Module	e appea	ars in				
		mination for the teaching	g degree Gymnasium	Mathematics (2015))	
First st	First state examination for the teaching degree Gymnasium Mathematics (2019)					
First st	First state examination for the teaching degree Gymnasium Mathematics (2023)					

Module	e title				Abbreviation
Mather	natical	Writing			10-M-MSC-152-m01
Module	coord	inator		Module offered by	
		es Mathematik (Mathema	atics)	Institute of Mathematics	
ECTS		od of grading	Only after succ. com		latics
5		successfully completed			
Duratio		Module level	Other prerequisites		
1 semester undergraduate					
Conten	ts		I		
vers the compre	e whole hensiv	e range of mathematical t	exts from short proof or's or Master's theses	s and the formulation	case examples. The course co- on of theorems and definitions to s include not only mathematical
Intende	ed lear	ning outcomes			
					nprehensibly. He/She knows ements of scientific work.
Course	s (type	, number of weekly conta	ict hours, language —	if other than Germa	an)
V (2) +	Ü (2)				
		essment (type, scope, la on on whether module ca			tion offered — if not every seme-
Assess	ment o	oo minutes) or b) term pa ffered: In the semester in ssessment: German and,	which the course is		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22	Nr. 3 f)				
Module	appea	ars in			
Bachelo Bachelo First sta Bachelo Bachelo Bachelo First sta Bachelo	or' deg or' deg ate exa or' deg ate exa or' deg or' deg ge prog ate exa or' deg	ree (1 major) Mathematic ree (1 major) Mathematic ree (1 major) Computatio mination for the teaching ree (1 major) Mathematic mination for the teaching ree (1 major) Mathematic gram Mathematics (2023) mination for the teaching ree (1 major) Mathematic ree (1 major) Mathematic	al Physics (2015) nal Mathematics (202 g degree Gymnasium al Physics (2016) g degree Gymnasium al Physics (2020) al Data Science (2022) g degree Gymnasium s (2023)	Mathematics (2015) Mathematics (2019) 2)	

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	data record Lehramt Gymnasien Mathematik - 2023	

Numer	e title				Abbreviation
	rical Ma	thematics 1 for Teaching	Degree (German Gyr	nnasium)	10-M-NUL1-191-m01
Modul	e coord	inator		Module offered by	
Dean c	of Studi	es Mathematik (Mathema	atics)	Institute of Mather	natics
ECTS		od of grading	Only after succ. con	npl. of module(s)	
5	5 (not) successfully completed				
		Other prerequisites			
1 semester undergraduate					
Conter	nts				
		stems of linear equations tion with polynomials, sp			quations and systems of equati- rical integration.
Intend	ed lear	ning outcomes			
		acquainted with the fun oblems and knows abou			erical mathematics, applies them
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
Ü (2)					
ster, in	nformat	ion on whether module c	an be chosen to earn	a bonus)	ation offered — if not every seme-
(15 to 3 Langua	30 minu	ites) or c) oral examinations or c) oral examinations or c) oral examinations of the second sec	on in groups (groups		kamination of one candidate each es per candidate)
Allocat	tion of	places			
Allocat	tion of	places			
		ormation			
	onal inf				
 Additic 	onal inf				
 Additic Worklc 150 h	onal inf oad	ormation			
 Additic Worklc 150 h	onal inf	ormation			
 Additio Worklo 150 h Teachi 	onal inf oad ing cycl	ormation	lations for teaching-0	degree programmes)
 Additic Worklo 150 h Teachi Referre	onal inf oad ing cycl ed to in	ormation e LPOI (examination regu	lations for teaching-o	degree programmes)
 Additio 150 h Teachi Referre § 73 N	onal inf oad ing cycl ed to in Nr. 2 (2	e LPOI (examination regu	lations for teaching-o	degree programmes)
 Additic 150 h Teachi Referre § 73 N Module	onal inf oad ing cycl ed to in Nr. 2 (2 e appea	e LPOI (examination regu			

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	data record Lehramt Gymnasien Mathematik - 2023	

Module	e title				Abbreviation
Operat	ions Re	esearch			10-M-ORS-152-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	tics) Institute of Mathematics	
ECTS	S Method of grading Only after succ. co		Only after succ. com	pl. of module(s)	
9					
Duratio	Duration Module level		Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Linear	prograr	nming, duality theory, tra	nsport problems, inte	egral linear program	ming, graph theoretic problems.
Intende	ed lear	ning outcomes			
for solv	ing ma		pecially in economics		n, as required as a central tool apply these methods to practical
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +					
ster, in a) writt (15 to 3 Assess Langua credita	formati en exa o minu ment o ge of a ble for	on on whether module ca mination (approx. 90 to 1 Ites) or c) oral examinatic ffered: In the semester in ssessment: German and, bonus	an be chosen to earn 80 minutes, usually o on in groups (groups o which the course is	a bonus) :hosen) or b) oral ex of 2, 10 to 15 minutes	
Allocat	ion of j	olaces			
Additio	onal inf	ormation			
Worklo	ad				
270 h					
Teachi	ng cycl	е			
		LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22					
Module					
Bachel First sta First sta	or' deg ate exa ate exa	ree (1 major) Mathematic ree (1 major) Computatio mination for the teaching mination for the teaching mination for the teaching	nal Mathematics (201 g degree Gymnasium g degree Gymnasium	Mathematics (2015) Mathematics (2019)	

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	data record Lehramt Gymnasien Mathematik - 2023	

Modul	e title				Abbreviation
Introdu	uctory I	Projective Geometry for T	eaching Degree (Ger	man Gymnasium)	10-M-PGEL-191-m01
Modul	e coord	inator		Module offered by	·
Dean o	of Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
10	lo numerical grade				
		Other prerequisites			
1 semester undergraduate					
Conter	nts				
		l affine planes, projective 5, dualities and polarities		_	s, fundamental theorems for pro-
Intend	ed lear	ning outcomes			
		acquainted with the fun nethods to practical probl		nd methods of proje	ective geometry. He/she is able to
Course	es (type	, number of weekly conta	ct hours, language —	if other than Germa	an)
V (4) +	Ü (2)				
ster, in a) writt 30 min Langua credita Assess	format ten exa utes) o age of a able for	ion on whether module ca mination (approx. 90 to 1 r c) oral examination in g ssessment: German and, bonus offered: Only when annou	an be chosen to earn 80 minutes) or b) ora roups (groups of 2, 10 /or English	a bonus) Il examination of on D to 15 minutes per o	ation offered — if not every seme- e candidate each (approx. 15 to candidate) es are offered and in the subse-
Allocat	tion of	places			
Additio	onal inf	ormation			
Worklo	oad				
300 h					
	ng cycl	e			
	0 . 7				
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programmes	
§ 73 N					
	e anne:	ars in			
Modul	e appea	ars in mination for the teaching	degree Gymnasium	Mathematics (2010)	-

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Module	e title				Abbreviation
Hands-	on Ser	ninar Mathematics			10-M-PRA-152-m01
Module	e coord	linator		Module offered by	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	natics
ECTS	S Method of grading Only after succ. co		Only after succ. com	pl. of module(s)	
3	(not)	successfully completed			
Duration Module level		Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
tics" (g ject, sc terest):	eomet hool te formu ic for c	ry, algebra, stochastics, a erm paper (Facharbeit) or lation of subject-related a	nalytic geometry, and Pluskurs (additional and didactic requirem	alysis) or a topic rela course for the in-dep nents, search for an	be a topic in "classical mathema- ated to a school workshop, pro- oth study of areas of special in- appropriate topic, preparation of Il be supervised and reflected by
Intend	ed lear	ning outcomes			
					natics in school. He/She is ac- e to critically reflect the process.
Course	s (type	, number of weekly conta	ct hours, language —	- if other than Germa	in)
S (2)					
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
		ng up a project plan (10 t offered: Every two years, s			
Allocat	ion of	places			
Additio	onal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cvcl	e			
		-	· · · · · · · · · · · · · · · · · · ·		
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
§ 22					
Module		ars in			
First sta First sta	ate exa ate exa	mination for the teaching mination for the teaching gram Mathematics (2023)			

Module title				Abbreviation	
Programming	course for students of	Mathematics and othe	er subjects	10-M-PRG-152-m01	
Module coord	inator		Module offered by	<u> </u>	
	es Mathematik (Mathe	matics)			
	od of grading	Only after succ. cor		latics	
	successfully completed				
Duration	Module level	Other prerequisites	•		
1 semester	undergraduate				
Contents					
	· · · ·				
	odern programming lan	guage (e.g.C).			
Intended lear	ning outcomes				
The student is in mathematic	able to work independ cs.	lently on small program	nming exercises and	standard programm	ing problems
Courses (type	, number of weekly cor	itact hours, language -	– if other than Germa	an)	
P (2)					
Method of as	sessment (type, scope, ion on whether module			ation offered — if not	every seme-
	form of programming e offered: Once a year, su		25 hours)		
	issessment: German ar				
Allocation of		<u> </u>			
Allocation of					
Additional inf	ormation				
Workload					
90 h					
Teaching cycl	e				
Referred to in	LPOI (examination re	gulations for teaching-	degree programmes)	
§ 22 Nr. 3 f)		<u> </u>	0,0		
Module appea	ars in				
	ree (1 major) Mathema	tice $(201r)$			
-	ree (1 major) Physics (2				
•	ree (1 major) Nanostruo)		
-	ree (1 major) Economal		,		
-	ree (1 major) Mathema	_			
-	ree (1 major) Computat		15)		
-	ree (1 major) Functiona		5.		
First state exa	mination for the teachi	ng degree Gymnasium	Mathematics (2015)	I	
Bachelor' deg	ree (1 major) Mathema	tical Physics (2016)			
Bachelor' deg	ree (1 major) Economat	hematics (2017)			
	mination for the teachi		Mathematics (2019))	
-	ree (1 major) Physics (2				
-	ree (1 major) Nanostruo))		
-	ree (1 major) Mathema				
-	ree (1 major) Functiona				
	ree (1 major) Quantum				
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Bachelor' degree (1 major) Economathematics (2021) Bachelor' degree (1 major) Economathematics (2022) Bachelor' degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor' degree (1 major) Mathematics (2023) Bachelor' degree (1 major) Economathematics (2023) Bachelor' degree (1 major) Mathematical Physics (2024) Bachelor' degree (1 major) Economathematics (2024)

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Module	e title				Abbreviation
Introdu	uction t	o Hands-on Mathematics	5		10-M-PRM1-152-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS			Only after succ. con	npl. of module(s)	
3	(not)	successfully completed			
Duration Module level		Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
ten), Pl tical ph table to providi	uskurs nase, th opic, el ng eac	e (additional courses for ne students formulate the	the in-depth study of subject-specific and project and draw up	areas of special int didactic requireme a project plan. This	school term papers (Facharbei- erest), workshops. In the theore- nts of the topic, search for a sui- is done in groups with students other's work.
The stu	ident is	able to select a suitable	mathematical topic	for a school project a	and elaborate it.
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)
S (2)					
ster, in project	format (10 to	ion on whether module c 15 pages) ffered: Every two years, v	an be chosen to earn		ation offered — if not every seme-
Allocat					
Additio	onal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cvcl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
§ 22		,			
§ 22					
Module	e appea	ars in			
		mination for the teaching			
		mination for the teaching		-	
		mination for the teaching	,	Mathematics (2019)	
		gram Mathematics (2023 mination for the teaching		Mathematics (2000))
11151 51	ale exd		s degree Gymmasiulli	mainematics (2023)	1

LA Gymnasien Mathematics (2023))
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Module	e title				Abbreviation
Practic	al Coui	rse Hands-on Mathematic	CS		10-M-PRM2-152-m01
Module	e coord	inator		Module offered by	<u> </u>
	Dean of Studies Mathematik (Mathematics)			Institute of Mathem	natics
ECTS		od of grading	Only after succ. compl. of module(s)		
3	(not) s	successfully completed		· · · · · · ·	
Duratio	Duration Module level Other prerequisites				
1 seme	ster	undergraduate			
Conten	ts				
beiten) tical pł	, Plusk nase th	urse (additional courses	for the in-depth stud	y of areas of special	ays, school term papers (Fachar- interest), workshops. In the prac- upils and afterwards reflect the
Intend	ed lear	ning outcomes			
		able to perform a schoo cts of project planning ar			pic. He/She is acquainted with ess critically.
Course	s (type	, number of weekly conta	ct hours, language –	· if other than Germa	ın)
P (2)					
ster, in project	format : drawi	ion on whether module can be a project plan (5 to	an be chosen to earn 10 pages) and practi	a bonus)	tion offered — if not every seme-
		ffered: Every two years, s	ummer semester		
Allocat		DIACES			
Additio	nal inf	ormation			
		ormation			
Worklo	ad				
90 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-	legree programmes)	
§ 22 § 22	Nr. 2 f				
Module		ars in			
First sta First sta	ate exa ate exa	mination for the teaching mination for the teaching mination for the teaching	degree Gymnasium degree Gymnasium	Mathematics (2015)	
	- ,	gram Mathematics (2023 mination for the teaching		Mathematics (2023)	1

Module title Abbreviation					Abbreviation
Review	w Cours	e for Teaching Degree (G	erman Gymnasium)		10-M-REPL-191-m01
Modu	le coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)		Institute of Mathem	natics		
ECTS					
3	(not)	successfully completed			
Durati	ion	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conte	nts				
numbe		y; mathematics didactics			ysis; linear algebra, algebra and s and answering past state ex-
Intend	ded lear	ning outcomes			
		as advanced knowledge , §73 (2), and is able to a			regulations for teaching degree nation.
Cours	es (type	, number of weekly conta	ict hours, language –	- if other than Germa	ın)
S (2)					
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-
		x. 45 minutes) or b) proje ssessment: German and			
Alloca	tion of _l	places			
Additi	ional inf	ormation			
		N			
Workl	oad				
Workl 90 h	oad				
90 h		e			
90 h	oad ing cycl	e			
90 h Teach i 	ing cycl		lations for teaching-o	degree programmes)	
90 h Teach Referr	ing cycl red to in	e LPOI (examination regu	lations for teaching-o	degree programmes)	
90 h Teach Referr § 22 ll	ing cycl r ed to in I Nr. 3 f)	LPOI (examination regu	lations for teaching-o	degree programmes)	
90 h Teach <u>Referr</u> § 22 Modul	ing cycl red to in I Nr. 3 f) le appea	LPOI (examination regu			

School Mathematics from a Higher Perspective 10-M-SCH-152-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) 5 (not) successfully completed Duration Module level Other prerequisites 1 semester undergraduate				
Dean of Studies Mathematik (Mathematics) Institute of Mathematics ECTS Method of grading Only after succ. compl. of module(s) 5 (not) successfully completed Duration Module level Other prerequisites				
Dean of Studies Mathematik (Mathematics) Institute of Mathematics ECTS Method of grading Only after succ. compl. of module(s) 5 (not) successfully completed Duration Module level Other prerequisites				
ECTS Method of grading Only after succ. compl. of module(s) 5 (not) successfully completed Duration Module level Other prerequisites				
5 (not) successfully completed Duration Module level Other prerequisites				
Duration Module level Other prerequisites				
1 semester undergraduate				
Contents				
Discussion of selected topics in school mathematics with respect to their integration into wider theory their didactic implementation at both school and university levels.	ories and			
Intended learning outcomes				
By means of selected examples, the student gains insight into the interrealtion between school mat and advanced mathematical theories. He/She is able to discuss these under mathematical, didacti- thodical aspect.				
Courses (type, number of weekly contact hours, language — if other than German)				
$V(2) + \ddot{U}(2)$				
Method of assessment (type, scope, language — if other than German, examination offered — if not ster, information on whether module can be chosen to earn a bonus)	every seme-			
a) talk (approx. 45 minutes) or b) term paper (10 to 15 pages) or c) project (15 to 25 hours) Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English				
Allocation of places				
Additional information				
···				
Workload				
150 h				
Teaching cycle				
Poferred to in LPO L (examination regulations for teaching degree programmes)				
Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22 Nr. 1 h) § 22 Nr. 2 f)				
§ 22 Nr. 3 f)				
Module appears in				
Bachelor' degree (1 major) Mathematics (2015) Bachelor' degree (1 major) Mathematical Physics (2015) Bachelor' degree (1 major) Computational Mathematics (2015)				
First state examination for the teaching degree Grundschule Mathematics (2015) First state examination for the teaching degree Realschule Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Mittelschule Mathematics (2015) Bachelor' degree (1 major) Mathematical Physics (2016) First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Mittelschule Mathematics (2020 (Prüfungsordnungs 2015)) Bachelor' degree (1 major) Mathematical Physics (2020)	version			



Bachelor' degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor' degree (1 major) Mathematics (2023) Bachelor' degree (1 major) Mathematical Physics (2024)

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Module	e title				Abbreviation
Semina	ar Math	nematics			10-M-SEM-152-m01
Module	e coord	inator		Module offered by	
Dean o	of Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	. compl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
A selec	ted top	pic in mathematics.			
Intend	ed lear	ning outcomes			
of a giv	/en top				sters elaboration and structuring /She is able to participate active
Course	s (type	, number of weekly conta	ect hours, language –	- if other than Germa	an)
S (2)					
talk (60	o to 120 age of a	ion on whether module c o minutes) Issessment: German and Dlaces		a bonus)	
Additio	onal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cvcl	e			
Referre	ed to in	LPOI (examination regu	llations for teaching-o	degree programmes)	
§ 22			3		
Module	-	ars in			
		ree (1 major) Mathematic	cs (2015)		
	-	ree (1 major) Computatio	-	15)	
		mination for the teaching			
		mination for the teaching			
		ree (1 major) Mathematic		2)	
	• •	gram Mathematics (2023			
		mination for the teaching	,	Mathematics (2023))
Bachel	or deg	ree (1 major) Mathematic	:5 (2023)		

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	data record Lehramt Gymnasien Mathematik - 2023	

Mouuu	e title				Abbreviation
		ning in Classroom Teach	ing including Theory ((German Gymnasi-	10-M-SFDPGY-152-m01
um)					
Module	e coord	linator		Module offered by	
Dean o	of Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. com	fter succ. compl. of module(s)	
4	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
specific ject-sp res what dactic a cordan practic cessful Intendo The stu able to cationa	c teach ecific to at he/s aspects ce with e, also l praction dent is teach al system	ing models, examples ar echniques. In the univers he has learned during hi s. In this context, the cou applicable guidelines a taking into account aspe cal implementation of su ning outcomes s acquainted with the mo the relevant topics for di	nd projects in different sity course accompany s/her teaching placem irse discusses selected nd curricula. The cours ects of school pedagog bject-specific concept st important compone fferent forms, and can inect ideas from schoo	grades, the modul ing the placement, ent and explores a l practical aspects e focuses on recen y and learning psyc ual designs. nts of planning and critically reflect the l pedagogy and lea	on teaching methodology). Using e introduces the student to sub- the student reflects and structu- dditional subject-specific and di- of teaching mathematics in ac- t developments in classroom chology that can support the suc-
		, number of weekly conta		-	ın)
P (o) +	S (2)				
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-
Conten regulat	its and ions fo		s specified in Section 3 mmes); participation i	4 Subsection 1 Ser	paper (10 to 15 pages) ntence 1 No. 4 LPO I (examination ing practice, completion of all set
Allocat	ion of	places			
 Additio	onal inf	ormation			
Additio	onal inf	ormation			
 Additio Worklo		ormation			
		ormation			
 Worklo	ad				
 Worklo 120 h	ad				
 Worklo 120 h Teachin	oad ng cycl	e	llations for teaching-de	egree programmes	
 Worklo 120 h Teachin Referre	oad ng cycl ed to in		llations for teaching-de	egree programmes)	
 Worklo 120 h Teachin	ng cycl ed to in Nr. 4	e LPOI (examination regu	llations for teaching-de	egree programmes)	

LA Gymnasien	Mathematics	(2023)
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	e title			<u>.</u>	Abbreviation
Stocha	stics fo	or Teaching Degree (Gern	nan Gymnasium)		10-M-STL-191-m01
Modul	e coord	inator		Module offered by	
Dean o	of Studi	es Mathematik (Mathema	atics)	Institute of Mather	natics
ECTS	Metho	od of grading	Only after succ. con	ucc. compl. of module(s)	
6	nume	rical grade			
Duratio	Duration Module level Other prerequisites				
1 seme	ester	undergraduate	Jate		
Conter	nts	-	·		
assum discret conditi ce and	ptions: e distri ional pr correla	basic notions of descrip butions, elements of con obability, stochastic ind	tive statistics, discret nbinatorics, principle ependence, common ems, law of the large r	e probability space of inclusion and ex distributions, expen- numbers, central lim	sation and discussion of basic s, random variables, important clusion, multistage experiments cted value and variance, covaria it theorem, confidence intervals
		ning outcomes			
Germa		asium. He/She is able to			ics, as required for teaching at and handle the concept of stati
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	an)
Course V (4) +		, number of weekly conta	act hours, language –	- if other than Germa	an)
V (4) + Metho ster, in	Ü (2) d of ass formati	sessment (type, scope, la ion on whether module c	anguage — if other tha an be chosen to earn	an German, examina a bonus)	ation offered — if not every seme
V (4) + Metho ster, in a) writt 30 min Langua	Ü (2) d of ass formati cen exa utes) o	Sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita	Ü (2) d of ass formati cen exa utes) o age of a	Sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita	Ü (2) d of ass formati en exa utes) o age of a ble for	Sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p	Sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additic	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additio Worklo 180 h	Ü (2) d of ass formati en exa utes) o age of a ble for tion of J onal inf	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places ormation	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additio Worklo 180 h	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places ormation	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10	an German, examina a bonus) al examination of on	ation offered — if not every seme e candidate each (approx. 15 to
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additio 180 h Teachi 	Ü (2) d of ass formati en exa utes) o age of a ble for tion of p onal inf pad	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places ormation	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10 /or English	an German, examina a bonus) al examination of on o to 15 minutes per	ation offered — if not every seme e candidate each (approx. 15 to candidate)
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additic Worklo 180 h Teachi Referro	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p onal inf onal inf oad	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places ormation	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10 /or English	an German, examina a bonus) al examination of on o to 15 minutes per	ation offered — if not every seme e candidate each (approx. 15 to candidate)
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additio 180 h Teachi Referro § 73 N	Ü (2) d of ass formati en exat utes) o age of a ble for tion of p onal inf onal inf oad ag cycl ed to in	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places ormation e LPOI (examination regu	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10 /or English	an German, examina a bonus) al examination of on o to 15 minutes per	ation offered — if not every seme e candidate each (approx. 15 to candidate)
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additic Worklo 180 h Teachi Referro § 73 N Modulo	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p onal inf onal inf onal inf onal inf onal inf onal inf ad	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places ormation e LPO I (examination regu	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10 /or English	an German, examina a bonus) al examination of on o to 15 minutes per degree programmes	ation offered — if not every seme e candidate each (approx. 15 to candidate)
V (4) + Metho ster, in a) writt 30 min Langua credita Allocat Additio 180 h Teachi 180 h Teachi S 73 I N Modulo First st	Ü (2) d of ass formati en exal utes) o age of a ble for tion of p onal inf onal inf onal inf onal inf onal inf onal inf onal inf onal inf onal inf onal inf ad	sessment (type, scope, la ion on whether module c mination (approx. 90 to 1 r c) oral examination in g ssessment: German and bonus places ormation e LPOI (examination regu	anguage — if other tha an be chosen to earn 180 minutes) or b) ora groups (groups of 2, 10 /or English allations for teaching-o	an German, examina a bonus) al examination of on o to 15 minutes per degree programmes	ation offered — if not every seme e candidate each (approx. 15 to candidate)

Modul	e title				Abbreviation
Stocha	astics 1	for Teaching Degree (Ge	rman Gymnasium)		10-M-STOL-191-m01
Modul	e coord	inator		Module offered by	
Dean c	Dean of Studies Mathematik (Mathematics)			Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	ucc. compl. of module(s)	
6	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
contin chastic	uous di c indep	stributions: normal distri	bution, random varia ditional probability,	ble, distribution fun characteristics of dis	asure and integration theory, ction, product measures and sto- stributions: expected value and
Intend	ed lear	ning outcomes			
		acquainted with fundam lems and knows about th	•		ics, applies these methods to
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	in)
V (4) +	Ü (2)				
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
30 min Langua	utes) o	r c) oral examination in g ssessment: German and,	roups (groups of 2, 1		e candidate each (approx. 15 to candidate)
Alloca	tion of	olaces			
Additio	onal inf	ormation			
Worklo	bad				
180 h					
	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-	legree programmes)	
§7311	-				
	e appea	ars in			
First st	ate exa	mination for the teaching mination for the teaching			

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5 (not) successfully completed Duration Module level Other prerequisites 1 semester undergraduate Contents Contents Contents Interded learning outcomes Intended learning outcomes The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical proof exercises and to find possible solutions. Courses (type, number of weekly contact hours, language — if other than German) T (o) 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 of tutoring activities or correcting work by supervising lecturers or exercise supervisors (1 to 2 teaching units or approx. 5 pieces of correcting work) Allocation of places Additional information Please direct application to teaching coordinator Mathematics, he/she will select participants. Workload	Module	title			Abbreviation	
Module coordinator Module offered by Dean of Studies Mathematik (Mathematics) Institute of Mathematics CTS Method of grading Only after succ. compl. of module(s) 5 (not) successfully completed - Duration Module level Other prerequisites 1 semester undergraduate - Contents - - Tutoring or grading homework for one of the basic courses in the Bachelor's or teaching degree programmes under supervision of the respective lecturer or exercise supervisor. Intended learning outcomes - - The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical proof exercises and to find possible solutions. - Courses (type, number of weekly contact hours, language – if other than German) To other thomation on whether module can be chosen to earn a bonus) Massessment (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 of trutoring activities or correcting work) - Allocation of places -	Exercise	e tutor or proof-reading in Ma	thematics		10-M-TuKo-152-mo1	
Dean of Studies Mathematik (Mathematics) Institute of Mathematics ECTS Method of grading Only after succ. compl. of module(s) 5 (not) successfully completed						
ECTS Method of grading Only after succ. compl. of module(s) i (not) successfully completed Other prerequisites i semester undergraduate Contents Contents Contents Contents Contents Intended learning outcomes The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical profe exercises and to find possible solutions. Courses (type, number of weekly contact hours, language if other than German, examination offered if not every semester, information on whether module can be chosen to earn a bonus) Assessment of tutoring activities or correcting work by supervising lecturers or exercise supervisors (t to 2 teaching units or approx. 5 pleces of correcting work) Additoration of places Additoration for Leaching coordinator Mathematics, he/she will select participants. More approx. 5 pleces of correcting work) Addito						
5 [not) successfully completed Duration Module level Other prerequisites isemester undergraduate Conterts			- i		natics	
Duration Module level Other prerequisites is sensiter undergraduate Contents Contents (utoring orgrading homework for one of the basic courses in the Bachelor's or teaching degree programmes under supervision of the respective lecturer or exercise supervisor. Intended learning outcomes The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical profexercises and to find possible solutions. Courses (type, number of weekly contact hours, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) Assessment of tutoring activities or correcting work by supervising lecturers or exercise supervisors (a to 2 teaching units or approx. 5 pieces of correcting work) Allocation of places	ECTS			pl. of module(s)		
a semester undergraduate	5					
Contents Tutoring or grading homework for one of the basic courses in the Bachelor's or teaching degree programmes un- der supervision of the respective lecturer or exercise supervisor. Intended learning outcomes The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical proof exercises and to find possible solutions. Courses (type, number of weekly contact hours, language — if other than German) T (o) 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 of tutoring activities or correcting work by supervising lecturers or exercise supervisors (a to 2 tea- ching units or approx. 5 pieces of correcting work) Allocation of places						
Tutoring or grading homework for one of the basic courses in the Bachelor's or teaching degree programmes un- der supervision of the respective lecturer or exercise supervisor. Intended learning outcomes The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical proof exercises and to find possible solutions. Courses (type, number of weekly contact hours, language — if other than German) T (a) 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 of tutoring activities or correcting work by supervising lecturers or exercise supervisors (1 to 2 tea- ching units or approx. 5 pieces of correcting work) Aldotation of places 	1 semes	ster undergraduate				
der supervision of the respective lecturer or exercise supervisor. Intendel learning outcomes The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical proof exercises and to find possible solutions. Courses (type, number of weekly contact hours, language — if other than German) T (o) 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 of tutoring activities or correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 5 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 5 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 5 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 5 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 6 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 7 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 7 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 7 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 7 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 7 pieces of correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 7 pieces of teaching correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units of the teaching degree (i major) Computational Mathematics (2015) Bachelor' degree (i major) Mathematical P	Content	ts				
Intended learning outcomes The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical proof exercises and to find possible solutions. Courses (type, number of weekly contact hours, language — if other than German) T (o) 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 of tutoring activities or correcting work by supervising lecturers or exercise supervisors (i to 2 tea- ching units or approx. 5 pieces of correcting work) Allocation of places Additional information Please direct application to teaching coordinator Mathematics, he/she will select participants. Workload 150 h Teaching cycle Teaching cycle Teaching cycle Teaching (gene (1 major) Mathematics (2015) Bachelor' degree (1 major) Mathematics (2015) Bachelor' degree (1 major) Mathematics (2015) Bachelor' degree (1 major) Conomathematics (2015) Bachelor' degree (1 major) Mathematics (2017) First state examination for the teaching degree Gymnasium Mathematics (2015) Bachelor' degree (1 major) Mathematical Physics (2020) Bachelor' degree (1 major) Mathematical Physics (2020) Bachelor' degree (1 major) Mathematical Data Science (2022) Bachelor' degree (1 major) Mathematical Data Science (2022) Bachelor' degree (1 major) Mathematical Data Science (2022) Bachelor' degree (1 major) Mathematics (2023) Bachelor'	Tutoring or grading homework for one of the basic courses in the Bachelor's or teaching degree programmes un-					
The student is able to support the acquisition of mathematical skills and knowledge. He/She helps to identify mistakes in mathematical proof exercises and to find possible solutions. Courses (type, number of weekly contact hours, language — if other than German) T (o) 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 of tutoring activities or correcting work by supervising lecturers or exercise supervisors (1 to 2 tea- ching units or approx. 5 pieces of correcting work) Allocation of places	Intende	d learning outcomes				
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A Gymnasien Mathematics (2023) JMU Würzburg • generated 30-Mär-2024 • exam. reg. Dage 53 / 82						· · ·
data record Lehramt Gymnasien Mathematik - 2023	LA Gymnasi	en Mathematics (2023)	-		-	page 53 / 82



Bachelor' degree (1 major) Mathematical Physics (2024) Bachelor' degree (1 major) Economathematics (2024)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 54 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module					Abbreviation
Basics	in Aritl	nmetics (virtual course)			10-M-VHBAri-152-m01
Module	e coord	inator		Module offered by	<u> </u>
		es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
2		successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conten	nts				
Basic t	opics o	n teaching arithmetics in	school, e. g. divisabi	lity theory, prime nu	ımbers, set theory.
Intend	ed lear	ning outcomes			
The stu	udent le	earns basic topics in the t	eaching of arithmetic	s and the related ma	athematical backgrounds and
					hing arithmetic in school.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
Ü (2)					
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	(vhb)	
			0 0		tion offered — if not every seme
		ion on whether module ca	an be chosen to earn	a bonus)	
		based, 15 to 20 hours) ffered: Once a year, winte	or comoctor		
		· · · · ·			
Allocat		JIALES			
	1				
Additio	nal inf	ormation			
Worklo	bad				
60 h					
Teachi	ng cycl	e			
		LPOI (examination regu	lations for teaching-o	egree programmes)	
§ 22	,				
§ 22 § 22					
Module		ars in			
		mination for the teaching	degree Grundschule	Mathematics (2015)
			-		natics (Primary School) (2015)
		mination for the teaching	-		
		mination for the teaching	-	-	
First st (2015)	ate exa	mination for the teaching	degree Sonderpädag	gogik Didactics in M	athematics (Primary School)
(2015)					athematics (Middle School)
		mination for the teaching	-		
			-		natics (Middle School) (2015)
		mination for the teaching	- ,		
FIRST ST 2015))	ale exa	mination for the teaching	, degree milleischule	mathematics (2020	(Prüfungsordnungsversion

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 55 / 82
	data record Lehramt Gymnasien Mathematik - 2023	



First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2020 (Prüfungsordnungsversion 2015))

exchange program Mathematics (2023)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 56 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module title					Abbreviation	
Start-u	Start-up Tutorial Mathematics (virtual course)				10-M-VHBBr-152-m01	
Module coordinator				Module offered by	<u> </u>	
Dean c	of Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS		od of grading	Only after succ. con	pl. of module(s)		
2	(not)	successfully completed				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
		ussion of basic topics in r proofs.	nathematics that are	well known from sc	hool, with a focus on mathemati-	
Intend	ed lear	ning outcomes				
		ets acquainted with the b degree study programme.		ues which are prere	equisites for the further courses ir	
Course	es (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)	
Ü (2) Course	e type: e	eLearning, mostly Virtuell	e Hochschule Bayern	(vhb)		
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-	
		oased, 15 to 20 hours) offered: Every two years, v	vinter semester			
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	oad					
60 h						
Teachi	ng cycl	e				
	- /					
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
	Nr. 3 f)					
	e appea	ars in				
		mination for the teaching	g degree Gymnasium	Mathematics (2015)		
		mination for the teaching				
		mination for the teaching		-		

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	data record Lehramt Gymnasien Mathematik - 2023	

Module title					Abbreviation
Compu	Computer and Mathematics (virtual course)				10-M-VHBCom-152-m01
Module coordinator				Module offered by	<u> </u>
Dean c	of Studi	es Mathematik (Mathema	atics)	Institute of Mathe	matics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
2	(not)	successfully completed			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
Discus puter t		possible ways to use cor	nputers in teaching n	nathematics as wel	l as discussion of common com-
Intend	ed lear	ning outcomes			
		s acquainted with basic p s with the potential and l			uters in the teaching of mathema
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germ	ian)
Ü (2)					
Course	e type: (eLearning, mostly Virtuell	e Hochschule Bayern	ı (vhb)	
					ation offered — if not every seme
,		ion on whether module c	an be chosen to earn	a bonus)	
		based, 15 to 20 hours) offered: Every two years, s	summer semester		
Alloca	tion of	places			
Additi	onal inf	ormation			
Worklo	oad				
60 h					
Teachi	ing cycl	e			
Referr	ed to in	LPOI (examination regu	lations for teaching-	degree programmes	5)
	Nr. 3 f)				
	e appe	ars in			
		mination for the teaching	g degree Gymnasium	Mathematics (2015	;)
		mination for the teaching		-	
First st	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (202	3)

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	data record Lehramt Gymnasien Mathematik - 2023	

Module	e title				Abbreviation
School	Mathe	matics from a Didactical	Point of View: Algeb	ra online (virtual	10-M-VHBDAL-191-m01
course))				
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathen	natics
ECTS	i	od of grading	Only after succ. con	npl. of module(s)	
2	(not) s	successfully completed			
Duratio		Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
					n the central and important to-
		algebra: extensions of n	umber domains, vari	ables and terms, eq	uations and functions.
Intende	ed lear	ning outcomes			
justify l able to tion. Th sense of Course Ü (2) Methoo ster, int project Assess	learning assess ney kno of mode s (type d of ass formati (web-b ment o	g units and learning sequ and value the important w various fields of applic elling cycles) independer number of weekly conta ressment (type, scope, la on on whether module ca based, 15 to 20 hours) ffered: Once a year, winte	aences for the import ce of digital technolo cation of algebraic co atly. ct hours, language – nguage – if other tha an be chosen to earn	ant topics in school gy with respect to to ncepts, and are able - if other than Germa an German, examina	tics. They are able to develop and algebra independently. They are odays and future design of instruc- e to perform modelling (in the an) ation offered — if not every seme-
		ing, Vhb			
Allocat	ion of p	olaces			
Additio	onal info	ormation			
Worklo	ad				
60 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
§ 22	Nr. 3 f)				
Module	e appea	in and a second s			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2019)	
		gram Mathematics (2023			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2023))

Module title Abbreviation					
School	School Mathematics from a Didactical Point of View: Analy			sis online (virtual	10-M-VHBDAN-191-m01
course)					
Module coordinator			Module offered by		
		es Mathematik (Mathema		Institute of Mathem	natics
ECTS		od of grading	Only after succ. com	pl. of module(s)	
2		successfully completed			
Duratio		Module level	Other prerequisites		
1 seme		undergraduate	-		
Conten					
analysi	s. This		ntral and important t		e" is about learning and teaching ysis: functions, sequences and li-
Intende	ed lear	ning outcomes			
ment of justify l able to tion. Th	f under earnin assess iey kno	standing of the central co g units and learning seques and value the importance	oncepts of analysis in lences for the importa ce of digital technolog ation of concepts in a	teaching mathema ant topics in school gy with respect to to	niddle and long term develop- tics. They are able to develop and analysis independently. They are days and future design of instruc- le to perform modelling (in the
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	ın)
Ü (2)					
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
Assess	ment o	based, 15 to 20 hours) ffered: Once a year, winte ning, Vhb	er semester		
Allocat	ion of j	olaces			
Additio	nal inf	ormation			
Worklo	ad				
60 h					
Teachir	ng cvcl	e			
	<u> </u>				
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22					
Module		ars in			
		mination for the teaching	degree Gymnasium	Mathematics (2010)	
exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)					

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 60 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module	e title			Abbreviation				
School	Mathe	ematics from a Didactical	Point of View: Geom	etry online (virtual	10-M-VHBDG-191-m01			
course								
Module	Module coordinator			Module offered by				
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics			
ECTS		od of grading	Only after succ. com	pl. of module(s)				
2	(not)	successfully completed						
Duratio		Module level	Other prerequisites					
1 seme		undergraduate						
Conten	ts							
importa which a chapte	ant for are usu rs on s	all of geometry and math ally discussed only briefl pace geometry, trigonom	ematics, namely prov y or not at all in unive	ving and problem so ersity lectures and ir	es on topics which are central and lving. It also addresses topics I the literature. Among these are			
Intend	ed lear	ning outcomes						
ment o and jus They ar of instr (in the	f unde stify lea re able ruction sense	rstanding of the central co arning units and learning to assess and value the i . They know various fields of modelling cycles) inde	oncepts of geometry sequences for the im mportance of digital s of application of geo pendently.	in teaching mathem portant topics in sch technology with resp ometric concepts, ar	niddle and long term develop- atics. They are able to develop nool geometry independently. pect to todays and future design and are able to perform modelling			
	s (type	, number of weekly conta	ict nours, language –	- II other than Germa	11)			
Ü (2)			• • • • • •	<u> </u>				
		sessment (type, scope, la ion on whether module ca			ition offered — if not every seme-			
Assess	ment c	based, 15 to 20 hours) offered: Once a year, sum ning, Vhb	mer semester					
Allocat	ion of	places						
Additio	onal inf	ormation						
Worklo	ad							
60 h								
Teachi	ng cycl	e						
	-							
Referre	ed to in	LPO I (examination regu	lations for teaching-o	legree programmes)				
§ 22			U					
Module		ars in						
			g degree Gymnasium	Mathematics (2019)				
			First state examination for the teaching degree Gymnasium Mathematics (2019)					
	exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)							

Modul	e title				Abbreviation
Exam 1	Futorial	Ordinary Differential Equ	uations (virtual cours	se)	10-M-VHBDGL-191-m01
Modul	e coord	inator		Module offered by	
Dean c	Dean of Studies Mathematik (Mathematics)		atics)	Institute of Mathen	natics
ECTS	1	od of grading	Only after succ. con	npl. of module(s)	
3	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites	i	
1 seme	ester	undergraduate			
Conter	nts				
cus is g are sup	given to	o animations and visualis nted and illustrated by se	ations of the behavio	our of solutions of di	egree Gymnasium. A particular fo- fferential equations. The topics ms of previous years in varying
Intend	ed lear	ning outcomes			
the res rent co	pective ntexts.	e methods of proof in the The course shows the lev	field of ordinary diffe vel of difficulty in the	erential equations ar Bavarian state exan	
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
Ü (3)					
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-
Assess	sment o	based, 20 to 30 hours) ffered: Once a year, sum hing, Vhb	mer semester		
Allocat	tion of	places			
Additio	onal inf	ormation			
Worklo	bad				
90 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)	
§ 22	Nr. 3 f)				
Modul	e appea	ars in			
		mination for the teaching			
First st	ate exa	mination for the teachinន្	g degree Gymnasium	Mathematics (2023)	1

Module	e title				Abbreviation
Didacti	cs of S	tochastics (virtual course	e)		10-M-VHBDST-191-m01
Module	e coord	inator		Module offered by	
Dean of Studies Mathematik (Mathematics)		atics)	Institute of Mathem	natics	
ECTS	ECTS Method of grading Only after succ. compl. of module(s)				
2	(not) s	successfully completed			
Duration Module level Other prerequisites					
1 seme	ster	undergraduate			
Conten	ts				
portant dom va se cove	t topics triables ers topi	in stochastics, for exam , expected value, varianc cs which are usually not	ple basics in stochas ce, probability spaces	tics, Bernoulli exper s or the Tschebysche	focuses on the central and im- iments, location parameter, ran- eff inequality. Moreover, the cour- re on stochastics.
Intend	ed lear	ning outcomes			
of unde justify are abl structio (in the	erstand learnin e to as on. The sense o	ing of the central concep g units and learning sequ sess and value the impor y know various fields of a of modelling cycles) inde	ts of stochastics in te lences for the importa tance of digital techn application of concep pendently.	eaching mathematic ant topics in school ology with respect t ts in stochastics, an	Idle and long term development s. They are able to develop and stochastics independently. They o todays and future design of in- d are able to perform modelling
	s (type	, number of weekly conta	ct hours, language —	if other than Germa	an)
Ü (2)					
		s essment (type, scope, la on on whether module ca			ation offered — if not every seme-
Assess	ment o	based, 15 to 20 hours) ffered: Once a year, winto ing, Vhb	er semester		
Allocat	ion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
60 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
§ 22	Nr. 3 f)				
Module	e appea	ars in			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2019)	
		gram Mathematics (2023)			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2023))

LA Gymnasien	Mathematics	(2023)
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Modul	e title				Abbreviation
Exam 1	Futorial	Didactics of Mathematic	s (virtual course)		10-M-VHBEx-191-m01
Modul	e coord	inator		Module offered by	
Dean c	Dean of Studies Mathematik (Mathematics)		Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
3	(not)	successfully completed			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
the Ers	stes Sta	atsexamen für Lehramt G	ymnasium (first state	e examination for tea	g of theorems) in preparation for aching at a Gymnasium) as well state examination in Bavaria).
Intend	ed lear	ning outcomes			
The stu	udent le	earns about the structure	of the state exams a	nd different method	s for solving the exam problems.
Course	es (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)
Ü (2)					
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-
Assess	sment o	based, 15 to 20 hours) ffered: Once a year, wint hing, Vhb	er semester		
Alloca	tion of _l	places			
Additio	onal inf	ormation			
Worklo	bad				
90 h					
-	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes	
	Nr. 3 f)				
	e appea	ars in			
First st	ate exa	mination for the teaching mination for the teaching			

Module					Abbreviation
Exam T	utorial	Algebra (virtual course)			10-M-VHBExA-191-m01
Module	coord	inator		Module offered by	<u> </u>
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. con	cc. compl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
for the are add	Bavaria Iressec	an state examination for t	he teaching degree (and fundamental alg	Gymnasium. The the ebraic concepts with	ra with respect to their relevance ories of groups, rings and fields a their set-theoretic interrelations and their solutions.
Intende	ed lear	ning outcomes			
braic p	roof me				problems and the respective alge- shows the level of difficulty in the
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	in)
Ü (4)					
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
Assess	ment o	based, 15 to 20 hours) ffered: Once a year, sum iing, Vhb	mer semester		
Allocat	ion of j	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachir	ıg çvçi	e			
		-			
Referre	d to in	LPOI (examination regu	lations for teaching.	legree programmes)	
§ 22				2-3-00 programmes)	
Module		ars in			
		mination for the teaching	degree Gymnacium	Mathematics (2010)	
		mination for the teaching			
			,		

Exam ¹	Module title				Abbreviation
-//4/11	Tutorial	Complex Analysis (virtu	al course)		10-M-VHBFT-191-m01
Modul	le coord	inator		Module offered by	<u> </u>
Dean c	of Studi	es Mathematik (Mathema	atics)	Institute of Mather	natics
ECTS	Meth	od of grading	Only after succ. con	ucc. compl. of module(s)	
3	(not)	successfully completed			
Duration Module level Other prerequisites					
1 seme	ester	undergraduate			
Conter	nts				
for the tions v	e Bavari with ree	an state examination for	the teaching degree (The topics are supple	Gymnasium. A partice emented and illustra	s with respect to their relevance cular focus is given to interrela- ited by selected examples and
Intend	led lear	ning outcomes			
the res shows	spective the lev	e methods of proof in con el of difficulty in the Bava	nplex analysis and is arian state examination	able to apply them on.	ands the central concepts and in different contexts. The course
Course	es (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)
Ü (4)					
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme
Assess	sment o	oased, 30 to 40 hours) iffered: Once a year, wint ning, Vhb	er semester		
J					
	tion of				
	tion of				
Allocat					
Allocat		places			
Allocat Additio 	onal inf	places			
Allocat Additio Worklo	onal inf	places			
Allocat Additio Worklo 90 h	onal inf	places formation			
Alloca Additio Worklo 90 h Teachi	onal inf oad	places formation			
Allocat Additio Worklo 90 h Teachi 	onal inf oad ing cycl	places formation	llations for teaching-o	degree programmes)
Allocat Additio Worklo 90 h Teachi Referro	onal inf oad ing cycl ed to in	places formation	lations for teaching-o	degree programmes)
Allocat Additio Worklo 90 h Teachi Referro § 22 II	onal inf oad ing cycl ed to in Nr. 3 f)	places formation e LPOI (examination regu	lations for teaching-o	degree programmes)
Allocat Additio Worklo 90 h Teachi Referro § 22 II Modul	onal inf oad ing cycl ed to in Nr. 3 f) le appea	places formation e LPOI (examination regu			

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Modul	Module title				Abbreviation
Fundamentals of Applied University Mathematics (virtual			athematics (virtual c	ourse)	10-M-VHBGAH-232-m01
Modul	e coord	inator		Module offered by	
			Institute of Mathem	natics	
ECTS		od of grading	Only after succ. con	pl. of module(s)	
5	(not)	successfully completed	pleted		
Duratio	on	Module level	Other prerequisites		
1 seme	ester				
Conter	nts				
			-		
Intend	ed lear	ning outcomes			
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	an)
Ü (4)					
Course	e type: e	eLearning, mostly Virtuell	e Hochschule Bayern	(vhb)	
		s essment (type, scope, la ion on whether module c			ition offered — if not every seme
project	t (web-l	based, 15 to 20 hours)			
Allocat	tion of	places			
Additio	onal inf	ormation			
			_		
Worklo	bad				
150 h			-		
-	ng cycl	e	-		
	- /				
Referre	ed to in	LPO I (examination regu	llations for teaching-	degree programmes)	
§ 22	Nr. 3 f)				
Modul	e appea	ars in			
		gram Mathematics (2023)		
excitat		J	<i>v</i>		

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	data record Lehramt Gymnasien Mathematik - 2023	

	e title				Abbreviation
Basics	in Sch	ool Geometry (virtual co	ourse)	_	10-M-VHBGeo-152-m01
Modul	e coord	inator		Module offered by	<u> </u>
		es Mathematik (Mathem	natics)	Institute of Mathem	natics
ECTS		od of grading	Only after succ. cor		inatics
2		successfully completed			
Duratio	1	Module level	Other prerequisites	•	
1 seme		undergraduate			
Conter		undergraduate			
Revisio	on and o ecific a				hat are prerequisites for the sub Hauptschule, Realschule) in geo
Intend	ed lear	ning outcomes			
		as basic knowledge of s acquainted with the en			of mathematics and its didac- ng geometry in school.
Course	es (type	, number of weekly cont	tact hours, language –	– if other than Germa	an)
Ü (2) Course	e type: e	Learning, mostly Virtue	lle Hochschule Bayerr	า (vhb)	
		sessment (type, scope, ion on whether module			ation offered — if not every seme
		based, 15 to 20 hours) ffered: Once a year, sun	nmer semester		
Allocat	tion of _l	olaces			
Additio	onal inf				
		ormation			
		ormation			
 Workle	nad	ormation	_		
	oad	ormation			
60 h					
60 h	oad ing cycl				
60 h Teachi 	ing cycl	e			
60 h Teachi 	ing cycl		ulations for teaching-	degree programmes)
Teachi Referre § 22	ing cycl ed to in Nr. 1 h)	e	ulations for teaching-	degree programmes)
60 h Teachi <u>Referro</u> § 22 II § 22 II	ing cycl ed to in Nr. 1 h) Nr. 2 f)	e	ulations for teaching-	degree programmes)
60 h Teachi Referro § 22 II § 22 II § 22 II	ing cycl ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f)	e LPOI (examination reg	ulations for teaching-	degree programmes))
60 h Teachi § 22 § 22 § 22 § 22 Module	ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f) e appe a	e LPOI (examination reg			
60 h Teachi Referro § 22 II § 22 II § 22 II S 22 II Modul First st	ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f) e appea ate exa	e LPOI (examination reg ars in mination for the teachir	ng degree Grundschule	e Mathematics (2015	;)
60 h Teachi Referro § 22 II § 22 II § 22 II Modul First st First st	ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f) e appea tate exa tate exa	e LPOI (examination reg ars in mination for the teachir mination for the teachir	ng degree Grundschule ng degree Grundschule	e Mathematics (2019 e Didactics in Mathe	
60 h Teachi Referro § 22 II § 22 II § 22 II § 22 II First st First st First st	ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f) e appea tate exa tate exa tate exa	e LPOI (examination reg ars in mination for the teachir mination for the teachir mination for the teachir	ng degree Grundschuld ng degree Grundschuld ng degree Realschuld	e Mathematics (2015 e Didactics in Mathe Mathematics (2015)	;) matics (Primary School) (2015)
60 h Teachi Referro § 22 § 22 § 22 Module First st First st First st First st First st First st	ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f) e appea tate exa tate exa tate exa tate exa tate exa tate exa tate exa	e LPOI (examination reg mination for the teachir mination for the teachir mination for the teachir mination for the teachir mination for the teachir	ng degree Grundschuld ng degree Grundschuld ng degree Realschule I ng degree Gymnasium	e Mathematics (2015 e Didactics in Mathe Wathematics (2015) Mathematics (2015)	;) matics (Primary School) (2015)
60 h Teachi Referro § 22 II § 22 II § 22 II Modulo First st First st First st First st First st (2015)	ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f) e appea cate exa cate exa cate exa cate exa cate exa cate exa	e LPOI (examination reg mination for the teachir mination for the teachir	ng degree Grundschuld ng degree Grundschuld ng degree Realschule I ng degree Gymnasium ng degree Sonderpäda	e Mathematics (2015 e Didactics in Mathe Mathematics (2015) Mathematics (2015) Igogik Didactics in N	;) matics (Primary School) (2015)
60 h Teachi Referra § 22 II § 22 II § 22 II Modul First st First st First st First st First st (2015) First st (2015)	ed to in Nr. 1 h) Nr. 2 f) Nr. 3 f) e appea tate exa tate exa tate exa tate exa tate exa tate exa	e LPOI (examination reg mination for the teachir mination for the teachir	ng degree Grundschuld ng degree Grundschuld ng degree Realschule J ng degree Gymnasium ng degree Sonderpäda ng degree Sonderpäda	e Mathematics (2015 e Didactics in Mathe Wathematics (2015) Mathematics (2015) ngogik Didactics in N	;) matics (Primary School) (2015) lathematics (Primary School) lathematics (Middle School)

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Julius-Maximilians-UNIVERSITÄT WÜRZBURG

First state examination for the teaching degree Mittelschule Mathematics (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2020 (Prüfungsordnungsversion 2015))

exchange program Mathematics (2023)

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	Module title Abbreviation					
History	of Mat	hematics (virtual course)		10-M-VHBHM-191-m01	
Modul	e coord	inator		Module offered by		
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathen	natics	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
5	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
		cs from the history of ma ent of modern algebra (a			e foundation of mathematics or	
Intend	ed lear	ning outcomes				
The stu	ıdent sl	nall				
ii) learı	n the ba	verview over the develop asic techniques for worki search using databases	ng with mathematica	l texts as well as his	torical texts on mathematics	
iii) be a	able to	write an essay on a selec	ted topic from the his	story of mathematics	5.	
		, number of weekly conta	· · ·	•		
Ü (2)		, ,	<u> </u>		,	
• •	e taugh	t in: English				
		s essment (type, scope, la on on whether module c			ation offered — if not every seme	
Term paper (approx. 10 to 20 pages) Language of assessment: German and/or English Assessment offered: Once a year, summer term						
		ffered: Once a year, sum ing, Vhb				
Other:		ing, Vhb				
Other: Allocat	E-Learn	ing, Vhb				
Other: Allocat	E-Learn ion of p	ing, Vhb				
Other: Allocat	E-Learn ion of p	ing, Vhb blaces				
Other: Allocat Additic	E-Learn ion of p onal inf	ing, Vhb blaces				
Other: Allocat Additic Worklo	E-Learn ion of p onal inf	ing, Vhb blaces				
Other: Allocat Additic Worklo 150 h	E-Learn ion of p onal info oad	ing, Vhb olaces ormation				
Other: Allocat Additic Worklo 150 h	E-Learn ion of p onal inf	ing, Vhb olaces ormation				
Other: Allocat Additio Worklo 150 h Teachi 	E-Learn ion of p onal info oad	ing, Vhb olaces ormation e	mer term	legree programmes		
Other: Allocat Additic Worklo 150 h Teachi Referre	E-Learn ion of p onal info pad ng cycl	ing, Vhb olaces ormation	mer term	degree programmes)		
Other: Allocat Additio Worklo 150 h Teachi Referre § 22 II	E-Learn ion of p onal info oad ng cycl ed to in Nr. 3 f)	ing, Vhb olaces ormation e LPOI (examination regu	mer term	degree programmes)		
Other: Allocat Additic Worklo 150 h Teachi § 22 II Modulo	E-Learn ion of p onal info oad ng cycl ed to in Nr. 3 f) e appea	ing, Vhb olaces ormation e LPO I (examination regu	lations for teaching-c			
Other: Allocat Additic Worklo 150 h Teachi § 22 II Modulo First st	E-Learn ion of p onal info oad ng cycl ed to in Nr. 3 f) e appea ate exa	ing, Vhb olaces ormation e LPOI (examination regu	lations for teaching-o			

Module	e title			Abbreviation		
Mathe	matics in grade 10 (virtual co	urse)		10-M-VHBM10-152-	m01	
Madul	e coordinator		Module offered by			
			Module offered by			
	of Studies Mathematik (Mathe		Institute of Mathem	natics		
ECTS	Method of grading	Only after succ. con	npl. of module(s)			
2	(not) successfully complete					
Duratio		Other prerequisites				
1 seme	ester undergraduate					
Conten	its					
Basic topics on teaching mathematics in tenth grade in Hauptschule, Realschule and Gymnasium.						
Intend	ed learning outcomes					
schule of new	Ident learns basic topics in th , as well as the related mathe technologies for teaching ma	matical backgrounds a thematics in tenth form	nd proofs. He/She is	acquainted with the		
	s (type, number of weekly co	ntact nours, language –	- If other than Germa	in)		
Ü (2)	e type: eLearning, mostly Virtu	alla Hachcohula Pauar	(ubb)			
	,,, ,					
ster, in	d of assessment (type, scope formation on whether module			ition offered — if not	every seme-	
	t (web-based, 15 to 20 hours)					
	ment offered: Once a year, su	Immer semester				
Allocat	tion of places					
Additio	onal information					
Worklo	ad					
60 h						
Teachi	ng cycle					
	d to in IDO L (avamination r	gulations for toaching	dograa programmas			
	ed to in LPO I (examination re		legree programmes			
§ 22 § 22 § 22						
Module	e appears in					
	ate examination for the teach	ing degree Grundschule	e Mathematics (2015)		
	ate examination for the teach				ool) (2015)	
First sta	ate examination for the teach	ing degree Realschule I	Mathematics (2015)			
First st	ate examination for the teach	ing degree Gymnasium	Mathematics (2015)			
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School)						
(2015) First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School)						
(2015)						
First state examination for the teaching degree Mittelschule Mathematics (2015)						
First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015)						
	First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Mittelschule Mathematics (2020 (Prüfungsordnungsversion					
2015))		ma acaree milleisenuit				
LA Gymnas	sien Mathematics (2023)		• generated 30-Mär-2024 • ehramt Gymnasien Mathema	-	page 71 / 82	
			chianit Gynnasien Matilellia	ux 2023		



First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2020 (Prüfungsordnungsversion 2015))

exchange program Mathematics (2023)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 72 / 82
	data record Lehramt Gymnasien Mathematik - 2023	1

Module title Abbreviation					
Mather	matics 1 (virtual course)			10-M-VHBMa1-152-	m01
A4 - J [.					
	e coordinator		Module offered by		
	f Studies Mathematik (Mather		Institute of Mathem	atics	
ECTS	Method of grading	Only after succ. con	npl. of module(s)		
2	(not) successfully completed				
Duratio		Other prerequisites	i		
1 seme	ster undergraduate				
Conten	ts				
Discussion of basic topics on teaching mathematics in a Gymnasium, in particular verbal and subject-specific fundamentals concerning the organisation of classes.					
Intende	ed learning outcomes				
	ident is able to discuss select	• •	s on teaching mathe	matics at German G	ymnasium,
	ering both subject-related and				
	s (type, number of weekly con	itact hours, language –	- if other than Germa	n)	
Ü (2)			<i></i>		
	type: eLearning, mostly Virtue				
	d of assessment (type, scope, formation on whether module			tion offered — if not	every seme-
	(web-based, 15 to 20 hours)				
Assess	ment offered: Every two years	, winter semester			
Allocat	ion of places				
Additio	onal information				
Worklo	ad				
60 h					
Teachi	ng cycle				
Poforro	ed to in LPO I (examination reg		degree programmes)		
§ 22 § 22	Nr. 2 f)				
§ 22	Nr. 3 f)				
Module	e appears in				
First sta	ate examination for the teachi	ng degree Grundschule	e Mathematics (2015)	
First sta	ate examination for the teachi	ng degree Grundschule	e Didactics in Mather	natics (Primary Scho	ool) (2015)
	ate examination for the teachi				
	ate examination for the teachi	• • /			
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2015)					
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2015)					
First state examination for the teaching degree Mittelschule Mathematics (2015)					
First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015)					
	ate examination for the teachi				
First sta 2015))	ate examination for the teachi	ng degree Mittelschule	e Mathematics (2020	(Prüfungsordnungs	version
LA Gymnas	ien Mathematics (2023)	-	• generated 30-Mär-2024 • e	-	page 73 / 82
		data record L	ehramt Gymnasien Mathemat	ик - 2023	



First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2020 (Prüfungsordnungsversion 2015))

exchange program Mathematics (2023)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 74 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module	e title			Abbreviation	
Mathe	matics 2 (virtual course)			10-M-VHBMa2-152-	m01
Module	e coordinator		Module offered by		
Dean o	f Studies Mathematik (Mathe	ematics)	Institute of Mathem	natics	
ECTS	Method of grading	Only after succ. cor			
2	(not) successfully complete				
Duratio		Other prerequisites	3		
1 seme			9		
Conten		1			
Discus	sion of central topics on teac		Gymnasium, in partic	ular didactic analyse	es and possi-
	of implementation in the cla	ssroom.			
Intende	ed learning outcomes				
	ident is able to discuss and a sium from a didactical point	, , ,	and questions on tea	aching mathematics	at German
Course	s (type, number of weekly co	ntact hours, language -	– if other than Germa	n)	
Ü (2)	type: eLearning, mostly Virtu				
ster, in	d of assessment (type, scope formation on whether modul			tion offered — if not	every seme-
	(web-based, 15 to 20 hours) ment offered: Every two year	s, summer semester			
Allocat	tion of places				
Additio	onal information				
Worklo	ad				
60 h					
Teachi	ng cycle				
. cuelli					
Deferre	d to in IDO I (avamination s	aulations for too shing			
	ed to in LPO I (examination re	egulations for teaching-	degree programmes)		
§ 22 § 22 § 22	Nr. 2 f)				
	e appears in				
	ate examination for the teach	ing degree Grundschul	e Mathematics (2015)	
	ate examination for the teach				ol) (2015)
	ate examination for the teach				
	ate examination for the teach		-		
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2015)					
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2015)					
First state examination for the teaching degree Mittelschule Mathematics (2015)					
First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015)					
First sta	ate examination for the teach	ing degree Gymnasium	Mathematics (2019)		
First sta 2015))	ate examination for the teach	ing degree Mittelschule	e Mathematics (2020	(Prüfungsordnungs	version
	sien Mathematics (2023)		g ● generated 30-Mär-2024 ● 0 .ehramt Gymnasien Mathema		page 75 / 82
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First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2020 (Prüfungsordnungsversion 2015))

exchange program Mathematics (2023)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 76 / 82
	data record Lehramt Gymnasien Mathematik - 2023	1

Module title				Abbreviation	
Mather	Mathematics 3 (virtual course)				10-M-VHBMa3-232-m01
Module	Module coordinator			Module offered by	
				Institute of Mathem	atics
ECTS		od of grading			
3		successfully completed			
Duratio		Module level	Other prerequisites		
1 seme	ster				
Conten	ts				
Intende	ed lear	ning outcomes			
			·		
Course	s (type	, number of weekly conta	ct hours, language —	- if other than Germa	n)
Ü (2)					
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	(vhb)	
		sessment (type, scope, la on on whether module ca			tion offered — if not every seme-
		oased, 15 to 20 hours) ffered: Every two years, w	vinter semester		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cycl	e			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22	§ 22 II Nr. 3 f)				
Module appears in					
	exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 77 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module title				Abbreviation	
Mather	Mathematics 4 (virtual course)				10-M-VHBMa4-232-m01
Module	e coord	inator		Module offered by	
				Institute of Mathem	atics
ECTS		Method of grading Only after succ. compl. of module(s)			
3		successfully completed			
Duratio		Module level	Other prerequisites		
1 seme	ster				
Conten	ts				
Intende	ed lear	ning outcomes			
			·		
Course	s (type	, number of weekly conta	ct hours, language —	- if other than Germa	n)
Ü (2)					
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	(vhb)	
		s essment (type, scope, la on on whether module ca			tion offered — if not every seme-
		oased, 15 to 20 hours) ffered: Every two years, w	vinter semester		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cycl	e			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22	§ 22 Nr. 3 f)				
Module appears in					
	exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 78 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Module title				Abbreviation	
Mathematical Modelling (virtual course)			e)		10-M-VHBMM-232-m01
Module	e coord	inator		Module offered by	
				Institute of Mathem	atics
ECTS		od of grading	Only after succ. con	npl. of module(s)	
3	<u> </u>	successfully completed			
Duratio		Module level	Other prerequisites		
1 seme					
Conten	ts				
Intende	ed leari	ning outcomes			
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)
Ü (2)					
		Learning, mostly Virtuell			
		s essment (type, scope, la on on whether module ca			tion offered — if not every seme-
project	(web-b	ased, 15 to 20 hours)			
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22 Nr. 3 f)					
	Module appears in				
1	exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)				

Module	e title			Abbreviation				
Stocha	stics in Sekundarstufe I (virt	10-M-VHBSto-152-m	101					
Modula	e coordinator							
		(montion)	Module offered by					
	f Studies Mathematik (Mathe		Institute of Mathem	atics				
ECTS	Method of grading	Only after succ. con	ipl. of module(s)					
2	(not) successfully complete							
Duratio		Other prerequisites						
1 seme	ster undergraduate							
Conten	ts							
	n and consolidation of the fu didactic courses in stochasti	•	chastics that are pre	requisites for the su	ıbject-speci-			
Intend	ed learning outcomes							
	ident has basic knowledge of	ctochactics as require	d for the study of ma	thomatics and its di	dac			
	/She is acquainted with the e	•						
	s (type, number of weekly co		-	-				
Ü (2)	(),),),							
• •	type: eLearning, mostly Virtu	elle Hochschule Bavern	(vhb)					
	d of assessment (type, scope	·		tion offered — if not	every seme			
	formation on whether module				every seme			
-	(web-based, 15 to 20 hours)		······································					
	ment offered: Once a year, w	inter semester						
	ion of places							
Allocal	ion of places							
Additio	onal information							
Worklo	ad							
60 h								
Teachi	ng cycle							
	<u>, o , , </u>							
Deferre	d to in IDO L (avamination r	gulations for toaching	lagraa programmac)					
	ed to in LPO I (examination re		regree programmes)					
§ 22 § 22								
§ 22 § 22								
	e appears in							
		in a da ana a Cina da da da da	Marthan at					
	ate examination for the teach							
	First state examination for the teaching degree Grundschule Didactics in Mathematics (Primary School) (2015)							
First state examination for the teaching degree Realschule Mathematics (2015)								
First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School)								
(2015)		ma acarec sonuerpaua	Source and and an		501000			
	ate examination for the teach	ing degree Sonderpäda	gogik Didactics in Ma	athematics (Middle	School)			
(2015)		5 5			- 7			
_	ate examination for the teach	ing degree Mittelschule	Mathematics (2015)					
First st		ing degree Mittelschule	Didactics in Mathem	natics (Middle Schoo				
	ate examination for the teach				ol) (2015)			
First st	ate examination for the teach ate examination for the teach		Mathematics (2019)		ol) (2015)			
First sta First sta First sta		ing degree Gymnasium	-		_			
First sta First sta	ate examination for the teach	ing degree Gymnasium	-		_			
First sta First sta First sta 2015))	ate examination for the teach	ing degree Gymnasium ing degree Mittelschule	-	(Prüfungsordnungs [,]	_			



First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2020 (Prüfungsordnungsversion 2015))

exchange program Mathematics (2023)

LA Gymnasien Mathematics (2023)	JMU Würzburg • generated 30-Mär-2024 • exam. reg.	page 81 / 82
	data record Lehramt Gymnasien Mathematik - 2023	

Modul	e title				Abbreviation			
Accesses to the Foundations of Analysis (virtual course) 10-M-VHBZGA-232-m								
Modul	e coord	linator		Module offered by				
				Institute of Mathem	natics			
ECTS		od of grading	Only after succ. con	pl. of module(s)				
2	(not)	successfully completed						
Duration		Module level	Other prerequisites					
1 seme	ester							
Conter	nts							
Intend	ed lear	ning outcomes						
Course	es (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)			
Ü (2)								
Course	e type: e	eLearning, mostly Virtuell	e Hochschule Bayern	(vhb)				
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-			
project	t (web-l	pased, 15 to 20 hours)						
Allocat	tion of	places						
Additio	onal inf	ormation						
Worklo	bad							
60 h								
Teachi	ng cycl	e						
Referred to in LPO I (examination regulations for teaching-degree programmes)								
§ 22	§ 22 Nr. 3 f)							
Modul	e appea	ars in						
exchar	nge pro	gram Mathematics (2023)					
First st	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2023))			