

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: 2019 Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Mathematics

Learning Outcomes

UNIVERSITÄT

WÜRZBURG

German contents and learning outcome available but not translated yet.

Wissenschaftliche Befähigung

- Die Absolventinnen und Absolventen sind vertraut mit den Arbeitsweisen und der zugehörigen Fachsprache der Mathematik und beherrschen die Methoden mathematischen Denkens und Beweisens.
- Die Absolventinnen und Absolventen besitzen grundlegende Kenntnisse in Stochastik und mindestens einem weiteren Gebiet der Angewandten Mathematik und können sicher mit den Methoden dieser Gebiete umgehen.
- Die Absolventinnen und Absolventen besitzen grundlegende Kenntnisse ausgewählter Gebiete der Reinen Mathematik und sind vertraut mit den grundlegenden Beweismethoden dieser Gebiete.
- Die Absolventinnen und Absolventen sind geschult in analytischem Denken, besitzen ein hohes Abstraktionsvermögen, universell einsetzbare Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen sind in der Lage, sich selbständig mithilfe von Fachliteratur in weitere Gebiete der Mathematik einzuarbeiten.
- Die Absolventinnen und Absolventen sind in der Lage, ihre Kenntnisse, Ideen und Problemlösungen verständlich zu präsentieren.
- Die Absolventinnen und Absolventen besitzen die für ein weiterführendes, insbesondere Master-
- Studium, erforderlichen Grundkenntnisse, Denk- und Arbeitsweisen und Methodenkenntnisse.
- Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und sind in der Lage, sie in ihrer eigenen Arbeit zu beachten.
- Die Absolventinnen und Absolventen können Konzepte, Prinzipien, Methoden und evidenzbasierte Erkenntnisse aus dem Bereich der Mathematikdidaktik interpretieren und anwenden.
- Die Absolventinnen und Absolventen können den Einsatz von Medien im Mathematikunterricht und die Betreuung von Schülerinnen und Schülern an ausgewählten Lehr-Lernsituationen wissenschaftlich fundiert reflektieren.

Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die Absolventinnen und Absolventen sind geschult in analytischem Denken, besitzen ein hohes Abstraktionsvermögen, universell einsetzbare Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen sind in der Lage, ihre Kenntnisse, Ideen und Problemlösungen zielgruppenorientiert verständlich zu formulieren und zu präsentieren.
- Die Absolventinnen und Absolventen sind in der Lage, konkrete Probleme aus anderen Gebieten zu erkennen, strukturieren und modellieren, mit mathematischen Methoden Lösungswege zu entwickeln.
- Die Absolventinnen und Absolventen besitzen ein ausgeprägtes Durchhaltevermögen bei der Lösung komplexer Probleme.
- Die Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in Teams zu arbeiten.
- Die Absolventinnen und Absolventen sind in der Lage, sich weitere Wissensgebiete selbständig, effizient und systematisch zu erschließen.
- Die Absolventinnen und Absolventen sind vertraut mit dem Umgang von digitalen Medien im Mathematikunterricht und können mathematische Software gewinnbringend in Lehr-Lernsituationen einsetzen.

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 2 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

- Die Absolventinnen und Absolventen besitzen die Fähigkeit, in interdisziplinär zusammengesetzten Teams gestaltend mitzuwirken.
- Die Absolventinnen und Absolventen realisieren Konzepte, Prinzipien, Methoden und evidenzbasierte Erkenntnisse aus dem Bereich der Mathematikdidaktik im Mathematikunterricht.

Persönlichkeitsentwicklung

UNIVERSITÄT

WÜRZBURG

- Die Absolventinnen und Absolventen sind geschult in analytischem Denken, besitzen ein hohes Abstraktionsvermögen, universell einsetzbare Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen sind in der Lage, gesellschaftliche, wirtschaftliche, historische, fachdidaktische und schulpraktische Entwicklungen und Prozesse kritisch zu reflektieren und zu bewerten.
- Die Absolventinnen und Absolventen sind in der Lage, in partizipativen Prozessen gestaltend mitzuwirken.
- Die Absolventinnen und Absolventen besitzen ein ausgeprägtes Durchhaltevermögen bei der Lösung komplexer Probleme.
- Die Absolventinnen und Absolventen sind in der Lage, Ideen und Lösungsvorschläge allgemeinverständlich und zielgruppenorientiert zu identifizieren, realisieren und präsentieren.

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	
	data record Lehramt Gymnasien Mathematik - 2019	

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)):

07-Nov-2018 (2018-66)

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.

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	
	data record Lehramt Gymnasien Mathematik - 2019	

The subject is divided into

Abbreviation	Module title	ECTS Method of		nage		
	module litte	credits	grading	page		
Scientific Discipline (92 E	CTS credits)					
Compulsory Courses (46	6 ECTS credits)					
10-M-MDAL-152-m01	Introduction into Mathematical Thinking and Working for Tea-	5	B/NB	37		
	ching Degree (German Gymnasium)	ر 		1		
10-M-I NI -Ü-191-m01	Overview Linear Algebra for Teaching Degree (German Gymna-	13	NUM	36		
	sium)	-9				
10-M-ANL-Ü-191-m01	Overview Analysis for Teaching Degree (German Gymnasium)	16	NUM	13		
10-M-DFL-Ü-191-m01	Overview Differential Equations and Complex Analysis for Tea-	12	NUM	20		
	ching Degree (German Gymnasium)					
Compulsory Electives (4	6 ECTS credits)					
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	34		
10-M-LNL2-191-m01	Linear Algebra 2 for Teaching Degree (German Gymnasium)	5	B/NB	35		
Subfield Basics in Ana	lysis (5 ECTS credits)					
10-M-ANL1-191-m01	Analysis 1 for Teaching Degree (German Gymnasium)	5	B/NB	11		
10-M-ANL2-191-m01	Analysis 2 for Teaching Degree (German Gymnasium)	5	B/NB	12		
Subfield Basics in High	ner Analysis (5 ECTS credits)					
10 M DGU 101 m01	Ordinary Differential Equations for Teaching Degree (German	-	D /ND	22		
10-10-0611-191-1101	Gymnasium)	5	D/ND	22		
10 M ETHI 101 mo1	Introductory Complex Analysis for Teaching Degree (German	-	D/ND	20		
10-10-101	Gymnasium)	5	D/ND	ۍر		
Subfield Stochastics and Basics in Algebra and Applied Mathematics (11 ECTS credits)						
Focus Basics in Algeb	ora and Applied Mathematics (5 ECTS credits)					
10-M-ALGL-101-m01	Introductory Algebra for Teaching Degree (German Gymnasi-	F	B/NB	10		
10-M-ALGL-191-1101	um)	5	D/ND	10		
10-M-AALL-191-m01	Applied Algebra for Teaching Degree (German Gymnasium)	5	B/NB	8		
10-M-NUI 1-101-m01	Numerical Mathematics 1 for Teaching Degree (German Gymna-			40		
	sium)	5	D/ND	40		
Focus Stochastics (6	ECTS credits)					
10-M-STL-191-m01	Stochastics for Teaching Degree (German Gymnasium)	6	NUM	53		
10-M-STOL-191-m01	Stochastics 1 for Teaching Degree (German Gymnasium)	6	NUM	54		
Subfield Geometrie (10	ECTS credits)					
	Elementary Geometry for Teaching Degree (German Gymnasi-			_		
10-M-EGEL-191-m01	um)	10	NUM	28		
	Introductory Differential Geometry for Teaching Degree (Ger-					
10-M-DGEL-191-m01	man Gymnasium)	10	NUM	21		
	Introductory Projective Geometry for Teaching Degree (German					
10-M-PGEL-191-m01	Gymnasium)	10	NUM	42		
Subfield Overview Algebra and Applied Mathematics (10 ECTS credits)						
	Overview Algebra and Applied Algebra for Teaching Degree					
10-M-AALL-U-191-m01	(German Gymnasium)	10	NUM	9		
10-M-ANUL-Ü-191-	Overview Algebra and Numerical Mathematics 1 for Teaching		N11 1 N A			
mo1 Degree (German Gymnasium) 10 NUM			14			
LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam.	reg.	page	e 5 / 81		
	data record Lehramt Gymnasien Mathematik - 2	019	,			

Teaching (10 ECTS credit	s)			
Compulsory Courses (1	o ECTS credits)	-	-	
M DCV	Didactics of Mathematics: Algebra and Analysis (German Gym-			
10-M-DGY1-191-m01	nasium)	6	NUM	23
10-M-DGY2-191-m01	Didactics of Mathematics: Geometry (German Gymnasium)	4	NUM	24
Paper (4 ECTS credits)	•	•	•	•
Students studying for a teacl gy (studienbegleitendes fach Fach (subject studied with a regulations for teaching-deg ECTS credits obtained are co neral academic and examina	ning degree Gymnasium must complete a practical training in dic ndidaktisches Praktikum) which refers to one of the subjects they focus on the scientific discipline) pursuant to Section 34 Subsec ree programmes). The obligatory accompanying tutorial is offered unted in the subject Erziehungswissenschaften pursuant to Sect tion regulations for teaching-degree programms).	lactics and v selected tion 1 No. d by the re- ion 10 Sub	I teaching metl as vertieft stud 4 LPO I (examin spective subjective subjective subjective subjective subjective subjective subjective studies (section 3 LASF	hodolo- iertes nation ct. The 20 (ge-
10-M-SEDPGY-152-m01	Practical Training in Classroom Teaching including Theory (Ger-	4	B/NB	52
	man Gymnasium)	4	6/110	2
Teaching degree students m ject-specific electives) (Secti To achieve the required num Freier Bereich interdisciplin nex "Ergänzende Bestimmur Mathematics (Freier Bereich (general as v	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)	er Bereich teaching-d as below. can be four hramt".	(general as wel egree program nd in the respe	ll as sub mes)). ctive An
Module Group group Matl	nematics and Didactics of Mathematics			
10-M-SCH-152-m01	School Mathematics from a Higher Perspective	5	B/NB	49
10-M-DCMU-152-m01	Computers in Mathematical Teaching	3	B/NB	18
10-M-PRM1-152-m01	Introduction to Hands-on Mathematics	3	B/NB	46
10-M-PRM2-152-m01	Practical Course Hands-on Mathematics	3	B/NB	47
10-M-D3GY-152-m01	10-M-D3GY-152-mo1 Didactics of Mathematics: Analytic Geometry and Stochastics		B/NB	17
10-M-PRA-152-m01	Hands-on Seminar Mathematics	3	B/NB	43
10-M-GES-152-m01	Selected Topics in History of Mathematics	5	B/NB	31
10-M-MSC-152-m01	Mathematical Writing	5	B/NB	38
10-M-SEM-152-m01	Seminar Mathematics	5	NUM	51
10-M-COM-152-m01	Computational Mathematics	4	B/NB	15
10-M-PRG-152-m01	Programming course for students of Mathematics and other subjects	3	B/NB	44
10-M-TuKo-152-m01	Exercise tutor or proof-reading in Mathematics	5	B/NB	55
10-M-FAN-152-m01	Introduction to Functional Analysis	9	B/NB	29
10-M-ORS-152-m01	Operations Research	9	B/NB	41
10-M-DVGY-191-m01	Advanced Didactics of Mathematics (German Gymnasium)	2	B/NB	25
10-M-REPL-191-m01	Review Course for Teaching Degree (German Gymnasium)	3	B/NB	48
Module Group Virtual Cou	rses			_
10-M-DVHB-152-m01	E-Learning and Blended Learning in Mathematical Teaching (virtual Course)	3	B/NB	26
10-M-VHBAri-152-m01	Basics in Arithmetics (virtual course)	2	B/NB	58
10-M-VHBGe0-152-m01	Basics in School Geometry (virtual course)	2	B/NB	70
10-M-VHBBr-152-m01	Start-up Tutorial Mathematics (virtual course)	2	B/NB	60
10-M-VHBSto-152-m01	Stochastics in Sekundarstufe I (virtual course)	2	B/NB	79
10-M-VHBM10-152-m01	Mathematics in grade 10 (virtual course)	2	B/NB	73
10-M-VHBDAL-191-mo1	School Mathematics from a Didactical Point of View: Algebra online (virtual course)	2	B/NB	62

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	
	data record Lehramt Gymnasien Mathematik - 2019	

UNIVERSITÄT WÜRZBURG	Subdivided Mc	odule Cata	logue for the S Mathei LA Gymi	ubject matics nasien
			1	
10-M-VHBDAN-191-m01	School Mathematics from a Didactical Point of View: Analysis online (virtual course)	2	B/NB	63
10-M-VHBDST-191-m01	Didactics of Stochastics (virtual course)	2	B/NB	66
10-M-VHBEx-191-m01	Exam Tutorial Didactics of Mathematics (virtual course)	3	B/NB	67
10-M-VHBExA-191-m01	Exam Tutorial Algebra (virtual course)	3	B/NB	68
10-M-VHBMa1-152-m01	10-M-VHBMa1-152-mo1 Mathematics 1 (virtual course)			
10-M-VHBMa2-152-m01	10-M-VHBMa2-152-mo1 Mathematics 2 (virtual course)			77
10-M-VHBZth-191-m01	Introduction to Elementary Number Theory (virtual course)	3	B/NB	81
10-M-VHBAnG-191-m01	M-VHBAnG-191-mo1 Analytic Geometry (virtual course)		B/NB	57
10-M-VHBCom-152-m01	Computer and Mathematics (virtual course)	2	B/NB	61
10-M-VHBFT-191-m01	Exam Tutorial Complex Analysis (virtual course)	3	B/NB	69
10-M-VHBDGL-191-m01	Exam Tutorial Ordinary Differential Equations (virtual course)	3	B/NB	65
	School Mathematics from a Didactical Point of View: Geometry	2	D/ND	61
10-10-70000-191-1101	online (virtual course)	2	D/ND	04
10-M-VHBHM-191-m01	History of Mathematics (virtual course)	5	B/NB	72
Paper (10 ECTS credits)				

and a family

Julius Mavi

Preparation of a written Hausarbeit (thesis) in accordance with the provisions of Section 29 LPO I (examination regulations for teaching-degree programmes) is a prerequisite for teaching degree students to be admitted to the Erste Staatsprüfung (First State Examination). In accordance with the provisions of Section 29 LPO I, students studying for a teaching degree Gymnasium may write this thesis in one of the subjects they selected as vertieft studiertes Fach (subject studied with a focus on the scientific discipline) or in the subject Erziehungswissenschaften (Educational Science). Pursuant to Section 29 Subsection 1 Sentence 2 LPO I, students may also choose to write an interdisciplinary thesis.

10-M-HMGY-152-m01	Thesis in Mathematics (Teaching Degree at German Gymnasi- um)	10	NUM	33
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LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation		
Applied Algebra for Teaching Degree (German Gymnasium)		10-M-AALL-191-m01			
Module	e coord	inator		Module offered by	
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Topics theory, Applica	in field solvab tions c	theory (particularly algel ility of equations, cycloto of algebra and number th	oraic field extensions omic fields, finite field eory (e.g., coding the	, ruler and compass ds). ory, cryptography, co	constructions, basics in Galois omputer algebra).
Intende	ed leari	ning outcomes			
The stu is acqu pender	dent kı ainted ıtly.	nows and masters the es with the central concepts	sential methods and s in this field, and is a	basic notions in algo able to apply the fun	ebra and its applications. He/She damental proof methods inde-
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
Ü (2)					
Methoo ster, inf	l of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral c) oral e Langua credital	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and, bonus	80 minutes, usually o ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	chosen) or 5) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teaching cycle					
	<u> </u>				
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
§ 73 Nr. 2 (2 FCTS credits). § 73 Nr. 5 (3 FCTS credits)					
Module	Module appears in				
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2010)	
First sta	First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 8 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title				Abbreviation		
Overview Algebra and Applied Algebra for Teaching Degree (German Gymnasi-			10-M-AALL-Ü-191-m01			
um)						
Module coordinator Module offered by						
Dean of Studi	es Mathematik (Mathema	atics)	Institute of Mathem	latics		
ECIS Meth	od of grading	Only after succ. com	pl. of module(s)			
Duration	Modulo loval	 Other prorequisites				
2 semester	undergraduate					
Contents		<u> </u>				
Topics in Grou phism theore metric groups Topics in ring	up Theory (particularly fin ms, solvability, group ope , dihedral groups). theory (particularly ideal	ite abelian groups, no erations, Sylow theore s, divisibility, polynor	ormal subgroups, su ems; examples: cycli nial rings, irreducibi	b- and factorgroups, isomor- ic groups, alternating and sym- lity of polynomials).		
Topics in num mainder theo Topics in fielc theory, solval	ber theory (particularly E rem, residue class rings a l theory (particularly alge pility of equations, cycloto	uclidean algorithm, F Ind their unit groups, braic field extensions omic fields, finite field	ermat's little theorer quadratic number ri , ruler and compass ls).	n, Euler's theorem, Chinese re- ngs). constructions, basics in Galois		
Applications	of algebra and number th	eory (e.g., coding the	ory, cryptography, co	omputer algebra).		
Intended lear	ning outcomes					
The student h thods, so that problems in c	as extensive knowledge of the bas the bas the fields of mathematic the bas the fields of mathematic bas be as the fields of mathematic bases of the	of the mathematical v ic notions of algebra a :s.	vays of thinking and and number theory a	working as well as of proof me- and can apply them to elementary		
Courses (type	, number of weekly conta	ict hours, language —	if other than Germa	n)		
V (4) + V (4) +	Ü (2)					
Method of as ster, informat	sessment (type, scope, la ion on whether module c	nguage — if other tha an be chosen to earn	in German, examina a bonus)	tion offered — if not every seme-		
oral examinat Language of a Assessment v	ion of one candidate eac assessment: German and vill have reference to the	h (20 to 40 minutes) /or English contents of modules :	10-M-ALGL und 10-M	I-AALL		
Allocation of	places					
Additional inf	ormation					
Workload						
300 h						
Teaching cycle						
Referred to in	Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 73 Nr. 2 (5	§ 73 Nr. 2 (5 ECTS credits), § 73 Nr. 5 (5 ECTS credits)					
Module appe	ars in					
First state exa First state exa	First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 9 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title				Abbreviation
Introductory Algebra for Teaching Degree (German Gymnasium)			10-M-ALGL-191-m01		
Module coordinator Module offered by			Module offered by		
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed			
Duratio	on stor	Module level	Other prerequisites		
1 Seme	ster	undergraduate			
Topics phism metric	in Grou theorer groups, in ring	p Theory (particularly fin ns, solvability, group ope dihedral groups).	ite abelian groups, no erations, Sylow theore	ormal subgroups, su ems; examples: cycli nial rings, irreducibi	b- and factorgroups, isomor- ic groups, alternating and sym- lity of polynomials).
Topics mainde	in num er theor	ber theory (particularly E em, residue class rings a	uclidean algorithm, Fo nd their unit groups,	ermat's little theorer quadratic number ri	n, Euler's theorem, Chinese re- ngs).
Intende	ed learr	ning outcomes			
The stu	dent kr	nows and masters the es	sential methods and	basic notions in alg	ebra. He/She is acquainted with
the cen	tral con	ncepts in this field, and is	s able to apply the fu	ndamental proof me	thods independently.
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
U (2)					
Method ster, in	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writt b) oral c) oral Langua credita	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and, bonus	80 minutes, usually c ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	:hosen) or 6) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
150 h					
Teaching cycle					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 73 Nr. 2 (2 ECTS credits), § 73 Nr. 5 (3 ECTS credits)					
Module	e appea	rs in			
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2019)	
First sta	ate exa	mination for the teaching	degree Gymnasium l	Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 10 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

			Abbreviation	
Analysis 1 for Teaching Degree (German Gymnasium)			10-M-ANL1-191-m01	
Module coordinator	Mod	ule offered by		
Dean of Studies Mathematik (Mathematics)	Instit	tute of Mathem	natics	
ECTS Method of grading Only	ter succ. compl. of	f module(s)		
5 (not) successfully completed				
Duration Module level Othe	orerequisites			
1 semester undergraduate				
Contents				
Real numbers and completeness; basic topo ries; power series and Taylor series; basics ir one variable (Riemann integral and improper	gical notions; conv lifferential calculu: itegral).	vergence and d s in one variab	livergence of sequences and se- le; basics of integral calculus in	
Intended learning outcomes				
The student knows and masters the essentia central proof methods in analysis and can en mathematical arguments independently and form.	nethods and notio loy them to solve express mathema	ns of analysis. easy problems atical argument	He/She is acquainted with the . He/she is able to perform easy ts precisely and clearly in written	
Courses (type, number of weekly contact hou	, language — if otł	ner than Germa	an)	
Ü (2)				
Method of assessment (type, scope, languag ster, information on whether module can be	— if other than Ge osen to earn a bor	rman, examina 1us)	tion offered — if not every seme-	
written examination (approx. 90 to 180 minut exercises each) Language of assessment: German and/or En	s) and written exer sh	cises (approx.	10 exercise sheets with approx. 4	
Allocation of places				
Additional information				
Workload				
150 h				
Teaching cycle				
Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 73 Nr. 1				
Module appears in				
First state examination for the teaching degree	Gymnasium Math	ematics (2019)		
First state examination for the teaching degree	Gymnasium Math	ematics (2023)		

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 11 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title				Abbreviation
Analys	is 2 for	Teaching Degree (Germa	an Gymnasium)		10-M-ANL2-191-m01
Module	e coord	inator		Module offered by	·
Dean o	f Studi	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			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Further implicit	topolo t functi	gical considerations, bas on theorem.	sics in differential cal	culus in several vari	ables, inverse function theorem,
Intende	ed lear	ning outcomes			
The stu central mather form.	dent k proof r natical	nows and masters the es methods in analysis and arguments independent	sential methods and can employ them to s ly and to express mat	notions of analysis. solve easy problems thematical argument	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	ict hours, language —	- if other than Germa	an)
Ü (2)					
Methoo ster, in	d of ass formati	sessment (type, scope, la ion on whether module c	inguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written exercis Langua	exami es eacl ge of a	nation (approx. 90 to 18c h) ssessment: German and	o minutes) and writter /or English	n exercises (approx.	10 exercise sheets with approx. 4
Allocat	ion of _l	places			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cvcl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
§ 73 N	lr. 1	, J		<u> </u>	
Module	e appea	ars in			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2019)	
riist sta	ate exa	mination for the teaching	s degree Gymnasium	mathematics (2023)	1

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.		
	data record Lehramt Gymnasien Mathematik - 2019		

Module	title				Abbreviation
Overview Analysis for Teaching Degree (German Gymnasium)			10-M-ANL-Ü-191-m01		
Module coordinator Module offer			Module offered by	· · · · · · · · · · · · · · · · · · ·	
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
16	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
2 seme	ster	undergraduate			
Conten	ts				
Real nu ries, dif with a f	mbers fferenti ocus o	and completeness, basion al and integral calculus i n functions in several van	c topological notions, n one variable, furthe riables.	, convergence and d r topological consid	ivergence of sequences and se- lerations, differential calculus
Intende	ed learr	ning outcomes			
The stu them in lytic ba ten and	dent kı Idepen ckgrou I oral fc	nows and masters the es dently, He/She has an ov nd and geometric interpr orm.	sential methods and verview over the fund etation, and can inte	proof techniques of amental notions and rconnect them and e	analysis and is able to apply d concepts of analysis, their ana- express them adequately in writ-
Courses	s (type,	number of weekly conta	ct hours, language —	if other than Germa	ın)
V (4) + V	V (4) +	Ü (2)			
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
oral exa Langua Assessi	aminati ge of a ment w	on of one candidate eac ssessment: German and, ill have reference to the	h (20 to 40 minutes) /or English contents of modules	10-M-ANL1 and 10-M	I-ANL2.
Allocati	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
480 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 73 Nr. 1					
Module	Module appears in				
First sta First sta	ate exa	mination for the teaching mination for the teaching	g degree Gymnasium g degree Gymnasium	Mathematics (2019) Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 13 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title				Abbreviation	
Overview Algebra and Numerical Mathematics 1 for Teaching Degree (German			10-M-ANUL-Ü-191-m01		
Gymnasium)					
Module coord	inator		Module offered by		
Dean of Studie	es Mathematik (Mathema	atics)	Institute of Mathem	iatics	
10 numer	rical grade	Only after succ. com	pl. of module(s)		
Duration		Other prerequisites			
2 semester	undergraduate				
Contents					
Topics in Grou phism theoren metric groups,	p Theory (particularly fin ns, solvability, group ope dihedral groups).	ite abelian groups, no erations, Sylow theore	ormal subgroups, su ems; examples: cycl	b- and factorgroups, isomor- ic groups, alternating and sym-	
Topics in ring	theory (particularly ideals	s, divisibility, polynon	nial rings, irreducibi	lity of polynomials).	
Topics in num mainder theor	ber theory (particularly E em, residue class rings a	uclidean algorithm, Fe nd their unit groups,	ermat's little theorer quadratic number ri	n, Euler's theorem, Chinese re- ngs).	
Topics in num equations and rical integratio	erical mathematics: Solu systems of equations, in n.	tion of systems of line nterpolation with poly	ear equations and c nomials, splines an	urve fitting problems, nonlinear d trigonometric functions, nume-	
Intended learn	ning outcomes				
The student is She is able to ders of differe	acquainted with fundam relate these concepts wi nt branches in mathemat	iental concepts and m th one another, and re tics.	nethods in algebra a ealises the advantag	nd numerical mathematics. He/ ges of thinking across the bor-	
Courses (type,	number of weekly conta	ct hours, language —	if other than Germa	n)	
V (4) + V (4) +	Ü (2)				
Method of ass ster, informati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	in German, examina a bonus)	tion offered — if not every seme-	
oral examinati Language of a Assessment w	on of one candidate eacl ssessment: German and, ill have reference to the o	h (20 to 40 minutes) /or English contents of modules 1	10-M-ALGL und 10-M	I-NUL1	
Allocation of p	olaces				
Additional info	ormation				
Workload					
300 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 73 Nr. 2 (5 ECTS credits), § 73 Nr. 5 (5 ECTS credits)					
Module appea	rs in				
First state exa First state exa	mination for the teaching mination for the teaching	g degree Gymnasium I g degree Gymnasium I	Nathematics (2019) Nathematics (2023)		

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 14 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation			
Compu	Computational Mathematics 10-M-COM-152-m01					
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Mathematik (Mathem	atics) Institute of Mathematics			
ECTS	Metho	od of grading	Only after succ. compl. of module(s)			
4	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	its		·			
Introdu merica and 10 rential	iction to l compi -M-LNA and int	o modern mathematical utation (e. g. Matlab) to -G). Computer-based so egral calculus; visualisa	software for symbolic supplement the basic lution of problems in tion of functions.	computation (e. g. <i>N</i> modules in analysis linear algebra, geom	Aathematica or Map and linear algebra (etry, analysis, in par	le) and nu- (10-M-ANA-G ticular diffe-
Intend	ed lear	ning outcomes				
The stu fields o	ident le of appli	earns the use of advance cation to solve mathema	d modern mathemati atical problems.	cal software package	es, and is able to ass	sess their
Course	s (type	, number of weekly cont	act hours, language –	- if other than Germa	n)	
V (1) +	Ü (2)					
Metho ster, in	d of ass formati	essment (type, scope, l on on whether module o	anguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
project Langua Assess	in the age of a ment o	form of programming ex ssessment: German and ffered: Once a year, wint	ercises (approx. 20 to I/or English ter semester	25 hours)		
Allocat	ion of p	olaces	_			
Additio	onal inf	ormation				
Worklo	ad					
120 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination reg	ulations for teaching-	legree programmes)		
§ 22	Nr. 3 f)			5 1 5 /		
Module	e annea	urs in				
Bachel	or's de	gree (1 major) Mathemat	ics (2015)			
Bachel	or's de	gree (1 major) Physics (2	015)			
Bachel	or's de	gree (1 major) Nanostruc	ture Technology (201	5)		
Bachel	or's de	gree (1 major) Economat	hematics (2015)	<i>)</i> /		
Bachelor's degree (1 major) Mathematical Physics (2015)						
Bachelor's degree (1 major) Computational Mathematics (2015)						
Bachelor's degree (1 major) Functional Materials (2015)						
First state examination for the teaching degree Gymnasium Mathematics (2015)						
Bachelor's degree (1 major) Mathematical Physics (2016)						
Bachelor's degree (1 major) Economathematics (2017)						
First state examination for the teaching degree Gymnasium Mathematics (2019)						
Bachel	or's de	gree (1 major) Physics (2	020)			
Bachel	or's de	gree (1 major) Nanostruc	ture Technology (202	o)		
LA Gymnas	ien Mathe	matics (2019)	JMU Würzburg data record L	• generated 19-Apr-2025 • e chramt Gymnasien Mathemat	xam. reg. ik - 2010	page 15 / 81



Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Economathematics (2025)

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LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 16 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title Abbrev				Abbreviation	
Didactics of Mathematics: Analytic Geometry and Stochastics			ics	10-M-D3GY-152-m01	
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Discuss stochas cluding	sion of stics (S mode	basic topics in mathema ekundarstufe I) as well a 'n technologies.	tics didactics for Gym s discussion of possi	nasium using the ex bilities of implemen	xamples of analytic geometry and tation in the classroom, also in-
Intende	ed learı	ning outcomes			
The stu fields o ception matics,	dent is f analy of mat maste	acquainted with basic m tic geometry and stochas thematical topics, He/Sh rs different strategies for	nathematical ways of stics in Sekundarstufe e knows important as teaching and learnin	thinking and workin e I) and is able to tal spects of planning a g und can assess th	g techniques (in particular in the ke into account the students'per- nd analysing teaching of mathe- em.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	ın)
V (2)					
Methoo ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral c) oral e Assess	en exar examin examin ment o	nination (approx. 6o to g ation of one candidate e ation in groups of up to g ffered: Every two years, s	oo minutes) or ach (approx. 15 to 20 3 candidates (approx. ummer semester	minutes) or 10 minutes per can	didate)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachir	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22 Nr. 3 f)					
Module	appea	irs in			
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2015)	
First sta	First state examination for the teaching degree Gymnasium Mathematics (2019)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 17 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title				Abbreviation		
Compu	iters in	Mathematical Teaching	8		10-M-DCMU-152-mc	01
Modul	e coord	inator		Module offered by		
Dean c	of Studie	es Mathematik (Mather	natics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
3	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conter	Its					
Discus puter t	sion of ools.	possible ways to use c	omputers in teaching r	nathematics as well	as discussion of con	nmon com-
Intend	ed learı	ning outcomes				
The stu tics, as	ident is well as	acquainted with basic with the potential and	possibilities for the er limitations of comput	nployment of compu er tools.	ters in the teaching	of mathema-
Course	s (type	, number of weekly con	tact hours, language –	- if other than Germa	n)	
V (2)						
Metho ster, in	d of ass formati	essment (type, scope, on on whether module	language — if other th can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
project Assess	(10 to) ment o	15 pages) ffered: Every two years	winter semester			
Allocat	ion of r	olaces				
Additio	onal inf	ormation				
Worklo	ad					
90 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination reg	gulations for teaching-	degree programmes)		
§ 22	Nr. 2 f)					
§ 22 8 22	Nr.1h) Nr.2f)					
Modul	a annea	rs in				
First st	ate exa	mination for the teachi	ng degree Realschule I	Mathematics (2015)		
First st	ate exa	mination for the teachi	ng degree Gymnasium	Mathematics (2015)		
First st	ate exa	mination for the teachi	ng degree Sonderpäda	gogik Didactics in M	athematics (Middle	School)
(2015)						
FIRST ST	First state examination for the teaching degree Mittelschule Mathematics (2015)				al) (2015)	
First state examination for the teaching degree Gymnasium Mathematics (2010)						
First state examination for the teaching degree Mittelschule Mathematics (2020 (Prüfungsordnungsversion 2015))						
First st (Prüfur	First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2020 (Prüfungsordnungsversion 2015))					ol) (2020
First st	ate exa	mination for the teachi	ng degree Sonderpäda	gogik Didactics in M	athematics (Middle	School)
(2020	(Prüfun	gsordnungsversion 201	5)) ->			
exchar	ige proរ្	gram Mathematics (202	:3)			
LA Gymnas	sien Mathe	matics (2019)	JMU Würzburg data record L	g • generated 19-Apr-2025 • e ehramt Gymnasien Mathemat	xam. reg. tik - 2019	page 18 / 81



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

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 19 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation		
Overview Differential Equations and Complex Analysis for Teaching Degree			10-M-DFL-Ü-191-m01		
(Germa	n Gym	nasium)			
Module coordinator Module offered by					
Dean of	fStudi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
12	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
2 seme	ster	undergraduate			
Conten	ts				
rems, is erstraß continu al serie	solated producious de s, linea	rentiability and Cauchy-R l singularities, meromorp ct theorem and theorem of ependence of solutions o ar differential equations o	hic functions and Lau hic functions and Lau of Mittag-Leffler, conf n initial values, syste of higher order.	quations, path integ irent series, residue ormal maps; exister ms of linear differen	theorem and applications, Wei- ice and uniqueness theorem, tial equations, matrix exponenti-
Intende	ed lear	ning outcomes			
The stu nary dif ges of t	dent is ferenti hinkin	acquainted with fundam al equations. He/She is a g across the borders of d	nental concepts and r able to relate these co ifferent branches in n	nethods in complex oncepts with one an nathematics.	analysis and the theory of ordi- other, and realises the advanta-
Course	s (type	, number of weekly conta	ict hours, language —	if other than Germa	in)
V (4) + '	V (4) +	Ü (2)			
Methoo ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
oral exa Langua Assess	aminat ge of a ment w	ion of one candidate each ssessment: German and, /ill have reference to the o	h (20 to 40 minutes) /or English contents of modules	10-M-DGLL and 10-N	1-FTHL.
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
360 h					
Referred to in LPO L (examination regulations for teaching degree programmes)					
§ 73 N	r. 1				
Module	Module appears in				
First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record Lehramt Gymnasien Mathematik - 2019	page 20 / 81
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Module	e title				Abbreviation
Introductory Differential Geometry for Teaching Degree (German Gymnasium)			10-M-DGEL-191-m01		
Module coordinator Module offered by					
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Curves particul face the	in Eucl lar) in E eory, sp	idean spaces, curvature, Euclidean spaces, curvatu pecial classes of surfaces	Frenet equations, loca ure of hypersurfaces, § 	al classification, su geodesics, isometri	bmanifolds (hypersurfaces in es, main theorem on local sur-
Intende	ed learr	ning outcomes			
The stu quainte dently.	dent kı ed with	nows and masters the es the central concepts in t	sential methods and b his field, and is able to	pasic notions in diff o apply the fundam	erential geometry. He/She is ac- ental proof methods indepen-
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Methoo ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn a	n German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral c c) oral c Langua Assess quent s credital	 a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English Assessment offered: Only when announced in the semester in which the courses are offered and in the subsequent semester creditable for bonus 				
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
300 h	300 h				
Teaching cycle					
Referre	d to in	LPO I (examination regu	lations for teaching-d	egree programmes)	
§ 73 Nr. 4					
Module	appea	irs in			
First sta	ate exa	mination for the teaching	degree Gymnasium N	Mathematics (2019)	
First sta	ate exa	mination for the teaching	degree Gymnasium N	Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 21 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation		
Ordinary Differential Equations for Teaching Degree (German Gymnasium)			10-M-DGLL-191-m01		
Module	e coord	inator		Module offered by	
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Existen ferentia	ce and al equa	uniqueness theorem; co tions; matrix exponential	ntinuous dependenc l series; linear differe	e of solutions on ini ntial equations of hi	tial values; systems of linear dif- gher order.
Intende	ed learı	ning outcomes			
The stu equatio	dent is ons. He	acquainted with the fun /she is able to apply the	damental concepts a se methods to practic	nd methods of the tl al problems.	neory of ordinary differential
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
Ü (2)					
Method ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral e c) oral e Langua credital	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and, bonus	80 minutes, usually o ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	chosen) or 5) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teaching cycle					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 73 Nr. 1					
Module	appea	ars in			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2019)	
First sta	First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 22 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title				Abbreviation	
Didactics of Mathematics: Algebra and Analysis (German Gymnas			ymnasium)	10-M-DGY1-191-m01	
Module	coord	inator		Module offered by	
Dean of	fStudie	es Mathematik (Mathema	itics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
2 seme	ster	undergraduate			
Conten	ts				
Discuss kundar classro	sion of stufe I) om, als	advanced topics in math and analysis (Sekundars o including modern tech	ematics didactics for tufe II) as well as dis nologies.	Gymnasium using t cussion of possibilit	he examples of algebra (Se- ties of implementation in the
Intende	ed learr	ning outcomes			
The stu of alget ception matics,	dent is ora in S of mat maste	acquainted with mathen bekundarstufe I and analy thematical topics, He/Sh rs different strategies for	natical ways of thinki rsis in sekundarstufe e knows different asp teaching and learnin	ng and working tech II) and is able to tak pects of planning an g und can assess th	iniques (in particular in the fields the into account the students'per- d analysing teaching of mathe- nem.
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	in)
V (2) +	U (2) +	V (2) + U (2)			
ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	ition offered — if not every seme-
a) writte b) oral e c) oral e Langua credital	en exar examin examin ge of a ble for	nination (6o to 120 minu ation of one candidate e ation in groups (groups c ssessment: German and/ bonus	tes) or ach (approx. 30 minu if 2, 10 to 15 minutes ′or English	tes) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
180 h					
Teaching cycle					
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)	
§73 N	r. 6				
Module	appea	in and the second se			
First state examination for the teaching degree Gymnasium Mathematics (2019)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record Lehramt Gymnasien Mathematik - 2019	page 23 / 81
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Module	e title				Abbreviation
Didactics of Mathematics: Geometry (German Gymnasium)			10-M-DGY2-191-m01		
Module coordinator				Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
4	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Discuss stufe I) logies.	sion of as wel	basic topics in mathema l as discussion of possib	tics didactics for Gym ilities of implementat	nasium using the ex ion in the classroom	xample of geometry (Sekundar- n, also including modern techno-
Intende	ed leari	ning outcomes			
The stu field of topics, strateg	dent is geome He/Sh ies for t	acquainted with basic m etry in Sekundarstufe I) ar e knows important aspec teaching and learning un	nathematical ways of nd is able to take into ts of planning and ar d can assess them.	thinking and workin account the studen aalysing teaching of	g techniques (in particular in the its'perception of mathematical mathematics, masters different
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
V (2) +	Ü (2)				
Methoo ster, in	l of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writt b) oral c) oral Langua credita	en exar examin examin ge of a ble for	nination (60 to 120 minu ation of one candidate e ation in groups (groups c ssessment: German and, bonus	tes) or ach (approx. 30 minu of 2, 10 to 15 minutes /or English	ites) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
120 h					
Teaching cycle					
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§731N	§ 73 Nr. 6				
Module	e appea	ars in			
First sta exchan First sta	First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 24 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation	
Advanced Didactics of Mathematics (German Gymnasium)			10-M-DVGY-191-m01	
Module coordinator Mod			Module offered by	
Dean of s	Studies Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS I	Method of grading	Only after succ. com	pl. of module(s)	
2 ((not) successfully completed			
Duration	Module level	Other prerequisites		
1 semest	ter undergraduate			
Contents	5			
Discussion lar matho possible	on of topics in teaching mathe ematical foundations, didactic approaches in the classroom.	matics in a Gymnasiu analyses, contempo	um taking into accou rary discussions in n	nt different aspects, in particu- nathematics didactics as well as
Intended	l learning outcomes			
The stud nasium),	ent is able to discuss central t , considering subject-specific,	opics and issues on t didactical and metho	eaching mathematic dical aspects.	cs in high school (German Gym-
Courses	(type, number of weekly conta	ct hours, language —	if other than Germa	n)
S (2)				
Method ster, info	of assessment (type, scope, la prmation on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
talk (app Languag Assessm	prox. 60 minutes) e of assessment: German nent offered: Once a year, sumi	ner term		
Allocatio	on of places			
Addition	al information			
Workloa	d			
60 h				
Teaching	g cycle			
Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22 Nr. 3 f)				
Module appears in				
First stat exchang First stat	e examination for the teaching e program Mathematics (2023) e examination for the teaching	g degree Gymnasium) g degree Gymnasium	Mathematics (2019) Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 25 / 81
	data record Lehramt Gymnasien Mathematik - 2019	1

Module title			Abbreviation			
E-Learning and Blended Learning in Mathematical Teaching (virtual Course)			10-M-DVHB-152-m0	91		
Module	e coord	inator		Module offered by	-	
Dean o	Dean of Studies Mathematik (Mathematics) Institute of Math		Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
3	(not) s	successfully completed				
Duratio	on .	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					-
In a cou techniq	urse off ques in	ered by Virtuelle Hoch e-learning and blende	schule Bayern (vhb), th d learning for teaching	e student becomes a mathematics.	acquainted with and	reflects on
Intende	ed learn	ning outcomes				
The stu well as	ident is their p	acquainted with basic otentials and limitatio	methods of e-learning	and blended learnir	ng in teaching methe	matics, as
Course	s (type,	number of weekly cor	ntact hours, language –	- if other than Germa	n)	
Ü (2) Course	type: e	Learning, mostly Virtu	elle Hochschule Bayern	(vhb)		
Methoo ster, inf	d of ass formati	essment (type, scope, on on whether module	language — if other the	an German, examina a bonus)	tion offered — if not	every seme-
project Assess	(web-b ment o	ased, 15 to 20 hours) ffered: Once a year, wi	nter semester			
Allocat	ion of r	laces				
	<u> </u>					
Additio	nal inf	ormation				
Worklo	ad					
90 h						
Teachir	ng cycl	9				
Referre	d to in	LPO I (examination re	gulations for teaching-	degree programmes)		
§ 22 § 22	Nr. 1 h) Nr. 2 f)		<u> </u>	,		
§ 22 [Nr. 3 f)					
Module	e appea	rs in			<u>\</u>	
First sta First sta First sta First sta	ate exa ate exa ate exa ate exa	mination for the teach mination for the teach mination for the teach mination for the teach	ng degree Grundschule ng degree Grundschule ng degree Realschule <i>N</i> ng degree Gymnasium	Mathematics (2015) Didactics in Mather Mathematics (2015) Mathematics (2015)) matics (Primary Scho	ool) (2015)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School)						
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2015)						
First sta	First state examination for the teaching degree Mittelschule Mathematics (2015)					
First sta	ate exa	mination for the teach	ng degree Mittelschule	Didactics in Mathem	natics (Middle Schoo	ol) (2015)
First sta	ate exa	mination for the teaching	ng degree Gymnasium	Mathematics (2019)	(Driifungcordnunger	vorsion
2015))			הב מכצוכב אווננפוגרועופ	mathematics (2020	(i rurungsorunungs)	VEISIUII
LA Gymnasi	ien Mathe	matics (2019)	JMU Würzburg data record L	• generated 19-Apr-2025 • e chramt Gymnasien Mathemat	xam. reg. tik - 2019	page 26 / 81

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)

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 27 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Elementary Geometry for Teaching Degree (German Gymnasium) 10-M-EGEL-191-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) To mumerical grade Duration Module level Other prerequisites 1 semester undergraduate Contents Basic topics in elementary and Euclidean geometry; axiomatic approach to Euclidean geometry, geometric, compass and ruler constructions, selected topics in descriptive geometry, elementary analytic geometry, geometric incursos and ruler constructions, selected topics in descriptive geometry, transformation geometry, selected topics in descriptive geometry, ternsformation of geometric intuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. Courses (type, number of weekly contact hours, language — if other than German) V (4) + û (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) a) written examination (approx. yo to 180 minutes) or b) oral examination of one candidate each (55 to 30 minutes) or b) oral examination of one candidate each (55 to 30 minutes) or b) oral examination or bor (course) Inthexaminatis (Intermanine)	Module title			Abbreviation		
Module conditator Module confered by Dean of Studies Mathematik (Mathematics) Institute of Mathematics CTS Method of grading Only after succ. compl. of module(s) 10 numerical grade Duration Module level Other prerequisites 1 semester undergraduate Contents Basic topics in elementary and Euclidean geometry; axiomatic approach to Euclidean geometry, geometric compass and ruler constructions, selected topics in descriptive geometry, elementary analytic geometry, geometric compass and ruler constructions, selected topics in descriptive geometry, selected topics in affine and/or projective geometry. Intended learning outcomes The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric intuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly leam about the use of new media. Courses (type, number of weekly contact hours, language — if other than German) V (4) + 0 (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to eam a bonus) a) written examination in groups (groups of 2, to to 3 minutes) or b) or al examination in groups (group	Elementary Geometry for Teaching Degree (German Gymnasium)			10-M-EGEL-191-m01		
Dean of Studies Mathematik (Mathematics) Institute of Mathematics ECTS Method of grading Only after succ. compl. of module(s) o numerical grade ~ Duration Module level Other prerequisites 1 semester undergraduate ~ Contents Basic topics in elementary and Euclidean geometry, similarity geometry, elementary analytic geometry, geometric compass and ruler constructions, selected topics in descriptive geometry, selected topics in affine and/or projective geometry. Intended learning outcomes Intended learning outcomes The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric intuition and stirl formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. Courses (type, number of weekly contact hours, language – if other than German) V (4) + 0 (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination on partos Use of numbers) Institute of Assessment: German and/or English creditable for bonus Aldication of places	Module coordinator				Module offered by	
Method of grading Only after succ. compl. of module(s) 10 numerical grade Duration Module level Other prerequisites 1 semester undergraduate Contents Basic topics in elementary and Euclidean geometry: axiomatic approach to Euclidean geometry with discussion. Congruence geometry, transformation geometry, similarity geometry, elementary analytic geometric, geometric compass and ruler constructions, selected topics in descriptive geometry, selected topics in affine and/or projective geometry. Intended learning outcomes The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric in tuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. Courses (type, number of weekly contact hours, language – if other than German) V (4) + 0 (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus) a) written examination of a ba minutes) or b) oral examination of one candidate each (15 to 30 minutes) prodection addite) anguage of assessment: Germa and/or English creditabel for bonus Alditional information	Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
10 numerical grade Duration Module level Other prerequisites 1 semester undergraduate Contents Basic topics in elementary and Euclidean geometry; similarity geometry, elementary analytic geometry, geometric, compass and ruler constructions, selected topics in descriptive geometry, selected topics in affine and/or projective geometry. Intended learning outcomes The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric in tuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. Courses (type, number of weekly contact hours, language – if other than German) V (4) + 0 (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination of places	ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
Duration Module level Other prerequisites 1 semester undergraduate Contents Basic topics in elementary and Euclidean geometry; axiomatic approach to Euclidean geometry with discussion. Congruence geometry, transformation geometry, similarity geometry, elementary analytic geometry, geometric compass and ruler constructions, selected topics in descriptive geometry, selected topics in affine and/or projective geometry. Intended learning outcomes The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric intuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. 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) a) written examination in groups (groups of 2, to to 15 minutes) or b) oral examination in groups (groups of 2, to to 15 minutes) or c) oral examination in groups (groups of 2, to to 15 minutes) or c) oral examination in groups (groups of 2, to to 15 minutes) or c) oral examination in groups (groups of 2, to to 15 minutes) or c) oral examination in groups (groups of 2, to to 15 minutes per candidate) Language of assessment: German and/or English Interdet for bonus Alditional information	10	nume	rical grade			
Isemester undergraduate Contents Basic topics in elementary and Euclidean geometry; axiomatic approach to Euclidean geometry with discussion. Congruence geometry, transformation geometry, similarity geometry, elementary analytic geometry, geometric compass and ruler constructions, selected topics in descriptive geometry, selected topics in affine and/or projective geometry. Intended learning outcomes Intended learning outcomes of geometry. He realizes the mutual stimulation of geometric intuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. 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) a) written examination (approx. 90 to 180 minutes) or b) oral examination in groups (groups of 2, 10 to 15 minutes) or c) oral examination of places Additional information Workload 300 h Teaching cycle Morkload Additional information Morkload 300 h	Duratio	n at a r	Module level	Other prerequisites		
Contents Basic topics in elementary and Euclidean geometry; axiomatic approach to Euclidean geometry with discussion. Congruence geometry, transformation geometry, similarity geometry, elementary analytic geometry, geometric compass and ruler constructions, selected topics in descriptive geometry, selected topics in affine and/or projective geometry. Intended learning outcomes The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric intuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. Courses (type, number of weekly contact hours, language — if other than German) V (a) + 0 (z) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination on candidate each (15 to 30 minutes) or c) are assessment: German and/or English creditable for bonus Allocation of places - - Morkload 30 on h Teaching cycle - - Referred to in LPO 1 (examination regulations for teaching-degree programmes) § 731 Nr. 4<	1 seme	ster	undergraduate			
Intended learning outcomes The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric intuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. Courses (type, number of weekly contact hours, language — if other than German) V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination on one candidate each (t5 to 30 minutes) or c) are examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus Allocation of places - Workload 300 h Teaching cycle - Referred to in LPO1 (examination regulations for teaching-degree programmes) § 73 l Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023)	Basic to Congru compas jective	opics ir ence ge ss and geome	elementary and Euclide cometry, transformation ; ruler constructions, selec try.	an geometry; axioma geometry, similarity g ted topics in descrip	tic approach to Eucli eometry, elementar tive geometry, selec	idean geometry with discussion. y analytic geometry, geometric ted topics in affine and/or pro-
The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof me- thods, so that he/she masters the basic notions of geometry. He realizes the mutual stimulation of geometric in- tuition and strict formal proofs. The students enhance their geometric sense of imagination, and implicitly learn about the use of new media. Courses (type, number of weekly contact hours, language — if other than German) V(q) + U(2) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Workload 300 h Teaching cycle Referred to in LPO 1 (examination regulations for teaching-degree programmes) § 73 l Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) Eirst state examination for the teaching degree Gymnasium Mathematics (2020)	Intende	ed learn	ning outcomes			
Courses (type, number of weekly contact hours, language — if other than German) V (4) + Ü (2) Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus Allocation of places Motkload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 l Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023)	The stu thods, tuition about t	dent ha so that and str he use	as extensive knowledge of he/she masters the basi ict formal proofs. The stu of new media.	of the mathematical v c notions of geometr dents enhance their	vays of thinking and y. He realizes the mu geometric sense of i	working as well as of proof me- utual stimulation of geometric in- magination, and implicitly learn
V (4) + Ü (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every seme- ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English Allocation of places Additional information Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 l Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) 	Course	s (type,	number of weekly conta	ct hours, language —	if other than Germa	n)
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Workload 300 h Teaching cycle Referred to in LPO 1 (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	V (4) +	Ü (2)				
a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus Allocation of places Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 l Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	Methoo ster, in	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
Allocation of places Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 I Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	a) writt b) oral c) oral Langua credita	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and, bonus	80 minutes) or ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	s) or per candidate)	
Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 l Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	Allocat	ion of p	olaces			
Additional information Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)						
 Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) 	Additio	nal inf	ormation			
Workload 300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)						
300 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	Worklo	ad				
Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	300 h					
Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes) § 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)						
§ 73 Nr. 4 Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module appears in First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	§731N	r. 4				
First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)	Module	e appea	rs in			
	First sta exchan First sta	ate exa ge prog ate exa	mination for the teaching gram Mathematics (2023) mination for the teaching	g degree Gymnasium) g degree Gymnasium	Mathematics (2019) Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 28 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation		
Introduction to Functional Analysis			10-M-FAN-152-m01		
Module coordinator Modul		Module offered by			
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
9	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Banach	space	s and Hilbert spaces, bo	unded operators, prin	ciples of functional	analysis.
Intende	ed learı	ning outcomes			
The stu method broad a	dent kı ls, is al applica	nows the fundamental co ole to apply methods fror bility of the theory to oth	ncepts and methods n linear algebra and a er branches of mathe	of functional analys analysis to functiona matics.	is as well as the pertinent proof al analysis, and realises the
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Methoo ster, in	l of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
b) oral c) oral Langua credita	examin examin ge of a ble for	ation of one candidate e ation in groups (groups c ssessment: German and, bonus	ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	6) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
270 h					
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-d	legree programmes)	
§ 22 II Nr. 3 f)					
Module appears in					
Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Mathematical Physics (2015) Bachelor's degree (1 major) Computational Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2015) Bachelor's 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 (2023) Bachelor's degree (1 major) Mathematics (2023)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 29 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title				Abbreviation
Introductory Complex Analysis for Teaching Degree (German Gymnasium)			10-M-FTHL-191-m01		
Module coordinator Module offered b			Module offered by		
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Comple rems, is erstraß	ex diffe solated produe	rentiability and Cauchy-R singularities, meromorp t theorem and theorem o	liemann differential e hic functions and Lau of Mittag-Leffler, conf	quations, path integ urent series, residue formal maps.	rals and Cauchy integral theo- theorem and applications, Wei-
Intende	ed learı	ning outcomes			
The stu apply tl	dent is hese m	acquainted with the fun ethods to practical probl	damental concepts a ems.	nd methods in comp	olex analysis. He/she is able to
Course	s (type	, number of weekly conta	ict hours, language –	· if other than Germa	in)
Ü (2)					
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral e c) oral e Langua credital	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and, bonus	80 minutes, usually 6 ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	chosen) or 5) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation	·		
Worklo	ad				
150 h	150 h				
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 73 Nr. 1					
Module	e appea	irs in			
First sta First sta	ate exa ate exa	mination for the teaching mination for the teaching	g degree Gymnasium g degree Gymnasium	Mathematics (2019) Mathematics (2023)	
L					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 30 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title				Abbreviation	
Selected Topics in History of Mathematics 10-M-GES-152-mo1					
Module coordinator		Module offered by			
Dean of Studies Mathematik (Mathematics)		matics)	Institute of Mathem	natics	
ECTS	Method of grading	Only after succ. compl. of module(s)			
5	(not) successfully completed	t			
Duratio	on Module level	Other prerequisites	i		
1 seme	ester undergraduate				
Conter	its				
Histori the fur image	cal and cultural development idamentals of mathematics, in of mathematics in modern so	as well as social releva n particular in its relatic ciety.	nce of mathematics; on to other sciences a	more in-depth discu and humanities as w	ussion of ell as to the
Intend	ed learning outcomes				
Based tical th audien	on selected examples, the stu eories and their social relevance.	udent has gained insigh nce. He/she is able to p	nt into the historical a present mathematica	and cultural genesis l ideas and concepts	of mathema- s to a general
Course	s (type, number of weekly cor	ntact hours, language –	- if other than Germa	ın)	
V (2) +	Ü (2)				
Metho ster, in	d of assessment (type, scope, formation on whether module	, language — if other th e can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
b) term c) proje Langua Assess	a paper (10 to 15 pages) or ect work (15 to 25 hours) age of assessment: German ar sment offered: In the semester	nd/or English r in which the course is	offered and in the su	ubsequent semester	
Allocat	tion of places				
Additio	onal information				
Worklo	ad				
150 h					
Teachi	ng cycle				
Referre	ed to in LPO I (examination re	gulations for teaching-	degree programmes)		
§ 22	Nr. 3 f)				
Modul	e appears in				
Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Mathematical Physics (2015) Bachelor's degree (1 major) Computational Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2015) Bachelor's degree (1 major) Mathematical Physics (2016) First state examination for the teaching degree Gymnasium Mathematics (2019) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor's degree (1 major) Mathematical Data Science (2022)					
LA Gymnas	sien Mathematics (2019)	JMU Würzburg data record L	g ● generated 19-Apr-2025 ● e ehramt Gymnasien Mathema	exam. reg. tik - 2019	page 31 / 81



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

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 32 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Thesis in Mathematics (Teaching Degree at German Gymna			ee at German Gymna	sium)	10-M-HMGY-152-m01
Module coordinator				Module offered by	
Dean o	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
		undergraduate			
Conten	ts				
Indeper tion wit	ndently h the s	researching and writing upervisor.	on a topic in mathen	natics or mathematio	cs didactics selected in consulta-
Intende	ed learr	ing outcomes			
The stu tained work in	dent is during a suita	able to work independer his/her studies in the tea ble form, incorporating a	ntly on a given mathe aching degree progra aspects of the didacti	matical topic and ap mme. He/She can w cs of mathematics.	oply the skills and methods ob- rite down the result of his/her
Course	s (type,	number of weekly conta	ct hours, language —	if other than Germa	n)
No cou	rses as	signed to module			
Method ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
Hausar to 300 Langua ons for	beit (th hours) ge of a teachiı	esis) pursuant to Sectior ssessment: German; exc ng-degree programmes)	n 29 LPO I (examination eptions pursuant to S	on regulations for te Section 29 Subsectio	aching-degree programmes) (250 on 4 LPO I (examination regulati-
Allocat	ion of p	laces			
Additio	nal inf	ormation			
Worklo	ad				
300 h					
Teachir	ng cycl	2			
	0	-			
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
§ 20					
Module	Module appears in				
First sta First sta First sta	First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 33 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title				Abbreviation
Linear Algebra 1 for Teaching Degree (German Gymnasium)			German Gymnasium)		10-M-LNL1-191-m01
Module coordinator		Module offered by			
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
5	(not) 9	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Basic n termina	otions ants.	and structures; vector sp	oaces, linear maps, sy	ystems of linear equa	ations; theory of matrices and de-
Intende	ed lear	ning outcomes			
The stu ted wit to perfo	ident k h the co orm sin	nows and masters the ba entral proof methods in li nple mathematical argum	sic notions and esse inear algebra and car ients independently,	ntial methods of line apply them to solve and can present the	ear algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.
Course	s (type	, number of weekly conta	ict hours, language —	- if other than Germa	ın)
Ü (2)					
Metho ster, in	d of ass formati	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written exercis Langua	examines each	nation (approx. 90 to 180 h) ssessment: German and,	minutes) and writter /or English	n exercises (approx.	10 exercise sheets with approx. 4
Allocat	ion of	olaces	U		
Additio	onal inf	ormation			
Worklo	ad				
150 h	au				
Teeshi					
Teachi		e			
Referred to in LPUT (examination regulations for teaching-degree programmes)					
973IN	Ir. 2	•			
Module	e appea	ars in			
First sta	First state examination for the teaching degree Gymnasium Mathematics (2019)				
FIRST Sta	First state examination for the teaching degree Gymnasium Mathematics (2023)				

Module title			Abbreviation		
Linear Algebra 2 for Teaching Degree (German Gymnasium)			10-M-LNL2-191-m01		
Module coordinator		Module offered by			
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	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			
Conter	Its				
Eigenv	alue th	eory, bilinear forms, Eucl	idean and unitary veo	tor spaces, diagona	lisation and Jordan normal form.
Intend	ed lear	ning outcomes			
The stu ted wit to perf	ident k h the co orm sin	nows and masters the ba entral proof methods in li 1ple mathematical argum	sic notions and esse inear algebra and car ients independently,	ntial methods of line apply them to solve and can present the	ear algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.
Course	s (type	, number of weekly conta	ict hours, language —	if other than Germa	n)
Ü (2)					
Metho ster, in	d of ass formati	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
written exercis Langua	examines eacl	nation (approx. 90 to 180 h) ssessment: German and,	minutes) and writter /or English	n exercises (approx.	10 exercise sheets with approx. 4
Allocat	ion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
§731N	lr. 2				
Modul	e appea	ars in			
First st First st	First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)				
			,		

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 35 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title	_			Abbreviation	
Overview Linear Algebra for Teaching Degree (German Gymnasium)			10-M-LNL-Ü-191-m01			
Module coordinator				Module offered by		
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
13	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
2 seme	ster	undergraduate				
Conten	ts					
Basic n determ dan no	otions inants; rmal fo	and structures; vector sp eigenvalue theory; biling rm.	aces, linear maps an ear forms and Euclide	d systems of linear o ean/unitary vector sp	equations; theory of matrices and baces; diagonalisability and Jor-	
Intende	ed leari	ning outcomes	,			
The stu ply the knows them a	dent ki m inde about t dequat	nows and masters the es pendently. He/She has a heir algebraic and geome ely in written and oral for	sential methods and n overview over the fi etric background, is a m.	proof techniques of undamental notions ible to relate them to	linear algebra and is able to ap- and methods of linear algebra, b each other and can present	
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	in)	
V (4) +	V (4) +	Ü (2)				
Methoo ster, in	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
oral exa Langua Assess	aminati ge of a ment w	on of one candidate each ssessment: German and, ill have reference to the	h (20 to 40 minutes) /or English contents of modules	10-M-LNL1 and 10-M	-LNL2.	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
390 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
§ 73 Nr. 2						
Module	e appea	irs in				
First sta	First state examination for the teaching degree Gymnasium Mathematics (2019)					
First sta	First state examination for the teaching degree Gymnasium Mathematics (2023)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 36 / 81			
	data record Lehramt Gymnasien Mathematik - 2019				
Module	title				Abbreviation
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Introdu	ction i	nto Mathematical Thinki	10-M-MDAL-152-m01		
(Germa	n Gym	nasium)		Module offered by	
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	ipl. of module(s)	latics
5	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
Logical tics, e.	founda g. sets	ations of mathematical p and functions; basic tech	roofs, in particular ax nniques and methods	iomatic and deducti s for proving; mathe	on; basic concepts in mathema- matical writing.
Intende	ed lear	ning outcomes			
The stu form ea oral for	dent is isy mat m.	acquainted with the bas hematical arguments ind	ic proof methods and lependently and pres	d techniques in math ent them adequately	nematics. He/She is able to per- y and reasonably in written and
Courses	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)
V (1) + Ü	۲ (1) (1)	V (1) + Ü (1)			
Method ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Langua	(10 to ge of a	15 pages) ssessment: German and/	or English		
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Additio period.	nal info	ormation on module dura	tion: includes block	taught sessions prio	r to the beginning of the lecture
Worklo	ad				
150 h					
Teachir	ıg cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 73 N § 73 N § 73 N	r. 2 (1 r. 3 (2 r. 5 (2	ECTS credits) ECTS credits) ECTS credits)			
Module	e appea	in in			
First sta First sta First sta	ate exa ate exa ate exa	mination for the teaching mination for the teaching mination for the teaching	degree Gymnasium degree Gymnasium degree Gymnasium	Mathematics (2015) Mathematics (2019) Mathematics (2023)	
		0	5,	× <i>J</i> /	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 37 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title Abbreviation						
Mathe	Mathematical Writing 10-M-MSC-152-m01					
Module coordinator Mo			Module offered by			
Dean o	an of Studies Mathematik (Mathematics)			Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	(not) s	successfully completed	 			
Duratio	on	Module level	Other prerequisites			
Conter	its	undergraduate				
Discus vers th compre rigour a	Discussion of good and bad mathematical writing using practical exercises and case examples. The course co- vers the whole range of mathematical texts from short proofs and the formulation of theorems and definitions to comprehensive works such as Bachelor's or Master's theses. Important aspects include not only mathematical rigour and efficiency but also didactic questions.					
Intend	ed lear	ning outcomes				
The stu about t	ident is the stru	able to formulate mat ctures and convention	hematical subject matt s of mathematical litera	er precisely and com ature and the require	prehensibly. He/She ments of scientific w	e knows vork.
Course	s (type	, number of weekly cor	ntact hours, language –	- if other than Germa	n)	
V (2) +	Ü (2)					
Metho ster, in	d of ass formati	essment (type, scope, on on whether module	language — if other the can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
b) term c) proje Langua Assess	a) talk (45 to 90 minutes) or b) term paper (10 to 15 pages) or c) project work (15 to 25 hours) Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester					
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination re	gulations for teaching-o	degree programmes)		
§ 22	Nr. 3 f)					
Modul	e appea	irs in				
Bachel Bachel First st Bachel First st Bachel Bachel exchar First st Bachel	or's de or's de ate exa or's de ate exa or's de or's de ate exa or's de or's de or's de or's de ate exa	gree (1 major) Mathem gree (1 major) Mathem gree (1 major) Computa mination for the teach gree (1 major) Mathem mination for the teach gree (1 major) Mathem gram Mathematics (20 mination for the teach gree (1 major) Mathem	atics (2015) atical Physics (2015) ational Mathematics (20 ng degree Gymnasium atical Physics (2016) ng degree Gymnasium atical Physics (2020) atical Data Science (20 23) ng degree Gymnasium atics (2023)	015) Mathematics (2015) Mathematics (2019) 22) Mathematics (2023)		
LA Gymnas	sien Mathe	matics (2019)	JMU Würzburg data record Lo	g • generated 19-Apr-2025 • e ehramt Gymnasien Mathemat	xam. reg. tik - 2019	page 38 / 81



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

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 39 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Numerical Mathematics 1 for Teaching Degree (German Gymnasium)			10-M-NUL1-191-m01		
Module coordinator				Module offered by	·
Dean of	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Solutio ons, int	n of sy: terpola	stems of linear equations tion with polynomials, sp	and curve fitting pro olines and trigonomet	blems, nonlinear eq	uations and systems of equati- rical integration.
Intende	ed lear	ning outcomes			
The stu to pract	dent is tical pr	acquainted with the fun oblems and knows about	damental concepts a t their typical fields o	nd methods in nume f application.	erical mathematics, applies them
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
Ü (2)					
Methoo ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral e c) oral e Langua credital	en exai examir examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and, bonus	80 minutes, usually o ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	chosen) or 5) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ng cycl	9			
	0 . 7	-			
Referre	d to in	LPO I (examination regu	lations for teaching-o	legree programmes)	
§ 73 N	r. 2 (2	ECTS credits), § 73 Nr. 5	(3 ECTS credits)		
Module	e appea	irs in	0		
First sta First sta	ate exa	mination for the teaching mination for the teaching	g degree Gymnasium g degree Gymnasium	Mathematics (2019) Mathematics (2023)	
			, , , , , , , , , , , , , , , , , , , ,		

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 40 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title				Abbreviation
Operations Research			10-M-ORS-152-m01		
Module coordinator				Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
9	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Linear	program	nming, duality theory, tra	insport problems, int	egral linear program	ming, graph theoretic problems.
Intende	ed leari	ning outcomes			
The stu for solv probler	dent is ving ma ns, bot	acquainted with the fun- ny practical problems es h theoretically and nume	damental methods in pecially in economics rically.	operations research . He/She is able to a	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) +	Ü (2)				
Methoo ster, in	d of ass formati	s essment (type, scope, la on on whether module ca	inguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
b) oral c) oral Langua Assess credita	examin examin ge of a ment o ble for	ation of one candidate e ation in groups (groups c ssessment: German and, ffered: In the semester in bonus	ach (15 to 30 minutes of 2, 10 to 15 minutes /or English n which the course is	s) or per candidate) offered and in the su	ıbsequent semester
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
270 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22	Nr. 3 f)				
Module	e appea	irs in			
Bachel	or's de	gree (1 major) Mathemati	cs (2015)		
Bachel	or's de	gree (1 major) Computatio	onal Mathematics (20	015)	
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2015)	
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2019)	
FIRST STA	ate exa	mination for the teaching	g degree Gymnasium	mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 41 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Introdu	ctory F	Projective Geometry for T	eaching Degree (Ger	man Gymnasium)	10-M-PGEL-101-m01
		· · ·			
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Projecti jective	ive and spaces	l affine planes, projective , dualities and polarities	e and affine spaces, the of projective spaces.	heorem of Desargue	s, fundamental theorems for pro-
Intende	ed learı	ning outcomes			
The stu apply t	dent is hese m	acquainted with the fun ethods to practical probl	damental concepts a ems.	nd methods of proje	ective geometry. He/she is able to
Course	s (type	, number of weekly conta	ict hours, language —	- if other than Germa	an)
V (4) +	Ü (2)				
Methoo ster, in	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	ition offered — if not every seme-
a) writt b) oral c) oral c Langua Assess quent s credita	en exar examin examin ge of a ment o semeste ble for	mination (approx. 90 to 1 nation of one candidate e ation in groups (groups of ssessment: German and, ffered: Only when annou er bonus	80 minutes) or ach (15 to 30 minutes of 2, 10 to 15 minutes /or English nced in the semester	5) or per candidate) in which the course	s are offered and in the subse-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
300 h					
Teachi	ıg cycl	е			
Referre	d to in	LPOI (examination regu	lations for teaching-o	degree programmes)	
§731N	r. 4				
Module	appea	urs in			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2019)	
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2023))

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 42 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Hands-on Seminar Mathematics				10-M-PRA-152-m01	
Module	coord	inator		Module offered by	
Dean of	Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
Elabora tics" (ge ject, sch terest): the topi the lect	tion of cometr hool te formul ic for cl urer.	a topic in the practical te y, algebra, stochastics, a rm paper (Facharbeit) or lation of subject-related a lassroom practice. Usuall	eaching of mathemati nalytic geometry, ana Pluskurs (additional and didactic requirem ly the work will be do	ics. This can either b alysis) or a topic rela course for the in-dep nents, search for an a ne in groups and wil	e a topic in "classical mathema- ted to a school workshop, pro- oth study of areas of special in- appropriate topic, preparation of l be supervised and reflected by
Intende	d learı	ning outcomes			
The stu quainte	dent is d with	able to select and elabo didactical and methodic	rate a suitable topic f al aspects of selectin	or teaching mathem g a topic, and is able	atics in school. He/She is ac- e to critically reflect the process.
Courses	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
S (2)					
Method ster, inf	l of ass ormati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project: Assessi	drawi ment o	ng up a project plan (10 t ffered: Every two years, s	o 15 pages) ummer semester		
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachin	ig cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
§ 22 N	Nr. 3 f)				
Module	appea	ars in			
First sta First sta exchang First sta	First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2019) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 43 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Modul	e title				Abbreviation	
Progra	Programming course for students of Mathematics and other subjects 10-M-PRG-152-mo1					
Modul	e coord	inator		Module offered by	·	
Dean c	of Studio	es Mathematik (Mathe	matics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
3	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts	0				
Basics	of a mo	odern programming lar	guage (e. g. C).			
Intend	ed lear	ning outcomes				
The stu	udent is	able to work independ	lently on small progran	nming exercises and	standard programm	ing problems
Carrie				if a the set the set Common)	
Course	es (type	, number of weekly cor	itact nours, language –	- if other than Germa	in)	
P (2)						
Metho ster, in	d of ass formati	essment (type, scope, on on whether module	language — if other the can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
project	in the	form of programming e	xercises (approx. 20 to	25 hours)		
Assess	iment o	ffered: Once a year, su	mmer semester			
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
90 h						
Teachi	ng cycl	e				
		•				
Referre	ed to in	LPOI (examination re	gulations for teaching-	degree programmes)		
§ 22	Nr. 3 f)					
Modul		urs in				
Bachel	or's de	gree (1 major) Mathem	atics (2015)			
Bachel	or's de	gree (1 major) Physics	(2015)			
Bachel	or's de	gree (1 major) Nanostri	icture Technology (201	5)		
Bachel	or's de	gree (1 major) Francostra gree (1 major) Economa	athematics (2015)			
Bachel	or's de	gree (1 major) Mathem	atical Physics (2015)			
Bachel	or's de	gree (1 major) Computa	ational Mathematics (20	015)		
Bachel	or's de	gree (1 major) Function	al Materials (2015)			
First st	ate exa	mination for the teach	ng degree Gymnasium	Mathematics (2015)		
Bachelor's degree (1 major) Mathematical Physics (2016)						
Bachelor's degree (1 major) Economathematics (2017)						
First state examination for the teaching degree Gymnasium Mathematics (2019)						
Bachel	or's de	gree (1 major) Physics	(2020)			
Bachel	or's de	gree (1 major) Nanostri	ucture Technology (202	o)		
Bachel	or's de	gree (1 major) Mathem	atical Physics (2020)			
Bachel	or's de	gree (1 major) Function	al Materials (2021)			
Bachel	or's de	gree (1 major) Quantur	1 Technology (2021)			
LA Gymnas	sien Mathe	matics (2019)	JMU Würzburg data record L	g • generated 19-Apr-2025 • e ehramt Gymnasien Mathema	xam. reg. tik - 2019	page 44 / 81

Julius-Maximilians-UNIVERSITÄT WÜRZBURG



Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Economathematics (2025)

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 45 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation	
Introdu	Introduction to Hands-on Mathematics 10-M-PRM1-152-m01					
Module coordinator Module offered by						
Dean of	fStudi	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
3	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Elabora ten), Pl tical ph table to providi	Elaboration of a school project on a topic in mathematics, e. g. for project days, school term papers (Facharbei- ten), Pluskurse (additional courses for the in-depth study of areas of special interest), workshops. In the theore- tical phase, the students formulate the subject-specific and didactic requirements of the topic, search for a sui- table topic, elaborate this topic for the project and draw up a project plan. This is done in groups with students providing each other with advice as well as challenging and reflecting on each other's work					
Intende	ed lear	ning outcomes				
The stu	dent is	able to select a suitable	mathematical topic f	or a school project a	and elaborate it.	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
S (2)						
Methoo ster, int	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
project Assess	(10 to ment o	15 pages) ffered: Every two years, w	vinter semester			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
90 h						
Teachir	ng cycl	e				
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)		
§ 22 Nr. 2 f § 22 Nr. 3 f)						
Module appears in						
First sta First sta First sta exchan First sta	Module appears in 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 Gymnasium Mathematics (2019) exchange program Mathematics (2023)					

Module	e title				Abbreviation
Practic	Practical Course Hands-on Mathematics 10-M-PRM2-152-m01				
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Implem beiten) tical ph plannir	entatio , Plusk ase the ig and	on of a school project on urse (additional courses e students prepare the in implementation.	a topic in mathematic for the in-depth study pplementation, realis	cs, e.g. for project d y of areas of special e the project with pu	ays, school term papers (Fachar- interest), workshops. In the prac- ipils and afterwards reflect the
Intende	ed learı	ning outcomes			
The stu differer	dent is nt aspe	able to perform a school cts of project planning ar	project with a suitab nd management, and	le mathematical top can reflect the proce	vic. He/She is acquainted with ess critically.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
P (2)					•
Methoo ster, in	l of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess	: drawi ment o	ng up a project plan (5 to ffered: Every two years, s	10 pages) and practi ummer semester	cal implementation	with pupils
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regu	lations for teaching-c	legree programmes)	
§ 22	Nr. 2 f				
§ 22 Nr. 3 f)					
Module	e appea	irs in			
First sta	ate exa	mination for the teaching	degree Realschule N	Aathematics (2015)	
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2015)	
FIRST Sta	ate exa	mination for the teaching	g degree Gymnasium (wathematics (2019)	
First sta	ate exa	mination for the teaching	, g degree Gymnasium :	Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 47 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title				Abbreviation
Review	Review Course for Teaching Degree (German Gymnasium) 10-M-REPL-191-m01				
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Revisio numbe ons.	n and o r theor	consolidation of the topic y; didactics of mathemati	s covered in the state cs) by completing ex	e examination (analy ercises and answeri	ysis; linear algebra, algebra and ng past state examination questi-
Intende	ed lear	ning outcomes			
The stu program	ident h nmes),	as advanced knowledge i §73 (2), and is able to ap	in the topics stated ir oply them on the leve	LPO I (examination l of the state examir	regulations for teaching degree nation.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
S (2)					
Methoo ster, in	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) talk b) proje Langua	(approx ect (10 ige of a	k. 45 minutes) or to 15 pages) ssessment: German and,	or English		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22 Nr. 3 f)					
Module	e appea	urs in			
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2019)	
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2023)	

data record Lehramt Gymnasien Mathematik - 2019	

Module tit	le			Abbreviation	
School Mathematics from a Higher Perspective 10-M-SCH-152-mo1					
Module co	ordinator		Module offered by		
Dean of St	udies Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS Me	ethod of grading	Only after succ. com	pl. of module(s)		
5 (no	ot) successfully completed				
Duration	Module level	Other prerequisites			
1 semester	undergraduate				
Contents					
Discussion their didac	n of selected topics in school tic implementation at both s	mathematics with re chool and university	spect to their integra levels.	ation into wider theories and	
Intended le	earning outcomes	,			
By means of and advan thodical as	of selected examples, the st ced mathematical theories. spect.	udent gains insight ir He/She is able to dis	nto the interrealtion l cuss these under ma	between school mathematics athematical, didactical and me-	
Courses (ty	ype, number of weekly conta	ct hours, language —	if other than Germa	n)	
V (2) + Ü (2	2)				
Method of ster, inform	assessment (type, scope, la nation on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
b) term paj c) project v Language o Assessmer	per (10 to 15 pages) or vork (15 to 25 hours) of assessment: German and, nt offered: In the semester in	/or English which the course is	offered and in the su	ıbsequent semester	
Allocation	of places				
Additional	information				
Workload					
150 h					
Teaching c	ycle				
Referred to	o in LPO I (examination regu	lations for teaching-o	legree programmes)		
§ 22 Nr. 1 § 22 Nr. 2 § 22 Nr. 3	§ 22 Nr. 1 h) § 22 Nr. 2 f) § 23 Nr. 2 f)				
Module appears in					
Bachelor's Bachelor's Bachelor's First state First state First state Bachelor's	degree (1 major) Mathemati degree (1 major) Mathemati degree (1 major) Mathemati degree (1 major) Computatio examination for the teaching examination for the teaching examination for the teaching degree (1 major) Mathemati	cs (2015) cal Physics (2015) onal Mathematics (20 g degree Grundschule g degree Realschule A g degree Gymnasium g degree Mittelschule cal Physics (2016)	015) Mathematics (2015) Aathematics (2015) Mathematics (2015) Mathematics (2015))	
inst state		segree oynnasium			

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 49 / 81
	data record Lehramt Gymnasien Mathematik - 2019	



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

Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor's degree (1 major) Mathematics (2023)

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

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 50 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Seminar Mathematics 10-M-SEM-152-m01					10-M-SEM-152-m01
Module coordinator				Module offered by	
Dean of	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
A selec	ted top	ic in mathematics.			
Intende	ed lear	ning outcomes			
The stu of a giv ly in a s	dent g en topi scientif	ains first experience with ic using selected literatur ic discussion.	independent scientif e, and prepares a tal	ic work. He/She ma k on the subject. He	sters elaboration and structuring /She is able to participate active-
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
S (2)					
Method ster, inf talk (6c	formati	sessment (type, scope, la on on whether module ca o minutes)	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
Langua	ge of a	ssessment: German and,	/or English		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ıg cycl	e			
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22	Nr. 3 f)				
Module	e appea	ars in			
Bacheld Bacheld First sta Bacheld exchan First sta Bacheld	Module appears in Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Computational Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2019) Bachelor's degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor's degree (1 major) Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 51 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Practical Training in Classroom Teaching including Theory (German Gym			German Gymnasi-	10-M-SFDPGY-152-m01	
um)	um)				
Module	coord	inator		Module offered by	
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
4	(1101) 5				
1 seme	n ster	undergraduate	Other prerequisites		
Conten	ts				
Contents The module introduces the student to the classroom practice of his/her Unterrichtsfach (subject studied with a focus on the scientific discipline) or Didaktikfach (subject studied with a focus on teaching methodology). Using specific teaching models, examples and projects in different grades, the module introduces the student to subject-specific techniques. In the university course accompanying the placement, the student reflects and structures what he/she has learned during his/her teaching placement and explores additional subject-specific and didactic aspects. In this context, the course discusses selected practical aspects of teaching mathematics in accordance with applicable guidelines and curricula. The course focuses on recent developments in classroom practice, also taking into account aspects of school pedagogy and learning psychology that can support the successful practical implementation of subject-specific conceptual designs. Intended learning outcomes The student is acquainted with the most important components of planning and organising teaching. He/She is able to teach the relevant topics for different forms, and can critically reflect the recent developments in the educational subject specific mathematics in the educational subject specific conception proves of planning and organising teaching.					
	s (type.	number of weekly conta	ct hours, language —	if other than Germa	n)
P (o) + 9	S (2)	,			,
Method ster, inf	l of ass formati	e ssment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn a	n German, examina a bonus)	tion offered — if not every seme-
a) prese b) term Content regulati tasks as	a) presentation (30 to 45 minutes) with position paper (1 to 2 pages) or b) term paper (10 to 15 pages) Contents and duration of placement as specified in Section 34 Subsection 1 Sentence 1 No. 4 LPO I (examination regulations for teaching-degree programmes); participation in mandatory teaching practice, completion of all set tasks as specified by placement school.				
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
120 h					
Teachir	Teaching cycle				
Referre	d to in	LPOI (examination regu	lations for teaching-d	egree programmes)	
§34 1	Nr. 4				
Module	appea	irs in			
First sta	ate exa	mination for the teaching	degree Gymnasium E	Educational Science	2 (2015)

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 52 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Stochastics for Teaching Degree (German Gymnasium)			10-M-STL-191-m01		
Module	coord	inator		Module offered by	
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Discrete assump discrete condition ce and and sta	e statis otions: e distril onal pr correla tistical	tics, in particular stochas basic notions of descript outions, elements of com obability, stochastic inde tion, waiting time proble tests in binomial models	stic modelling, motiva ive statistics, discret ibinatorics, principle ependence, common ms, law of the large n s, stochastic paradox	ation of conceptualis e probability spaces of inclusion and exc distributions, expec umbers, central limi es.	sation and discussion of basic , random variables, important clusion, multistage experiments, ted value and variance, covarian- it theorem, confidence intervals
Intende	ed learr	ning outcomes			
The stu Germar stical si	dent is 1 Gymn ignifica	acquainted with fundam asium. He/She is able to nce.	ental concepts and n assess stochastic ph	nethods of stochasti nenomena correctly a	ics, as required for teaching at and handle the concept of stati-
Course	s (type	number of weekly conta	ct hours, language —	if other than Germa	n)
V (4) +	Ü (2)				
Method ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
a) writte b) oral e c) oral e Langua credital	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and/ bonus	80 minutes) or ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	i) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
180 h					
Teachir	Teaching cycle				
Referre	d to in	LPOI (examination regu	lations for teaching-d	legree programmes)	
§731N	§ 73 Nr. 3				
Module	appea	rs in			
First sta exchan First sta	ate exa ge prog ate exa	mination for the teaching gram Mathematics (2023) mination for the teaching	g degree Gymnasium)) g degree Gymnasium)	Mathematics (2019) Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 53 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	e title				Abbreviation	
Stocha	Stochastics 1 for Teaching Degree (German Gymnasium)				10-M-STOL-191-m01	
Module	e coord	inator		Module offered by	Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Combir continu chastic varianc	natorics Ious di indepe e, limit	s, Laplace models, select stributions: normal distri endence, elementary con theorems: law of large n	ed discrete distributi bution, random varia ditional probability, c umbers, central limit	ons, elementary mea ble, distribution fun characteristics of dis theorem.	asure and integration theory, ction, product measures and sto- tributions: expected value and	
Intende	ed leari	ning outcomes				
The stu practica	dent is al prob	acquainted with fundam lems and knows about th	nental concepts and r ne typical fields of ap	nethods in stochast plication.	ics, applies these methods to	
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	in)	
V (4) +	Ü (2)					
Methoo ster, inf	l of ass formati	s essment (type, scope, la on on whether module ca	inguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
a) writte b) oral c) oral e Langua credital	en exar examin examin ge of a ble for	mination (approx. 90 to 1 lation of one candidate e ation in groups (groups o ssessment: German and bonus	80 minutes) or ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	5) or per candidate)		
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
180 h						
Teachir	ng cycl	6				
	0 . 7	-				
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)		
δ 73 N	r. 3			203.00 p.03.00000		
Module	appea	urs in				
First sta First sta	ate exa	mination for the teaching mination for the teaching	g degree Gymnasium g degree Gymnasium	Mathematics (2019) Mathematics (2023)		

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 54 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation			
Exercis	e tutor	or proof-reading in Ma	thematics		10-M-TuKo-152-mo1	L
Module coordinator Module			Module offered by			
Dean o	f Studie	es Mathematik (Mather	natics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)		
5	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	its					
Tutorin der sup	g or gra pervisio	iding homework for one n of the respective lect	e of the basic courses i urer or exercise superv	n the Bachelor's or t ⁄isor.	eaching degree prog	rammes un-
Intend	ed learı	ning outcomes				
The stu mistak	ıdent is es in m	able to support the ac athematical proof exer	quisition of mathemati cises and to find possi	cal skills and knowle ble solutions.	edge. He/She helps	to identify
Course	s (type	number of weekly con	tact hours, language –	- if other than Germa	n)	
Т (о)	- (-)	, , , , , , , , , , , , ,			.,	
Metho ster, in	d of ass formati	e ssment (type, scope, on on whether module	language — if other the can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
Assess ching ι	ment o Inits or	f tutoring activities or c approx. 5 pieces of cor	orrecting work by supe recting work)	ervising lecturers or e	xercise supervisors	(1 to 2 tea-
Allocat	ion of p	olaces				
Additic	nal inf	ormation				
Diago	direct	annliestion to tooching		ica halaha will cala	at norticinanta	
Please		application to teaching		lics, ne/sne will sele	ci participants.	
Worklo	ad					
150 h						
Teachi	ng cycl	9				
Referre	ed to in	LPOI (examination reg	gulations for teaching-	degree programmes)		
§ 22	Nr. 3 f)					
Modul	e appea	rs in				
Bachel	or's de	gree (1 major) Mathema	atics (2015)			
Bachel	or's deg	gree (1 major) Economa	thematics (2015)			
Bachel	or's de	gree (1 major) Mathema	atical Physics (2015)			
Bachel	or's de	gree (1 major) Computa	tional Mathematics (20	015)		
First st	ate exa	mination for the teachi	ng degree Gymnasium	Mathematics (2015)		
Bachel	or's de	gree (1 major) Mathema	atical Physics (2016)			
Bachel	or's de	gree (1 major) Economa	thematics (2017)			
First state examination for the teaching degree Gymnasium Mathematics (2019)						
Bachelor's degree (1 major) Mathematical Physics (2020)						
Bachelor's degree (1 major) Economathematics (2021)						
Bachelor's degree (1 major) Economathematics (2022)						
Bachelor's degree (1 major) Mathematical Data Science (2022)						
excitatinge program Mathematics (2023) First state examination for the teaching degree Cumpasium Mathematics (2000)						
Rachel	First state examination for the teaching degree Gymnasium Mathematics (2023)					
Bachel	or's de	gree (1 major) Mathema	$\frac{1}{2023}$			
Dachel	u sue					
LA Gymnas	ien Mathe	matics (2019)	JMU Würzburg data record L	s • generated 19-Apr-2025 • e ehramt Gymnasien Mathema	xam. reg. ik - 2010	page 55 / 81



Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Economathematics (2025)

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 56 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation		
Analytic Geometry (virtual course)			10-M-VHBAnG-191-m01		
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
The mo spaces	dule gi (incluc	ves a brief introduction t ling Hessian normal form	o the history of geom s) and finishes with t	etry, discusses anal the analysis and clas	ytic geometry in Euclidean vector ssification of quadrics.
Intende	ed lear	ning outcomes			
The stu the lang questio	dents g guage o ons. Mc	gain an overview over the of linear algebra. They co preover, the course is suit	development of geo nsolidate certain asp able for preparation f	metry and learn to tr ects of linear algebr for the final state exa	anslate geometric problems to a by applying them to geometric am.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)
Ü (2)					
Methoo ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess Other: I	(web-b ment o E-Learn	based, 15 to 20 hours) ffered: Once a year, sumi ing, Vhb	mer semester		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teaching cycle					
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
§ 22 Nr. 3 f)					
Module	e appea	urs in			
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2019)	

Module title			Abbreviation	
Basics in Arithmetics (virtual course) 10-M-VHBAri-152-mo1				10-M-VHBAri-152-m01
Module	e coordinator		Module offered by	
Dean o	f Studies Mathematik (Mathem	atics)	Institute of Mathem	atics
ECTS	Method of grading	Only after succ. com	pl. of module(s)	
2	(not) successfully completed			
Duratio	n Module level	Other prerequisites		
1 seme	ster undergraduate			
Conten	ts			
Basic to	opics on teaching arithmetics ir	school, e. g. divisab	ility theory, prime nu	mbers, set theory.
Intende	ed learning outcomes			
The stu proofs.	dent learns basic topics in the He/She is acquainted with the	teaching of arithmetic employment of new t	echnologies for teac	athematical backgrounds and hing arithmetic in school.
Course	s (type, number of weekly conta	act hours, language —	· if other than Germa	n)
Ü (2) Course	type: eLearning, mostly Virtuel	le Hochschule Bayern	(vhb)	
Methoo ster, in	d of assessment (type, scope, la formation on whether module c	anguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess	(web-based, 15 to 20 hours) ment offered: Once a year, wint	er semester		
Allocat	ion of places			
Additio	nal information			
Worklo	ad			
60 h				
Teachi	ng cycle	-		
	<u> </u>			
Referre	d to in LPO I (examination regu	llations for teaching-o	legree programmes)	
§ 22 § 22 § 22	Nr. 1 h) Nr. 2 f) Nr. 3 f)			
Module	e appears in			
First sta First sta First sta (2015) First sta (2015) First sta First sta First sta First sta First sta	ate examination for the teaching ate examination for the teaching	g degree Grundschule g degree Grundschule g degree Gymnasium g degree Sonderpäda g degree Sonderpäda g degree Mittelschule g degree Mittelschule g degree Gymnasium g degree Mittelschule	Poidactics in Mather Aathematics (2015) Mathematics (2015) gogik Didactics in Ma gogik Didactics in Ma Mathematics (2015) Didactics in Mathen Mathematics (2019) Mathematics (2020	natics (Primary School) (2015) athematics (Primary School) athematics (Middle School) natics (Middle School) (2015) (Prüfungsordnungsversion
2015))				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 58 / 81
	data record Lehramt Gymnasien Mathematik - 2019	



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)

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

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 59 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title Abbreviation				Abbreviation	
Start-u	p Tutoi	rial Mathematics (virtual	10-M-VHBBr-152-m01		
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. compl. of module(s)		
2	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
In-dept cal rigo	h discu our and	ussion of basic topics in r proofs.	nathematics that are	well known from sch	nool, with a focus on mathemati-
Intende	ed lear	ning outcomes			
The stu the tea	ident g ching c	ets acquainted with the b legree study programme.	asic working techniq	ues which are prere	quisites for the further courses in
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)	
Methoo ster, in	d of ass formati	sessment (type, scope, la ion on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess	(web-b ment o	oased, 15 to 20 hours) ffered: Every two years, w	vinter semester		
Allocat	ion of _l	olaces			
Additio	onal inf	ormation			
	1				
Worklo	ad		,		
60 h					
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22 Nr. 3 f)					
Module	Module appears in				
First sta First sta First sta	First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 60 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title Abbreviation					Abbreviation
Compu	Computer and Mathematics (virtual course)				10-M-VHBCom-152-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
2	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Discuss puter to	sion of pols.	possible ways to use con	nputers in teaching n	nathematics as well	as discussion of common com-
Intende	ed lear	ning outcomes			
The stu tics, as	dent is well as	acquainted with basic p s with the potential and li	ossibilities for the en mitations of compute	nployment of compu er tools.	ters in the teaching of mathema-
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)	
Methoo ster, in	d of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess	(web-b ment o	oased, 15 to 20 hours) ffered: Every two years, s	ummer semester		
Allocat	ion of _l	olaces			
Additio	nal inf	ormation			
Worklo	ad				
60 h					
Teachir	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22 Nr. 3 f)					
Module appears in					
First sta First sta First sta	First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 61 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	Module title Abbreviation					
School	Mathe	matics from a Didactical	Point of View: Algebi	ra online (virtual	10-M-VHBDAL-191-m01	
course)						
Module	<u>coord</u>	inator		Module offered by		
Dean of	fStudi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
2	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Algebra pics in a	ı didac school	tics is about learning and algebra: extensions of n	l teaching algebra. Th umber domains, varia	is course focuses of ables and terms, equ	n the central and important to- uations and functions.	
Intende	ed lear	ning outcomes				
notions ment of justify l able to tion. Th sense c	a and m f under earning assess ey kno of mode	nethods within a concept standing of the central co g units and learning sequ s and value the importance w various fields of applic elling cycles) independer	ubject-specific conte ual map. They know s oncepts of algebra in lences for the importa ce of digital technolog ation of algebraic con ltly.	strategies of short, n teaching mathemat ant topics in school gy with respect to to ncepts, and are able	a, and are able to structure the niddle and long term develop- ics. They are able to develop and algebra independently. They are days and future design of instruc- e to perform modelling (in the	
Course	s (type	number of weekly conta	ct hours, language —	· if other than Germa	in)	
Ü (2)	- (-)	,				
Methoo ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
project Assess Other: I	(web-b ment o E-Learn	based, 15 to 20 hours) ffered: Once a year, winte ing, Vhb	er semester			
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
60 h						
Teachir	ıg cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
§ 22 Nr. 3 f)						
Module	appea	urs in				
First sta exchan First sta	ate exa ge prog ate exa	mination for the teaching gram Mathematics (2023) mination for the teaching	g degree Gymnasium) g degree Gymnasium	Mathematics (2019) Mathematics (2023)		
	This state examination for the reacting degree dynnasium mathematics (2025)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 62 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title				Abbreviation	
School Mathematics from a Didactical Point of View: Analysis online (virtual			10-M-VHBDAN-191-m01		
course)				Madula offered by	
Module			-+:)	Module offered by	4
Dean of	Studie	es Mathematik (Mathema	atics)	Institute of Mathem	latics
	(not) a	od of grading	Only after succ. com	ipt. of module(s)	
2 Duratio	(1101) S		Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
The cou analysi mits, di	ırse "S s. This ifferent	chool Mathematics from course focuses on the ce ial calculus, applications	a Didactical Point of Ventral and important t antral and important t	View: Analysis onlin opics in school anal	e" is about learning and teaching ysis: functions, sequences and li-
Intende	ed learı	ning outcomes			
The stu notions ment of justify l able to tion. Th sense c	dents a and m f under earning assess ey kno of mode	are acquainted with the s nethods within a concept standing of the central co g units and learning sequ and value the importance w various fields of applic elling cycles) independer	ubject-specific conte ual map. They know s oncepts of analysis in tences for the importa ce of digital technolog tation of concepts in a ttly.	nts of school analys strategies of short, m i teaching mathema ant topics in school gy with respect to to analysis, and are ab	is, and are able to structure the 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	n)
Ü (2)			, , ,		•
Methoo ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess Other: I	(web-b ment o E-Learn	based, 15 to 20 hours) ffered: Once a year, winte ing, Vhb	er semester		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
60 h					
Teachir	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22	Nr. 3 f)				
Module	appea	urs in			
First sta exchan First sta	ate exa ge prog ate exa	mination for the teaching gram Mathematics (2023) mination for the teaching	g degree Gymnasium) g degree Gymnasium	Mathematics (2019) Mathematics (2023)	

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 63 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title					Abbreviation	
School Mathematics from a Didactical Point of View: Geometry online (virtual					10-M-VHBDG-191-m01	
course)						
Module	coord	inator		Module offered by		
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
2	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Geome	try dida	actics is about learning a	nd teaching geometry	. This course focuse	es on topics which are central and	
importa	ant for a	all of geometry and math	ematics, namely prov	ring and problem so	lving. It also addresses topics	
chapter	rs on si	bace geometry, trigonom	etry and similarity get	ometrv.	i the interature. Among these are	
Intende	ed lear	ning outcomes				
The stu	dents :	are acquainted with the s	ubject-specific conte	nts of school geome	atry and are able to structure the	
notions	and m	nethods within a concept	ual map. They know s	strategies of short, m	hiddle and long term develop-	
ment of	funder	standing of the central co	oncepts of geometry i	n teaching mathema	atics. They are able to develop	
and jus	tify lea	rning units and learning	sequences for the im	portant topics in sch	nool geometry independently.	
They ar	e able	to assess and value the i	mportance of digital f	technology with resp	pect to todays and future design	
(in the	uction. sense (ney know various fields of modelling cycles) inde	s of application of geo	ometric concepts, an	id are able to perform modelling	
Course	s (type	number of weekly conta	ct hours language -	if other than Germa	n)	
Ü (2)			er nours, tanguage		,	
Method	l of ass	essment (type scope la	nguage — if other tha	an German, examina	tion offered — if not every seme-	
ster, inf	formati	on on whether module ca	an be chosen to earn	a bonus)	tion oncrea in not every seme	
project	(web-b	based, 15 to 20 hours)				
Assess	ment o	ffered: Once a year, sum	mer semester			
Other:	-Learn	ling, Vhb				
Allocal		Jaces				
Additio	natint	ormation				
 Worklo						
60 h	au					
Teachir						
Referre	Referred to in LPO L (examination regulations for teaching-degree programmes)					
§ 22	Vr. 3 f)					
Module	appea	ars in				
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2019)		
exchan	ge prog	gram Mathematics (2023))			
First sta	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2023)		

Module title					Abbreviation
Exam T	utorial	Ordinary Differential Equ	uations (virtual cours	e)	10-M-VHBDGL-191-m01
Module	coord	inator		Module offered by	
Dean of	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
The exa respect cus is g are sup degrees	to the iven to pleme s of dif	rse ordinary differential e ir relevance for the Bavar animations and visualis nted and illustrated by se ficulty.	quations covers the operations covers the operation state examination ations of the behavior elected examples and	central topics in ordi n for the teaching de our of solutions of di l exercises from exal	inary differential equations with gree Gymnasium. A particular fo- fferential equations. The topics ms of previous years in varying
Intende	ed lear	ning outcomes			
The stu the resp rent cor	dent fo pective ntexts.	or the teaching degree for methods of proof in the The course shows the lev	German Gymnasium field of ordinary diffe vel of difficulty in the	knows and underst rential equations an Bavarian state exam	ands the central concepts and d is able to apply them in diffe- nination.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
Ü (3)					
Methoo ster, inf	l of ass formati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess Other: I	(web-b ment o E-Learn	oased, 20 to 30 hours) ffered: Once a year, sumi ing, Vhb	mer semester		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
90 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22 Nr. 3 f)					
Module	appea	urs in			
First sta	ate exa	mination for the teaching	degree Gymnasium	Mathematics (2019)	
First state examination for the teaching degree Gymnasium Mathematics (2023)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 65 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title					Abbreviation
Didactics of Stochastics (virtual course)					10-M-VHBDST-191-m01
Module	e coord	inator		Module offered by	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
2	(not) s	successfully completed			
Duratio	on d	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Didacti	cs of st	ochastics is about learni	ng and teaching stoc	hastics. This course	focuses on the central and im-
dom va	riables	. expected value, variance	e. probability spaces	or the Tschebysche	ff inequality. Moreover, the cour-
se cove	ers topi	cs which are usually not	content of university	courses and literatu	re on stochastics.
Intende	ed learr	ning outcomes			
The stu tions an of unde justify l are able structio (in the	dents a nd met erstand earning e to ass on. They sense o	are acquainted with the s hods within a conceptual 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	ubject-specific conte l map. They know stra ts of stochastics in te lences for the importa tance of digital techn pplication of concept pendently.	nts of stochastics, a ategies of short, mid aching mathematics ant topics in school s ology with respect to ts in stochastics, and	nd are able to structure the no- dle 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
Course	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
Ü (2)					
Method ster, in	l of ass formati	s essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess Other:	(web-b ment o E-Learn	ased, 15 to 20 hours) ffered: Once a year, winte ing, Vhb	er semester		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
60 h					
Teaching cycle					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22 Nr. 3 f)					
Module appears in					
First sta	ate exa	mination for the teaching	g degree Gymnasium I	Mathematics (2019)	
First sta	First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 66 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation		
Exam Tutorial Didactics of Mathematics (virtual course)			10-M-VHBEx-191-m01		
Module coordinator				Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) 9	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Revision the Ers as basi	on of ba tes Sta ic guide	sics (definitions of math atsexamen für Lehramt G elines for answering exan	ematical notions, for ymnasium (first state n questions (with a sp	mulation and proving e examination for tea pecial focus on the s	g of theorems) in preparation for aching at a Gymnasium) as well tate examination in Bavaria).
Intend	ed lear	ning outcomes			
The stu	ident le	arns about the structure	of the state exams a	nd different methods	s for solving the exam problems.
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	in)
Ü (2)					
Metho ster, in	d of ass formati	sessment (type, scope, la on on whether module ca	inguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-
project Assess Other:	: (web-b ment o E-Learr	based, 15 to 20 hours) ffered: Once a year, winto ing, Vhb	er semester		
Allocat	ion of _l	olaces			
Additio	onal inf	ormation			
Workload					
90 h					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22 II Nr. 3 f)					
Module appears in					
First state examination for the teaching degree Gymnasium Mathematics (2019)					
First state examination for the teaching degree Gymnasium Mathematics (2023)					

Module title			Abbreviation		
Exam Tutorial Algebra (virtual course)					10-M-VHBExA-191-m01
Module coordinator				Module offered by	
Dean of	Studie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Content	S				
The example for the E are add are disc	m cour Bavaria ressed ussed	rse (university) algebra co in state examination for t with equal importance, in detail. Each module co	overs the central topi the teaching degree G and fundamental algo ontains problems of i	cs in classical algeb Symnasium. The theo ebraic concepts with ncreasing difficulty a	ra with respect to their relevance ories of groups, rings and fields their set-theoretic interrelations and their solutions.
Intende	d learr	ning outcomes	· ·	_	
The stuc braic pro Bavaria	dent fo oof me n state	r the teaching degree for thods and is able to app examination.	German Gymnasium ly them in different co	knows the central p ontexts. The course s	roblems and the respective alge- shows the level of difficulty in the
Courses	(type	number of weekly conta	ct hours, language —	if other than Germa	n)
Ü (4)					
Method ster, info	Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)				
project (Assessn Other: E	(web-b nent o E-Learn	ased, 15 to 20 hours) ffered: Once a year, sumi ing, Vhb	ner semester		
Allocati	on of p	olaces			
Addition	nal info	ormation			
Workload					
90 h	90 h				
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 22 Nr. 3 f)					
Module appears in					
First sta	First state examination for the teaching degree Gymnasium Mathematics (2019)				
First state examination for the teaching degree Gymnasium Mathematics (2023)					

Module title			Abbreviation	
Exam Tutorial Complex Analysis (virtual course)			10-M-VHBFT-191-m01	
Module coordinator		Module offered by		
Dean of Studies Mathematik (Mathem	atics)	Institute of Mathem	atics	
ECTS Method of grading	Only after succ. con	pl. of module(s)		
3 (not) successfully completed				
Duration Module level	Other prerequisites			
1 semester undergraduate				
Contents				
The exam course complex analysis co for the Bavarian state examination for tions with reel analysis and geometry. exercises from exams of previous yea	vers the central topics the teaching degree (The topics are supple is in varying degrees o	in complex analysis Symnasium. A partic Emented and illustra f difficulty.	with respect to their relevance ular focus is given to interrela- ted by selected examples and	
Intended learning outcomes				
The student for the teaching degree for the respective methods of proof in con shows the level of difficulty in the Bay	r German Gymnasium nplex analysis and is arian state examinatio	knows and understa able to apply them in on.	ands the central concepts and n different contexts. The course	
Courses (type, number of weekly cont	act hours, language –	if other than Germa	n)	
Ü (4)				
Method of assessment (type, scope, l ster, information on whether module of	anguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-	
project (web-based, 30 to 40 hours) Assessment offered: Once a year, win Other: E-Learning, Vhb	ter semester			
Allocation of places				
Additional information				
Workload				
90 h				
Teaching cycle				
Referred to in LPO I (examination regulations for teaching-degree programmes)				
§ 22 Nr. 3 f)				
Module appears in				
First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)				

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 69 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module	title				Abbreviation
Basics in School Geometry (virtual course)			10-M-VHBGeo-152-m01		
Module coordinator		Module offered by			
Dean of Studies Mathematik (Mathematics)		atics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
2	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
Revisio ject-spe metry.	n and o ecific a	consolidation of the fund nd didactic courses (in pa	amental topics in eler articular teaching deg	nentary geometry th rees Grundschule, H	hat are prerequisites for the sub- Hauptschule, Realschule) in geo-
Intende	ed leari	ning outcomes			
The stu tics.He	dent ha /She is	as basic knowledge of sc acquainted with the emp	hool geometry, as rec ployment of new tech	uired for the study on ologies for teaching	of mathematics and its didac- g geometry in school.
Courses	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)	
Method ster, inf	l of ass formati	essment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	n German, examina a bonus)	tion offered — if not every seme-
project Assessi	(web-b ment o	oased, 15 to 20 hours) ffered: Once a year, sumr	ner semester		
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
60 h					
Teaching cycle					
Referre	d to in	LPO I (examination regu	lations for teaching-d	egree programmes)	
§ 22 II Nr. 1 h) § 22 II Nr. 2 f) § 22 II Nr. 3 f)					
Module appears in					
First state examination for the teaching degree Grundschule Mathematics (2015) 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)					
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) (2017)					
First state examination for the teaching degree Gymnasium Mathematics (2019)					

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 70 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

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)

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

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation			
History of Mathematics (virtual course)			10-M-VHBHM-191-m01			
Module coordinator		Module offered by				
Dean of Studio	es Mathematik (Mathema	atics)	Institute of Mathem	atics		
ECTS Metho	od of grading	Only after succ. com	pl. of module(s)			
5 (not) s	successfully completed					
Duration	Module level	Other prerequisites				
1 semester	undergraduate					
Contents						
Selected Topic the developm	cs from the history of mat ent of modern algebra (a	hematics as, for exar ccording to E. Noethe	nple, the crisis in the r).	e foundation of mathematics or		
Intended lear	ning outcomes					
The student sl	hall					
i) obtain an ov	verview over the develop	nent of mathematics,				
ii) learn the ba (e.g., doing re	asic techniques for workin search using databases a	ng with mathematical and investigating in a	texts as well as hist rchives), and	torical texts on mathematics		
iii) be able to	write an essay on a selec	ted topic from the his	tory of mathematics			
Courses (type	, number of weekly conta	ct hours, language —	if other than Germa	n)		
Ü (2) Module taugh	t in: English					
Method of ass ster, informati	sessment (type, scope, la on on whether module ca	nguage — if other tha an be chosen to earn	an German, examina a bonus)	tion offered — if not every seme-		
Term paper (10 Language of a Assessment o Other: E-Learn	Term paper (10 to 20 pages) Language of assessment: German and/or English Assessment offered: Once a year, summer term Other: E-Learning, Vhb					
Allocation of places						
Additional information						
Workload						
150 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
§ 22 Nr. 3 f)						
Module appears in						
First state examination for the teaching degree Gymnasium Mathematics (2019)						
exchange program Mathematics (2023)						
First state examination for the teaching degree Gymnasium Mathematics (2023)						
Module title			Abbreviation			
--	----------------------------------	---	---	--	--	-----------------------------
Mathematics in grade 10 (virtual course)10-M-VHBM10-152-m01			m01			
Modul	e coord	inator		Module offered by		
Dean of Studies Mathematik (Mathematics)		natics)	Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites	i		
1 seme	ster	undergraduate				
Conter	its					
Basic t	opics o	n teaching mathematio	s in tenth grade in Hau	iptschule, Realschule	e and Gymnasium.	
Intend	ed lear	ning outcomes				
The stu schule of new	ident le , as wel techno	arns basic topics in the l as the related mather logies for teaching ma	e teaching of mathema natical backgrounds a thematics in tenth form	tics in tenth form at 0 nd proofs. He/She is 1.	German Mittelschule acquainted with the	e and Real- e employment
Course	s (type	, number of weekly cor	tact hours, language –	- if other than Germa	n)	
Ü (2) Course	type: e	Learning, mostly Virtue	elle Hochschule Bayerr	ı (vhb)		
Metho ster, in	d of ass formati	essment (type, scope, on on whether module	language — if other th can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
project Assess	: (web-b ment o	oased, 15 to 20 hours) ffered: Once a year, su	mmer semester			
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination re	gulations for teaching-	degree programmes)		
§ 22 § 22 § 22	Nr. 1 h) Nr. 2 f) Nr. 3 f)					
Modul	e appea	ars in				
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 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 Mathematics (2015) First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015) First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015) First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015) First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (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						
LA Gymnas	sien Mathe	matics (2019)	JMU Würzburg data record L	g ● generated 19-Apr-2025 ● e ehramt Gymnasien Mathemal	xam. reg. tik - 2019	page 73 / 81



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 (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 74 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation			
Mathematics 1 (virtual course) 10-M-VHBMa1-152-m01				m01		
Modul	e coord	inator		Module offered by		
Dean o	f Studi	es Mathematik (Mathei	(Mathematics) Institute of Mathematics			
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites	;		
1 seme	ster	undergraduate				
Conter	ts					
Discus fundar	sion of nentals	basic topics on teachir concerning the organi	ng mathematics in a Gy Sation of classes.	mnasium, in particu	lar verbal and subjec	ct-specific
Intend	ed lear	ning outcomes				
The stu consid	udent is ering b	able to discuss select oth subject-related and	ed topics and question methodical aspects.	s on teaching mathe	matics at German Gy	ymnasium,
Course	s (type	, number of weekly con	tact hours, language –	- if other than Germa	n)	
Ü (2) Course	type: e	Learning, mostly Virtue	elle Hochschule Bayerr	ı (vhb)		
Metho ster, in	d of ass formati	essment (type, scope, on on whether module	language — if other th can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
project Assess	: (web-k ment o	based, 15 to 20 hours) ffered: Every two years	, winter semester			
Allocat	ion of p	olaces	· · · ·			
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination reg	gulations for teaching-	degree programmes)		
§ 22 § 22 § 22	Nr. 1 h) Nr. 2 f) Nr. 3 f)					
Modul		urs in				
First st	ate exa	mination for the teachi	ng degree Grundschule	e Mathematics (2015)	
First st First st	ate exa ate exa	mination for the teachi mination for the teachi	ng degree Grundschule ng degree Realschule I	e Didactics in Mather Mathematics (2015)	, matics (Primary Scho	ool) (2015)
First st	ate exa	mination for the teachi	ng degree Gymnasium	Mathematics (2015)		
First st (2015)	ate exa	mination for the teachi	ng degree Sonderpäda	gogik Didactics in M	athematics (Primary	School)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School)						
First st	ate exa	mination for the teachi	ng degree Mittelschule	Mathematics (2015))	
First st	ate exa	mination for the teachi	ng degree Mittelschule	Didactics in Mathen	natics (Middle Schoo	ol) (2015)
First st	ate exa	mination for the teachi	ng degree Gymnasium	Mathematics (2019)		
First st 2015))	ate exa	mination for the teachi	ng degree Mittelschule	e wathematics (2020	(Prutungsordnungs)	version
LA Gymnas	ien Mathe	matics (2019)	JMU Würzburg data record L	g • generated 19-Apr-2025 • e ehramt Gymnasien Mathemat	xam. reg. tik - 2019	page 75 / 81



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 (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 76 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation			
Mathematics 2 (virtual course) 10-M-VHBMa2-152-m01			m01			
Modul	e coord	inator		Module offered by		
Dean o	of Studi	es Mathematik (Mathe	matics)	natics) Institute of Mathematics		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
2	(not) 9	successfully completed				
Durati	on	Module level	Other prerequisites			
1 Seme	ester	undergraduate				
Discus	Discussion of central topics on teaching mathematics in a Gymnasium, in particular didactic analyses and possi-					
bilities	s of imp	lementation in the clas	sroom.			
Intend	ed lear	ning outcomes			1.1	1.0
The sti Gymna	udent is asium fr	able to discuss and ai om a didactical point c	nalyse selected topics a f view.	and questions on tea	iching mathematics	at German
Course	es (type	, number of weekly cor	itact hours, language –	· if other than Germa	n)	
Ü (2) Course	e type: e	Learning, mostly Virtue	elle Hochschule Bayern	(vhb)		
Metho ster, ir	d of ass formati	essment (type, scope, on on whether module	language — if other the can be chosen to earn	an German, examina a bonus)	tion offered — if not	every seme-
projec Assess	t (web-t sment o	based, 15 to 20 hours) ffered: Every two years	, summer semester			
Alloca	tion of p	olaces				
Additi	onal inf	ormation				
Worklo	bad					
60 h						
Teachi	ng cycl	е				
Referr	ed to in	LPOI (examination re	gulations for teaching-o	legree programmes)		
§ 22 § 22 § 22	Nr. 1 h) Nr. 2 f) Nr. 3 f)					
Modul	e appea	irs in				
First state examination for the teaching degree Grundschule Mathematics (2015) 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) 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 Mittelschule Didactics in Mathematics (Middle School) (2015) First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2015) First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (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))						
LA Gymna:	sien Mathe	matics (2019)	JMU Würzburg data record Li	• generated 19-Apr-2025 • e ehramt Gymnasien Mathemat	xam. reg. iik - 2019	page 77 / 81



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 (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 78 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation			
Stochastics in Sekundarstufe I (virtual course) 10-M-VHBSto-152-mo1						
Modul	e coord	inator		Module offered by	<u> </u>	
Dean c	of Studio	es Mathematik (Mathe	matics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)		
2	(not) s	successfully completed	l			
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
Revisio fic and	on and o didact	consolidation of the fu ic courses in stochastic	ndamental topics in sto cs.	ochastics that are pre	erequisites for the subject	t-speci-
Intend	ed lear	ning outcomes				
The stu tics.He	udent h e/She is	as basic knowledge of acquainted with the e	stochastics, as require mployment of new tech	d for the study of ma inologies for teachin	thematics and its didac- g stochastics in school.	
Course	es (type	, number of weekly cor	itact hours, language –	- if other than Germa	n)	
Ü (2) Course	e type: e	Learning, mostly Virtue	elle Hochschule Bayerr	ı (vhb)	·	
Metho ster, in	d of ass Iformati	essment (type, scope, on on whether module	language — if other th can be chosen to earn	an German, examina a bonus)	tion offered — if not every	y seme-
project Assess	t (web-t sment o	oased, 15 to 20 hours) ffered: Once a year, wi	nter semester			
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	bad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination re	gulations for teaching-	degree programmes)		
§ 22	Nr. 1 h)					
§ 22	Nr. 2 f)					
§ 22	Nr. 3 f)					
Modul	e appea	ars in			<u>\</u>	
First st First st First st	ate exa ate exa ate exa	mination for the teachi mination for the teachi mination for the teachi	ng degree Grundschule ng degree Grundschule ng degree Realschule I	e Mathematics (201 <u>5</u> e Didactics in Mather Mathematics (2015)) natics (Primary School) (2	2015)
First st	ate exa	mination for the teachi	ng degree Gymnasium	Mathematics (2015)		
First st	ate exa	mination for the teachi	ng degree Sonderpäda	gogik Didactics in M	athematics (Primary Scho	ol)
(2015) First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School)						
First st	ate exa	mination for the teachi	ng degree Mittelschule	Mathematics (2015))	
First st	ate exa	mination for the teachi	ng degree Mittelschule	Didactics in Mather	natics (Middle School) (20	015)
First st	ate exa	mination for the teachi	ng degree Gymnasium	Mathematics (2019)		
First st 2015))	ate exa	mination for the teachi	ng degree Mittelschule	Mathematics (2020	(Prüfungsordnungsversio	วท
LA Gymnas	sien Mathe	matics (2019)	JMU Würzburg data record L	g • generated 19-Apr-2025 • e ehramt Gymnasien Mathema	xam. reg. page tik - 2019	e 79 / 81



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 (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 80 / 81
	data record Lehramt Gymnasien Mathematik - 2019	

Module title			Abbreviation	
Introduction to Elementary Number Theory (virtual course)			10-M-VHBZth-191-m01	
Module coordinator		Module offered by		
Dean of Studies Mathematik (Mathem	atics)	Institute of Mathem	natics	
ECTS Method of grading	Only after succ. com	pl. of module(s)		
3 (not) successfully completed				
Duration Module level	Other prerequisites			
1 semester undergraduate				
Contents				
The course gives a brief introduction to proofs), introduces the different numb (including modular arithmetics) and in	o mathematical worki er domains, discusse troduces continued fi	ng techniques (prop s elementary divisib ractions and their ap	ositional logic, sets, definitions, ility properties of the integers proximation properties.	
Intended learning outcomes				
The students get aquainted with the m number theoretic questions, and get a	athematical language first impression of th	e, apply easy deduct e multifarious applie	ion techniques to elementary cations.	
Courses (type, number of weekly conta	act hours, language —	if other than Germa	in)	
Ü (2)				
Method of assessment (type, scope, language — if other than German, examination offered — if not every seme- ster, information on whether module can be chosen to earn a bonus)				
project (web-based, 15 to 20 hours) Assessment offered: Once a year, wint Other: E-Learning, Vhb	er semester			
Allocation of places				
Additional information				
Workload				
90 h				
- Teaching cycle				
Referred to in LPO I (examination regu	lations for teaching-o	legree programmes)		
§ 22 Nr. 3 f)				
Module appears in				
First state examination for the teaching	g degree Gymnasium	Mathematics (2019)		

LA Gymnasien Mathematics (2019)	JMU Würzburg • generated 19-Apr-2025 • exam. reg.	page 81 / 81
	data record Lehramt Gymnasien Mathematik - 2019	