

# Module Catalogue

for the Module studies (Bachelor)

## Mathematics

Examination regulations version: 2019 Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Mathematics

JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record MB|105|-|-|H|2019

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## The subject is divided into

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#### Abbreviations used

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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:

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

15-May-2019 (2019-36) 27-Jun-2019 (2019-41) 14-Nov-2019 (2019-52) 22-Jan-2020 (2020-13) 06-May-2020 (2020-39) 22-Jul-2020 (2020-57) 17-Dec-2020 (2020-110) 10-Mar-2021 (2021-17)

Mathematics (2019)

09-Jun-2021 (2021-58) 22-Dec-2021 (2021-85) 05-Jul-2022 (2022-52) 31-Jan-2023 (2022-86) 15-Jun-2023 (2023-58) 13-Dec-2023 (2023-107) 07-Aug-2024 (2024-82) 22-Jan-2025 (2025-1)

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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.



## Summer Term 2019

Module	Module title Abbreviation					
Supple	menta	ry Seminar Mathematics			10-M-SEM2-152-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. con	pl. of module(s)		
4	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
A selec	ted top	oic in mathematics.				
Intende	ed lear	ning outcomes				
of a giv	en topi				sters elaboration and structuring /She is able to participate active-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	man)		
S (2)						
		<b>Sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		o minutes) ssessment: German and,	/or English			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
120 h						
Teaching cycle						
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					



## Winter Term 2019

Module	Module title Abbreviation					
Supple	menta	ry Seminar Mathematics			10-M-SEM2-152-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)		
4	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
A selec	ted top	oic in mathematics.				
Intende	ed lear	ning outcomes				
of a giv	en topi				sters elaboration and structuring /She is able to participate active-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	man)		
S (2)						
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		o minutes) ssessment: German and,	/or English			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	Workload					
120 h						
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					



## Summer Term 2020

Analysis 1       10-M-ANA1-152-m01         Module coordinator       Module offered by         Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed          Duration       Module level       Other prerequisites         1 semester       undergraduate				
Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed          Duration       Module level       Other prerequisites				
ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed          Duration       Module level       Other prerequisites				
8     (not) successfully completed       Duration     Module level       Other prerequisites				
Duration Module level Other prerequisites				
1 semester undergraduate				
Contents				
Real numbers and completeness; basic topological notions; convergence and divergence of sequences and se- ries; power series and Taylor series; basics in differential calculus in one variable; basics of integral calculus in one variable (Riemann integral and improper integral).				
Intended learning outcomes				
The student knows and masters the essential methods and notions of analysis. He/She is acquainted with the central proof methods in analysis and can employ them to solve easy problems. He/she is able to perform easy mathematical arguments independently and to express mathematical arguments precisely and clearly in written form.				
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)				
V (4) + Ü (2)				
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)				
written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each) Language of assessment: German and/or English				
Allocation of places				
Additional information				
Workload				
240 h				
Teaching cycle				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)				

Module	Module title Abbreviation					
E-Learr	ning an	d Blended Learning Math	nematics 1		10-M-VHB1-152-m01	
Module coordinator Module offer						
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS         Method of grading         Only after succ. compl. of module(s)						
2 (not) successfully completed						
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ basic me	thods of e-learning a	and blended learning	g in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)		
Ü (2)						
		Learning, mostly Virtuell	· · · · · ·	· ·		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, wint	er semester			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
60 h						
Teaching cycle						
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)		

Module	Module title Abbreviation					
E-Learı	ning an	d Blended Learning Matl	nematics 2		10-M-VHB2-152-m01	
Modul	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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Becom	ing farr	niliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)		
Ü (2)						
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester			
Allocat	ion of <b>j</b>	olaces				
Additio	onal inf	ormation				
Workload						
60 h						
Teaching cycle						
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ummes)		
Referred to in LPO I (examination regulations for teaching-degree programmes)						

Module	Module title Abbreviation					
Linear A	Algebra	11			10-M-LNA1-152-m01	
Module coordinator				Module offered by		
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
8	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Conten	ts					
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-	
Intende	ed learr	ning outcomes				
ted with	n the ce	entral proof methods in li	near algebra and can	apply them to solve	ear algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.	
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) + l	Ü (2)					
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4	
Allocati	ion of p	olaces				
Additio	nal info	ormation				
Workload						
240 h						
Teaching cycle						
	-					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)		



## Winter Term 2020

Module	Module title Abbreviation					
Analysis 1					10-M-ANA1-152-m01	
Module	Module coordinator			Module offered by		
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
8	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 semester undergraduate						
Conten	Contents					
ries; po	Real numbers and completeness; basic topological notions; convergence and divergence of sequences and se- ries; power series and Taylor series; basics in differential calculus in one variable; basics of integral calculus in one variable (Riemann integral and improper integral).					
Intende	ed leari	ning outcomes				
central	proof r	nethods in analysis and	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written	
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) +	Ü (2)					
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
exercis	es eacł			n exercises (approx.	12 exercise sheets with approx. 4	
Allocat						
Additio	nal inf	ormation				
Workload						
240 h						
Teachi	Teaching cycle					
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		

Module	Module title Abbreviation					
Reason	ing an	d Writing in Mathematics	5		10-M-ASM-152-m01	
Module	e coord	inator		Module offered by	I	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)		
2	2 (not) successfully completed					
Duratio	Duration Module level Other prerequisites					
1 seme	1 semester undergraduate					
Conten	ts					
	ical wr				s in mathematics as well as ma- approach to axiomatic and de-	
Intende	ed lear	ning outcomes				
	asy mat				hematics. He/She is able to per- y and reasonably in written and	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
V (1) + (	Ü (1)					
		<b>sessment</b> (type, scope, langua ıle for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		20 pages) ssessment: German and,	/or English			
Allocat	ion of <sub>l</sub>	olaces				
Additio	nal inf	ormation				
Worklo	ad					
60 h	60 h					
Teachiı	ng cycl	e				
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)		

Module	Module title Abbreviation					
E-Learr	ning an	d Blended Learning Math	nematics 1		10-M-VHB1-152-m01	
Module coordinator Module offer						
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS         Method of grading         Only after succ. compl. of module(s)						
2 (not) successfully completed						
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ basic me	thods of e-learning a	and blended learning	g in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)		
Ü (2)						
		Learning, mostly Virtuell	· · · · · ·	· ·		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, wint	er semester			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
60 h						
Teaching cycle						
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)		

Module title Abbreviation							
E-Learr	E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-mo1						
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)			
2	(not) s	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.		
Intend	ed lear	ning outcomes					
The stu	dent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-		
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Ge	rman)			
Ü (2)							
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)			
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester				
Allocat	ion of <b>j</b>	olaces					
Additio	onal inf	ormation					
Worklo	ad						
60 h							
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ummes)			

Module title Abbreviation					Abbreviation	
Basic N	Basic Notions and Methods of Mathematical Reasoning10-M-GBM-152-m01					
Module	e coord	inator		Module offered by	l	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
2	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Introdu	iction t	o the basic notions and p	proof techniques in m	athematics: approa	ch to sets, formal logic and maps	
Intend	ed lear	ning outcomes				
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in	
Course	<b>S</b> (type, 1	number of weekly contact hours, I	language — if other than Gei	rman)		
V (1) +	Ü (1)					
		<b>Sessment</b> (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		15 pages) ssessment: German and	/or English			
Allocat	ion of	places				
Additio	onal inf	ormation				
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.	
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
§ 22    Nr. 1 h) § 22    Nr. 2 f)						

Module	Module title Abbreviation						
Linear A	Algebra	11		10-M-LNA1-152-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)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-		
Intende	ed learr	ning outcomes					
ted with	n the ce	entral proof methods in li	near algebra and can	apply them to solve	ear algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.		
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l	Ü (2)						
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Worklo	ad						
240 h	240 h						
Teachir	Teaching cycle						
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			



## Summer Term 2021

Module title Abbreviation					Abbreviation			
Analysis 1					10-M-ANA1-152-m01			
Module	e coord	inator		Module offered by				
Dean o	f Studio	es Mathematik (Mathema	atics)	Institute of Mathem	atics			
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)				
8	(not) s	successfully completed						
Duratio	on	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts							
ries; po	wer se		isics in differential ca		ivergence of sequences and se- le; basics of integral calculus in			
Intende	ed leari	ning outcomes						
central	proof r	nethods in analysis and	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written			
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) +	Ü (2)							
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
exercis	es eacl			n exercises (approx.	12 exercise sheets with approx. 4			
Allocat								
Additio	nal inf	ormation						
Worklo	ad							
240 h								
Teaching cycle								
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				

Module	Module title Abbreviation							
Reason	Reasoning and Writing in Mathematics 10-M-ASM-152-mo1							
Module	Module coordinator Module offered by							
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics			
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)				
2	(not)	successfully completed		-				
Duratio	'n	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts							
	ical wr				s in mathematics as well as ma- approach to axiomatic and de-			
Intende	ed lear	ning outcomes						
	asy mat				hematics. He/She is able to per- y and reasonably in written and			
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)				
V (1) + (	Ü (1)							
		<b>sessment</b> (type, scope, langua ıle for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether			
		20 pages) ssessment: German and,	/or English					
Allocat	ion of <sub>l</sub>	olaces						
Additio	nal inf	ormation						
Worklo	ad							
60 h								
Teachi	Teaching cycle							
	-							
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)				

Module title Abbreviation							
E-Learr	E-Learning and Blended Learning Mathematics 1 10-M-VHB1-152-mo1						
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)			
2	(not) s	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.		
Intende	ed lear	ning outcomes					
The stu	dent is	able to employ basic me	thods of e-learning a	and blended learning	g in mathematics-		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)			
Ü (2)							
		Learning, mostly Virtuell	· · · · · ·	· ·			
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		based, 15 to 20 hours) ffered: Once a year, wint	er semester				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
60 h							
Teachi	Teaching cycle						
-							
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)			

Module title Abbreviation							
E-Learı	E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-m01						
Modul	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)			
2	(not) s	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	Its						
Becom	ing farr	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.		
Intend	ed lear	ning outcomes					
The stu	dent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-		
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)			
Ü (2)							
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)			
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester				
Allocat	ion of	olaces					
Additio	onal inf	ormation					
Worklo	ad						
60 h							
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ummes)			

Module title Abbreviation					Abbreviation	
Basic N	Basic Notions and Methods of Mathematical Reasoning10-M-GBM-152-m01					
Module	e coord	inator		Module offered by	l	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
2	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Introdu	iction t	o the basic notions and p	proof techniques in m	athematics: approa	ch to sets, formal logic and maps	
Intend	ed lear	ning outcomes				
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in	
Course	<b>S</b> (type, 1	number of weekly contact hours, I	language — if other than Gei	rman)		
V (1) +	Ü (1)					
		<b>Sessment</b> (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		15 pages) ssessment: German and	/or English			
Allocat	ion of	places				
Additio	onal inf	ormation				
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.	
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
§ 22    Nr. 1 h) § 22    Nr. 2 f)						

Module	Module title Abbreviation						
Linear A	Algebra	11		10-M-LNA1-152-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)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-		
Intende	ed learr	ning outcomes					
ted with	n the ce	entral proof methods in li	near algebra and can	apply them to solve	ear algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.		
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l	Ü (2)						
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Worklo	ad						
240 h	240 h						
Teachir	Teaching cycle						
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			

Module	Module title Abbreviation						
Supple	Supplementary Seminar Mathematics 10-M-SEM2-152-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	pl. of module(s)			
4	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
A selec	ted top	oic in mathematics.					
Intende	ed lear	ning outcomes					
of a giv	en topi				sters elaboration and structuring /She is able to participate active-		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	man)			
S (2)							
		<b>Sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		o minutes) ssessment: German and,	/or English				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
120 h							
Teaching cycle							
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						



## Winter Term 2021

Module title Abbreviation					Abbreviation			
Analysis 1					10-M-ANA1-152-m01			
Module	e coord	inator		Module offered by				
Dean o	f Studio	es Mathematik (Mathema	atics)	Institute of Mathem	atics			
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)				
8	(not) s	successfully completed						
Duratio	on	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts							
ries; po	wer se		isics in differential ca		ivergence of sequences and se- le; basics of integral calculus in			
Intende	ed leari	ning outcomes						
central	proof r	nethods in analysis and	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written			
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) +	Ü (2)							
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
exercis	es eacl			n exercises (approx.	12 exercise sheets with approx. 4			
Allocat								
Additio	nal inf	ormation						
Worklo	ad							
240 h								
Teaching cycle								
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				

Module	Module title Abbreviation						
Reasor	Reasoning and Writing in Mathematics 10-M-ASM-152-mo1						
Module	Module coordinator Module offered by						
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
2	(not)	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
	ical wr				s in mathematics as well as ma- approach to axiomatic and de-		
Intende	ed lear	ning outcomes					
	asy ma				hematics. He/She is able to per- ly and reasonably in written and		
Course	<b>S</b> (type, 1	number of weekly contact hours, l	anguage — if other than Gei	rman)			
V (1) +	Ü (1)						
		<b>sessment</b> (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		20 pages) issessment: German and,	/or English				
Allocat	ion of	places					
Additio	onal inf	ormation					
Worklo	ad						
60 h	60 h						
Teachi	Teaching cycle						
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)			

Module	title				Abbreviation	
Introduction to Functional Analysis 10-M-FAN-152-mo1						
Module	e coord	inator	Module offered by	Nodule offered by		
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathematics		
ECTS				. compl. of module(s)		
9	(not) s	successfully completed				
Duration Module level		Module level	Other prerequisites			
1 semester un		undergraduate				
Conten	ts					
Banach	space	s and Hilbert spaces, bo	unded operators, prir	nciples of functional	l analysis.	
Intende	ed lear	ning outcomes				
The student knows the fundamental concepts and methods of functional analysis as well as the pertinent proof methods, is able to apply methods from linear algebra and analysis to functional analysis, and realises the broad applicability of the theory to other branches of mathematics.						
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Ger	man)		
V (4) +	Ü (2)					
		<b>eessment</b> (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if n	ot every semester, information on whether	
a) written examination (approx. 90 to 180 minutes, usually chosen) 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						
Allocat	ion of p	olaces				
Additional information						
Workload						
270 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
§ 22    Nr. 3 f)						

Modul	e title			Abbreviation			
Introduction to Functional Analysis for Mathematical Physics 10-M-FANP-152-mo1							
Module coordinator				Module offered	by		
Dean c	of Studi	es Mathematik (Math	ematics)	Institute of Mat	hematics		
ECTS				. compl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ester	undergraduate					
Conter	nts						
Banacl	n space	es and Hilbert spaces,	bounded operators, pri	nciples of functio	nal analysis.		
Intend	ed lear	ning outcomes					
The student knows the fundamental concepts and methods of functional analysis as well as the pertinent proof methods, is able to apply methods from linear algebra and analysis to functional analysis, and realises the broad applicability of the theory to other branches of mathematics.							
Course	<b>S</b> (type, r	number of weekly contact ho	urs, language — if other than Ge	rman)			
V (4) +	Ü (2)						
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)							
a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Metho- den (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Ma- thematics). Language of assessment: German and/or English creditable for bonus							
Allocat	tion of p	places					
Additional information							
Workload							
300 h							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							

forms, diophantine approximation and diophantine equations. Intended learning outcomes	Module title Abbreviation						
Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         9       (not) successfully completed          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, pt tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quad forms, diophantine approximation and diophantine equations.         Intended learning outcomes          The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently.         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 where module is creditable for bonus         a) written examination of one candidate each (1s to 30 minutes) or       or         b) 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            Workload         270	Introduction to Number Theory 10-M-ZTH-152-mo1						
ECTS       Method of grading       Only after succ. compl. of module(s)         9       (not) successfully completed          Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents         Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, p tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quad forms, diophantine approximation and diophantine equations.         Intended learning outcomes          The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently.         Courses (type, number of weekly contact hours, language – if other than German)       V         V (a) + Û (2)          Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)         a) written examination of one candidate each (ts to 30 minutes) or          b) 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               Morkload            Yor h	Module	e coord	inator		Module offered by		
9       (not) successfully completed          Duration       Module level       Other prerequisites         1 semuster       undergraduate          Contents       Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, p         tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quadrators, diophantine approximation and diophantine equations.         Intended learning outcomes       Intendeviation is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently.         Courses (type, number of weekly contact hours, language – if other than German)       V (a) + Ū (a)         Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whet module is creditable for bonus)         a) writter       examination (approx. 90 to 180 minutes, usually chosen) or         b) or al examination of one candidate each (15 to 30 minutes) or         c) or al examination in groups (groups of 2, 10 to 15 minutes per candidate)         Language of assessment: German and/or English creditable         creditable for bonus       Image of assessment: German and/or English         creditable for bonus       Image of assessment: German and/or English         creditable for bonus       Image of assessment: German and/or English         cred	Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
Duration       Module level       Other prerequisites         1 semester       undergraduate          Contents           Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, p       tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quadratic forms, diophantine approximation and diophantine equations.         Intended learning outcomes          The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently.         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 where module is creditable for bonus)         a) written examination (approx. 90 to 180 minutes, usually chosen) 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              Morkload          270 h          Teaching cycle				Only after succ. con	Ily after succ. compl. of module(s)		
1 semester       undergraduate          Contents          Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, p         tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quadrows, diophantine approximation and diophantine equations.         Intended learning outcomes         The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently.         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 where module is creditable for bonus)         a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) or al examination of one candidate each (15 to 30 minutes) or c) or al 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          270 h          Teaching cycle	9	(not) s	successfully completed				
Contents         Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, p         tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quad         forms, diophantine approximation and diophantine equations.         Intended learning outcomes         The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently.         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 where module is creditable for bonus)         a) written examination (approx. 90 to 180 minutes, usually chosen) or         b) oral examination of one candidate each (15 to 30 minutes) or         c) oral examination of one candidate each (15 to 30 minutes) per candidate)         Language of assessment: German and/or English         creditable for bonus         Allocation of places            Workload         270 h         Teaching cycle	Duratio			Other prerequisites			
Elementary properties of divisibility, prime numbers and prime number factorisation, modular arithmetics, p tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quad forms, diophantine approximation and diophantine equations. Intended learning outcomes The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently. Courses (type, number of weekly contact hours, language – if other than German) V (μ) + Ü (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whet module is creditable for bonus) a) written examination (approx. 90 to 180 minutes, usually chosen) 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  Morkload 270 h Teaching cycle 	1 semester		undergraduate				
tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quad forms, diophantine approximation and diophantine equations. Intended learning outcomes The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently. 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 whe module is creditable for bonus) a) written examination (approx. 90 to 180 minutes, usually chosen) 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  Morkload 270 h Teaching cycle 	Conten	ts		• •			
The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to ploy the basic methods and proof techniques independently. 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 whet module is creditable for bonus) a) written examination (approx. 90 to 180 minutes, usually chosen) 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 Morkload 270 h Teaching cycle	tests and methods for factorisation, structure of the residue class rings, theory of quadratic remainder, quadratic						
ploy the basic methods and proof techniques independently. 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 whete module is creditable for bonus) a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) 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 270 h Teaching cycle 	Intende	ed lear	ning outcomes				
V (4) + Ü (2) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whet module is creditable for bonus) a) written examination (approx. 90 to 180 minutes, usually chosen) 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 270 h Teaching cycle 	The student is acquainted with the fundamental concepts and methods of number theory. He/she is able to employ the basic methods and proof techniques independently.						
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whet module is creditable for bonus) a) written examination (approx. 90 to 180 minutes, usually chosen) 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 270 h Teaching cycle	Course	<b>S</b> (type, r	number of weekly contact hours, I	language — if other than Ger	man)		
module is creditable for bonus)         a) written examination (approx. 90 to 180 minutes, usually chosen) 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         270 h         Teaching cycle	V (4) +	Ü (2)					
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 270 h Teaching cycle 				ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
Additional information Workload 270 h Teaching cycle	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						
 Workload 270 h Teaching cycle 	Allocat	ion of p	olaces				
 Workload 270 h Teaching cycle 							
270 h Teaching cycle	Additional information						
270 h Teaching cycle							
Teaching cycle	Workload						
···	270 h						
Referred to in LPO I (examination regulations for teaching-degree programmes)	Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)							
	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						

Module title Abbreviation								
Introdu	Introduction to Number Theory for Mathematical Physics 10-M-ZTHP-152-mo1							
Module	e coord	inator		Module offered by				
Dean o	of Studi	es Mathematik (Mathem	atics)	Institute of Mather	natics			
ECTS	Meth	od of grading	Only after succ. com	pl. of module(s)				
10	nume	rical grade						
Duratio	on	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	Its	κ						
tests a	nd met		ructure of the residue	class rings, theory	ation, modular arithmetics, prime of quadratic remainder, quadratic			
Intend	ed lear	ning outcomes						
		s acquainted with the fun methods and proof tech			ber theory. He/she is able to em-			
Course	<b>S</b> (type, 1	number of weekly contact hours,	language — if other than Ger	man)				
V (4) +	Ü (2)							
Metho	d of as	<b>sessment</b> (type, scope, langua	age — if other than German, e	examination offered — if n	ot every semester, information on whether			
		ole for bonus)			-			
b) oral c) oral	examir examir age of a	mination (approx. 90 to a nation of one candidate e nation in groups (groups (ssessment: German and bonus	each (15 to 30 minutes of 2, 10 to 15 minutes	5) or				
Allocat	ion of	places						
Additio	onal inf	ormation						
Worklo	ad							
300 h								
Teachi	ng cycl	e						
Referre	ed to in	LPO I (examination regulation	is for teaching-degree progra					
			is for teaching degree progra	mmes)				

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 1 10-M-VHB1-152-mo1						
Module coordinator Module offer						
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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ basic me	thods of e-learning a	and blended learning	g in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)		
Ü (2)						
		Learning, mostly Virtuell	· · · · · ·	· ·		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, wint	er semester			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)		

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-mo1						
Modul	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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Becom	ing farr	niliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)		
Ü (2)						
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester			
Allocat	ion of	olaces				
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ummes)		

Module title Abbreviation						
Supplementary Seminar Mathematics 10-M-SEM2-152-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	pl. of module(s)		
4	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
A selec	ted top	oic in mathematics.				
Intende	ed lear	ning outcomes				
of a giv	en topi				sters elaboration and structuring /She is able to participate active-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	man)		
S (2)						
		<b>Sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		o minutes) ssessment: German and,	/or English			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
120 h						
Teachi	ıg cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		

Module title Abbreviation					
Basic N	lotions	and Methods of Mathem	natical Reasoning		10-M-GBM-152-m01
Module	e coord	inator		Module offered by	, ,
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mather	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
2	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Introdu	ction t	o the basic notions and p	proof techniques in m	athematics: approa	ach to sets, formal logic and maps
Intend	ed lear	ning outcomes			
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in
Course	<b>S</b> (type, 1	number of weekly contact hours, I	anguage — if other than Ge	rman)	
V (1) +	Ü (1)				
		<b>Sessment</b> (type, scope, langua Ile for bonus)	ge — if other than German,	examination offered — if n	ot every semester, information on whether
	-	15 pages) ssessment: German and	/or English		
Allocat	ion of	olaces			
Additio	onal inf	ormation			
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.
Worklo	ad				
60 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	ammes)	
§ 22	Nr. 1 h) Nr. 2 f)				

Module title Abbreviation					
Linear Algebra 1					10-M-LNA1-152-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)	
8	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-
Intende	ed learr	ning outcomes			
ted with to perfo	n the ce orm sim	entral proof methods in li pple mathematical argum	near algebra and can ents independently,	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.
		umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (4) + l					
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4
Allocati	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
240 h					
Teachir	ng cycl	e			
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)	

Module title Abbreviation						
Seminar Mathematics 10-M-SEM-152-mo1						
Module	e coord	inator	Module offered by			
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
A selec	ted top	oic in mathematics.				
Intende	ed lear	ning outcomes				
of a giv	en top				sters elaboration and structuring /She is able to participate active-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
S (2)						
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		o minutes) ssessment: German and,	/or English			
Allocat	ion of <sub>l</sub>	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
§ 22	Nr. 3 f)					



## Summer Term 2022

Module title					Abbreviation			
Analysi	is 1				10-M-ANA1-152-m01			
Module coordinator				Module offered by				
Dean o	f Studio	es Mathematik (Mathema	atics)	Institute of Mathem	atics			
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)				
8	(not) s	successfully completed						
Duratio	on	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts							
ries; po	wer se		isics in differential ca		ivergence of sequences and se- le; basics of integral calculus in			
Intende	ed leari	ning outcomes						
central	proof r	nethods in analysis and	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written			
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) +	Ü (2)							
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
exercis	es eacl			n exercises (approx.	12 exercise sheets with approx. 4			
Allocat								
Additio	nal inf	ormation						
Worklo	ad							
240 h								
Teachi	ng cycl	e						
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				

Module	e title				Abbreviation		
Reason	Reasoning and Writing in Mathematics10-M-ASM-152-m01						
Module	e coord	inator		Module offered by	I		
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)			
2	(not)	successfully completed		-			
Duratio	'n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
	ical wr				s in mathematics as well as ma- approach to axiomatic and de-		
Intende	ed lear	ning outcomes					
	asy mat				hematics. He/She is able to per- y and reasonably in written and		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (1) + (	Ü (1)						
		<b>sessment</b> (type, scope, langua ıle for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
		20 pages) ssessment: German and,	/or English				
Allocat	ion of <sub>l</sub>	olaces					
Additio	nal inf	ormation					
Worklo	ad						
60 h							
Teachiı	ng cycl	e					
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)			

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 1 10-M-VHB1-152-mo1						
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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	ident is	able to employ basic me	ethods of e-learning a	and blended learning	g in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)		
Ü (2)	-					
		Learning, mostly Virtuell	· · · · · · · · · · · · · · · · · · ·			
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, wint	er semester			
Allocat						
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	immes)		
			· · · · · · · · · · · · · · · · · · ·			

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Ge	rman)		
Ü (2)						
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester			
Allocat	ion of <b>j</b>	olaces				
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ummes)		

Module title Abbreviation					
Basic N	lotions	and Methods of Mathem	natical Reasoning		10-M-GBM-152-m01
Module	e coord	inator		Module offered by	, ,
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mather	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
2	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Introdu	ction t	o the basic notions and p	proof techniques in m	athematics: approa	ach to sets, formal logic and maps
Intend	ed lear	ning outcomes			
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in
Course	<b>S</b> (type, 1	number of weekly contact hours, I	anguage — if other than Ge	rman)	
V (1) +	Ü (1)				
		<b>Sessment</b> (type, scope, langua Ile for bonus)	ge — if other than German,	examination offered — if n	ot every semester, information on whether
	-	15 pages) ssessment: German and	/or English		
Allocat	ion of	olaces			
Additio	onal inf	ormation			
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.
Worklo	ad				
60 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	ammes)	
§ 22	Nr. 1 h) Nr. 2 f)				

Module title Abbreviation							
Linear Algebra 1 10-M-LNA1-152-m01					10-M-LNA1-152-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)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-		
Intende	ed learr	ning outcomes					
ted with to perfo	n the ce orm sim	entral proof methods in li pple mathematical argum	near algebra and can ents independently,	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.		
		umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l	<u> </u>						
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Workload							
240 h	240 h						
Teachir	ng cycl	e					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			



## Winter Term 2022

Module title					Abbreviation	
Analysis 1					10-M-ANA1-152-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studio	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
8	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
ries; po	wer se		isics in differential ca		ivergence of sequences and se- le; basics of integral calculus in	
Intende	ed leari	ning outcomes				
central	proof r	nethods in analysis and	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written	
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) +	Ü (2)					
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
exercis	es eacł			n exercises (approx.	12 exercise sheets with approx. 4	
Allocat						
Additio	nal inf	ormation				
Workload						
240 h						
Teaching cycle						
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		

Module	Module title Abbreviation					
Reasor	Reasoning and Writing in Mathematics 10-M-ASM-152-mo1					
Module	e coord	inator		Module offered by	1	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Methe	od of grading	Only after succ. con	npl. of module(s)		
2		successfully completed				
Duratio	•	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts	к.				
	ical wr				in mathematics as well as ma- approach to axiomatic and de-	
Intende	ed lear	ning outcomes				
	asy mat				hematics. He/She is able to per- y and reasonably in written and	
	-	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V (1) +	Ü (1)					
		s <b>essment</b> (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		20 pages) ssessment: German and,	/or English			
Allocat	ion of <sub>l</sub>	places				
Additio	onal inf	ormation				
Worklo	ad					
60 h	60 h					
Teachi	Teaching cycle					
	-					
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	mmes)		

Module title Abbreviation							
E-Learı	E-Learning and Blended Learning Mathematics 1 10-M-VHB1-152-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)			
2	(not) s	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.		
Intend	ed lear	ning outcomes					
The stu	ident is	able to employ basic me	ethods of e-learning a	and blended learning	g in mathematics-		
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)			
Ü (2)	-						
		Learning, mostly Virtuell	· · · · · · · · · · · · · · · · · · ·				
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		based, 15 to 20 hours) ffered: Once a year, wint	er semester				
Allocat							
Additio	onal inf	ormation					
Worklo	ad						
60 h							
Teachi	ng cycl	e					
-							
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	immes)			
			· · · · · · · · · · · · · · · · · · ·				

Module title Abbreviation							
E-Learı	E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-mo1						
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)			
2	(not) s	successfully completed					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ster	undergraduate					
Conten	ts						
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.		
Intend	ed lear	ning outcomes					
The stu	ident is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)			
Ü (2)							
		Learning, mostly Virtuell	· · · · · · · · · · · · · · · · · · ·				
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester				
Allocat	ion of p	olaces					
Additio	onal inf	ormation					
Worklo	ad						
60 h							
Teachi	ng cycl	e					
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)			

Module	Module title Abbreviation						
Supple	Supplementary Seminar Mathematics 10-M-SEM2-152-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)			
4	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
A selec	ted top	oic in mathematics.					
Intende	ed lear	ning outcomes					
of a giv	en topi				sters elaboration and structuring /She is able to participate active-		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)			
S (2)							
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		o minutes) ssessment: German and,	/or English				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
120 h							
Teaching cycle							
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						

Module title Abbreviation					Abbreviation	
Basic N	Basic Notions and Methods of Mathematical Reasoning 10-M-GBM-152-mo1					
Module	e coord	inator		Module offered by	l	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
2	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Introdu	iction t	o the basic notions and p	proof techniques in m	athematics: approa	ch to sets, formal logic and maps	
Intend	ed lear	ning outcomes				
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in	
Course	<b>S</b> (type, 1	number of weekly contact hours, I	language — if other than Gei	rman)		
V (1) +	Ü (1)					
		<b>Sessment</b> (type, scope, langua vle for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		15 pages) ssessment: German and	/or English			
Allocat	ion of	places				
Additio	onal inf	ormation				
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.	
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
§ 22    Nr. 1 h) § 22    Nr. 2 f)						

Module title Abbreviation							
Linear Algebra 1 10-M-LNA1-152-m01					10-M-LNA1-152-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)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-		
Intende	ed learr	ning outcomes					
ted with to perfo	n the ce orm sim	entral proof methods in li pple mathematical argum	near algebra and can ents independently,	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.		
		umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l							
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Workload							
240 h	240 h						
Teachir	ng cycl	e					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			

Module	Module title Abbreviation					
Seminar Mathematics 10-M-SEM-152-m01						
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
A selec	ted top	oic in mathematics.				
Intend	ed lear	ning outcomes				
of a giv	en top				sters elaboration and structuring /She is able to participate active-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
S (2)						
		<b>Sessment</b> (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		o minutes) ssessment: German and	/or English			
Allocat	ion of <sub>l</sub>	places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		



## Summer Term 2023

Module title					Abbreviation	
Analysis 1					10-M-ANA1-152-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studio	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
8	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
ries; po	wer se		isics in differential ca		ivergence of sequences and se- le; basics of integral calculus in	
Intende	ed leari	ning outcomes				
central	proof r	nethods in analysis and	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written	
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) +	Ü (2)					
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
exercis	es eacł			n exercises (approx.	12 exercise sheets with approx. 4	
Allocat						
Additio	nal inf	ormation				
Workload						
240 h						
Teaching cycle						
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		

Module title Abbreviation					Abbreviation	
Analysis 2					10-M-ANA2-152-m01	
Module	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	npl. of module(s)		
8	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
		gical considerations, bas on theorem.	sics in differential cal	culus in several varia	ables, inverse function theorem,	
Intende	ed learr	ning outcomes				
central	proof n	nethods in analysis and o	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written	
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) +	Ü (2)					
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
exercis	es eacł			n exercises (approx.	12 exercise sheets with approx. 4	
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	Workload					
240 h						
Teachir	Teaching cycle					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)		

Module	Module title Abbreviation					
Reasor	Reasoning and Writing in Mathematics 10-M-ASM-152-mo1					
Module	e coord	inator		Module offered by	1	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Methe	od of grading	Only after succ. con	npl. of module(s)		
2		successfully completed				
Duratio	•	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts	к.	<u>.</u>			
	ical wr				in mathematics as well as ma- approach to axiomatic and de-	
Intende	ed lear	ning outcomes				
	asy mat				hematics. He/She is able to per- y and reasonably in written and	
	-	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V (1) +	Ü (1)					
		s <b>essment</b> (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		20 pages) ssessment: German and,	/or English			
Allocat	ion of <sub>l</sub>	places				
Additio	onal inf	ormation				
Worklo	ad					
60 h	60 h					
Teachi	Teaching cycle					
	-					
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	mmes)		

Module	Module title Abbreviation					
Basic Notions and Methods of Mathematical Reasoning       10-M-GBM-152-m01						
Module	e coord	1				
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	Method of grading Only after succ. compl. of module(s)				
2	2 (not) successfully completed					
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Introdu	iction t	o the basic notions and p	proof techniques in m	athematics: approa	ch to sets, formal logic and maps	
Intend	ed lear	ning outcomes				
		ets acquainted with the b s degree study programm		ques which are prere	quisites for the further courses in	
Course	<b>S</b> (type, 1	number of weekly contact hours, I	anguage — if other than Ge	rman)		
V (1) +	Ü (1)					
		<b>Sessment</b> (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		15 pages) ssessment: German and	/or English			
Allocat	ion of	places				
Additio	onal inf	ormation				
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.	
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
-	§ 22    Nr. 1 h) § 22    Nr. 2 f)					

Module	Module title Abbreviation					
Linear Algebra 1 10-M-LNA1-152-m01						
Module coordinator				Module offered by		
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathematics		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
8	8 (not) successfully completed					
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Conten	ts					
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-	
Intende	ed learr	ning outcomes				
ted with to perfo	n the ce orm sim	entral proof methods in li pple mathematical argum	near algebra and can ents independently,	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.	
		umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) + l	<u> </u>					
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4	
Allocati	ion of p	olaces				
Additio	nal info	ormation				
Workload						
240 h						
Teaching cycle						
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)		

Module title Abbreviation							
Linear Algebra 2 10-M-LNA2-152-m01					10-M-LNA2-152-m01		
Module coordinator				Module offered by			
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathematics			
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
8 (not) successfully completed							
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Eigenva	alue the	eory, bilinear forms, Eucli	dean and unitary veo	tor spaces, diagona	lisation and Jordan normal form.		
Intende	ed learr	ning outcomes					
ted with	n the ce	entral proof methods in li	near algebra and can	apply them to solve	ar algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.		
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) +	Ü (2)						
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercis	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocat							
Additio	nal inf	ormation					
Worklo	ad						
240 h							
Teaching cycle							
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)			

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 1 10-M-VHB1-152-mo1						
Module coordinator Module offere						
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
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					
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ basic me	thods of e-learning a	and blended learning	g in mathematics-	
Course	<b>S</b> (type, r	umber of weekly contact hours, l	anguage — if other than Gei	rman)		
Ü (2)						
		Learning, mostly Virtuell	· · · ·	· ·		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, wint	er semester			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
60 h						
Teaching cycle						
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)		

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-m01						
Module	e coord	inator	Module offered by			
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	ECTS Method 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	Its					
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	udent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)		
Ü (2)						
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester			
Allocat	ion of <b>j</b>	olaces				
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	immes)		



## Winter Term 2023

Module title Abbreviation							
Analysis 1					10-M-ANA1-152-m01		
Module coordinator				Module offered by			
Dean o	f Studio	es Mathematik (Mathema	atics)	Institute of Mathem	atics		
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)			
8 (not) successfully completed							
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
ries; po	wer se		isics in differential ca		ivergence of sequences and se- le; basics of integral calculus in		
Intende	ed leari	ning outcomes					
central	proof r	nethods in analysis and	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written		
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) +	Ü (2)						
		e <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercis	es eacl			n exercises (approx.	12 exercise sheets with approx. 4		
Allocat							
Additio	nal inf	ormation					
Workload							
240 h							
Teachi	Teaching cycle						
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)			

Module title Abbreviation							
Analysis 2 10-M-ANA2-152-m01					10-M-ANA2-152-m01		
Module coordinator				Module offered by			
Dean of	f Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
		gical considerations, bas on theorem.	sics in differential cal	culus in several varia	ables, inverse function theorem,		
Intende	ed learr	ning outcomes					
central	The student knows and masters the essential methods and notions of analysis. He/She is acquainted with the central proof methods in analysis and can employ them to solve easy problems. He/She is able to perform easy mathematical arguments independently and to express mathematical arguments precisely and clearly in written form.						
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) +	Ü (2)						
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether		
exercis	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocat	ion of p	olaces					
Additio	nal info	ormation					
Worklo	Workload						
240 h							
Teaching cycle							
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			

Module title Abbreviation							
Reason	Reasoning and Writing in Mathematics 10-M-ASM-152-mo1						
Module	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. con	pl. of module(s)			
2	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
	ical wr				s in mathematics as well as ma- approach to axiomatic and de-		
Intende	ed lear	ning outcomes					
	asy mat				hematics. He/She is able to per- y and reasonably in written and		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (1) + Ü	Ü (1)						
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
		20 pages) ssessment: German and,	/or English				
Allocat	ion of <sub>l</sub>	olaces					
Additio	nal inf	ormation					
Worklo	ad						
60 h							
Teaching cycle							
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)			

Module title Abbreviation					
E-Learr	ning an	10-M-VHB1-152-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)	
2	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.
Intende	ed lear	ning outcomes			
The stu	dent is	able to employ basic me	thods of e-learning a	and blended learning	g in mathematics-
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
Ü (2)					
		Learning, mostly Virtuell	· · · · · ·	· ·	
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
		based, 15 to 20 hours) ffered: Once a year, wint	er semester		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
60 h					
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)	

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-mo1						
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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Ge	rman)		
Ü (2)						
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester			
Allocat	ion of <b>j</b>	olaces				
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ummes)		

Module title Abbreviation						
Ordinary Differential Equations 10-M-DGL-152-mo1						
Module coordinator Module offered by						
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
9	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its	·	·			
		uniqueness theorem; co tions; matrix exponentia			tial values; systems of linear dif- igher order.	
Intend	ed lear	ning outcomes				
		acquainted with the fun s/she is able to apply the			heory of ordinary differential	
		number of weekly contact hours, l	· · · · · · · · · · · · · · · · · · ·	•		
V (4) +	Ü (2)					
		s <b>essment</b> (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
b) oral c) oral	examir examin age of a	mination (approx. 90 to 1 nation of one candidate e nation in groups (groups o ussessment: German and bonus	ach (15 to 30 minutes of 2, 10 to 15 minutes	s) or		
Allocat	ion of <sub>l</sub>	places				
Additio	onal inf	ormation				
Worklo	ad					
270 h	270 h					
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	mmes)		

Module	e title		Abbreviation			
Basic Notions and Methods of Mathematical Reasoning       10-M-GBM-152-m01						
Module coordinator Module offere					l	
Dean of Studies Mathematik (Mathematics)				Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
2	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Introdu	iction t	o the basic notions and p	proof techniques in m	athematics: approa	ch to sets, formal logic and maps	
Intend	ed lear	ning outcomes				
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in	
Course	<b>S</b> (type, 1	number of weekly contact hours, I	language — if other than Gei	rman)		
V (1) +	Ü (1)					
		<b>Sessment</b> (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		15 pages) ssessment: German and	/or English			
Allocat	ion of	places				
Additio	onal inf	ormation				
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.	
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
§ 22	Nr. 1 h) Nr. 2 f)					

Module	Module title Abbreviation						
Linear Algebra 1 10-M-LNA1-152-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)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-		
Intende	ed learr	ning outcomes					
ted with to perfo	n the ce orm sim	entral proof methods in li pple mathematical argum	near algebra and can ents independently,	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.		
		umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l	<u> </u>						
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Workload							
240 h							
Teachir	Teaching cycle						
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			

Module title Abbreviation								
Linear A	Algebra	12			10-M-LNA2-152-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)				
8	(not) s	successfully completed						
Duratio	n	Module level	Other prerequisites					
1 semes	ster	undergraduate						
Conten	ts							
Eigenva	alue the	eory, bilinear forms, Eucli	dean and unitary veo	tor spaces, diagona	lisation and Jordan normal form.			
Intende	ed learr	ning outcomes						
ted with	n the ce	entral proof methods in li	near algebra and can	apply them to solve	ar algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.			
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) + l	Ü (2)							
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4			
Allocati	ion of p	olaces						
Additio	nal info	ormation						
Workload								
240 h	240 h							
Teachir	Teaching cycle							
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				

Module	Module title Abbreviation						
Advanc	ed Ana	lysis		10-M-VAN-152-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)			
7	numei	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Continu	uation o	of analysis in several vari	ables, integration the	eorems.			
Intende	ed learr	ning outcomes					
		acquainted with advanc understand the construct			of the Lesbegue integral, he or		
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l	Ü (2)						
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
b) oral e c) oral e	examin examin ge of a	nination (approx. 90 to 1 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	5) or			
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Workload							
210 h							
Teachir	Teaching cycle						
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			



## Summer Term 2024

(ECTS credits)

Analysis 1       10-M-ANA1-152-m01         Module coordinator       Module offered by         Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed          Duration       Module level       Other prerequisites         1 semester       undergraduate						
Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed          Duration       Module level       Other prerequisites						
ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed          Duration       Module level       Other prerequisites						
8     (not) successfully completed       Duration     Module level       Other prerequisites						
Duration Module level Other prerequisites						
1 semester undergraduate						
Contents						
Real numbers and completeness; basic topological notions; convergence and divergence of sequences and se- ries; power series and Taylor series; basics in differential calculus in one variable; basics of integral calculus in one variable (Riemann integral and improper integral).						
Intended learning outcomes						
The student knows and masters the essential methods and notions of analysis. He/She is acquainted with the central proof methods in analysis and can employ them to solve easy problems. He/she is able to perform easy mathematical arguments independently and to express mathematical arguments precisely and clearly in written form.						
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)						
V (4) + Ü (2)						
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)						
written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each) Language of assessment: German and/or English						
Allocation of places						
Additional information						
Workload						
240 h						
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						

Module title Abbreviation								
Analysis 2					10-M-ANA2-152-m01			
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	npl. of module(s)				
8	(not) s	successfully completed						
Duratio	n	Module level	Other prerequisites					
1 semes	ster	undergraduate						
Conten	ts							
		gical considerations, bas on theorem.	sics in differential cal	culus in several varia	ables, inverse function theorem,			
Intende	ed learr	ning outcomes						
central	proof r	nethods in analysis and o	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written			
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) + (	Ü (2)							
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether			
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4			
Allocati	ion of p	laces						
Additio	nal info	ormation						
Workload								
240 h								
Teachir	Teaching cycle							
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				

Module title Abbreviation								
Reason	Reasoning and Writing in Mathematics 10-M-ASM-152-mo1							
Module coordinator Module offered by								
Dean o	natics							
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)				
2	(not)	successfully completed		-				
Duratio	'n	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts							
	ical wr				s in mathematics as well as ma- approach to axiomatic and de-			
Intende	ed lear	ning outcomes						
	asy mat				hematics. He/She is able to per- y and reasonably in written and			
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)				
V (1) + (	Ü (1)							
		<b>sessment</b> (type, scope, langua ıle for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether			
		20 pages) ssessment: German and,	/or English					
Allocat	ion of <sub>l</sub>	olaces						
Additio	nal inf	ormation						
Worklo	Workload							
60 h	60 h							
Teachiı	ng cycl	e						
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)				

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 1 10-M-VHB1-152-mo1						
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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing farr	iliar with and reflecting t	echniques in e-learn	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	ident is	able to employ basic me	ethods of e-learning a	and blended learning	g in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)		
Ü (2)	-					
		Learning, mostly Virtuell	· · · · · · · · · · · · · · · · · · ·			
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, wint	er semester			
Allocat						
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	immes)		
			· · · · · · · · · · · · · · · · · · ·			

Module title Abbreviation						
E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-mo1						
Modul	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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Becom	ing farr	niliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)		
Ü (2)						
Course	type: e	Learning, mostly Virtuell	e Hochschule Bayern	ı (vhb)		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester			
Allocat	ion of	olaces				
Additio	onal inf	ormation				
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ummes)		

Module	e title				Abbreviation	
Basic Notions and Methods of Mathematical Reasoning10-M-GBM-152-m01						
Module	e coord	inator		Module offered by	l	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
2	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Introdu	iction t	o the basic notions and p	proof techniques in m	athematics: approa	ch to sets, formal logic and maps	
Intend	ed lear	ning outcomes				
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in	
Course	<b>S</b> (type, 1	number of weekly contact hours, I	language — if other than Gei	rman)		
V (1) +	Ü (1)					
		<b>Sessment</b> (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		15 pages) ssessment: German and	/or English			
Allocat	ion of	places				
Additio	onal inf	ormation				
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.	
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
§ 22    Nr. 1 h) § 22    Nr. 2 f)						

Module title Abbreviation							
Linear A	Algebra	11		10-M-LNA1-152-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)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-		
Intende	ed learr	ning outcomes					
ted with to perfo	n the ce orm sim	entral proof methods in li pple mathematical argum	near algebra and can ents independently,	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.		
		umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l	<u> </u>						
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Workload							
240 h							
Teaching cycle							
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			

Module title					Abbreviation			
Linear A	Algebra	12			10-M-LNA2-152-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)				
8	(not) s	successfully completed						
Duratio	n	Module level	Other prerequisites					
1 semes	ster	undergraduate						
Conten	ts							
Eigenva	alue the	eory, bilinear forms, Eucli	dean and unitary veo	tor spaces, diagona	lisation and Jordan normal form.			
Intende	ed learr	ning outcomes						
ted with	n the ce	entral proof methods in li	near algebra and can	apply them to solve	ar algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.			
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) + l	Ü (2)							
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4			
Allocati	ion of p	olaces						
Additio	nal info	ormation						
Workload								
240 h								
Teaching cycle								
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				



## Winter Term 2024

(ECTS credits)

Analysis 1       10-M-ANA1-152-m01         Module coordinator       Module offered by         Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed          Duration       Module level       Other prerequisites						
Dean of Studies Mathematik (Mathematics)       Institute of Mathematics         ECTS       Method of grading       Only after succ. compl. of module(s)         8       (not) successfully completed						
ECTS     Method of grading     Only after succ. compl. of module(s)       8     (not) successfully completed						
8 (not) successfully completed						
Duration Module level Other prerequisites						
1 semester undergraduate						
Contents						
Real numbers and completeness; basic topological notions; convergence and divergence of sequences and se- ries; power series and Taylor series; basics in differential calculus in one variable; basics of integral calculus in one variable (Riemann integral and improper integral).						
Intended learning outcomes						
The student knows and masters the essential methods and notions of analysis. He/She is acquainted with the central proof methods in analysis and can employ them to solve easy problems. He/She is able to perform easy mathematical arguments independently and to express mathematical arguments precisely and clearly in writte form.						
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)						
V (4) + Ü (2)						
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)						
written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. exercises each) Language of assessment: German and/or English						
Allocation of places						
Additional information						
Workload						
240 h						
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						

Module title Al					Abbreviation			
Analysi	52				10-M-ANA2-152-m01			
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	npl. of module(s)				
8	(not) s	successfully completed						
Duratio	n	Module level	Other prerequisites					
1 semes	ster	undergraduate						
Conten	ts							
		gical considerations, bas on theorem.	sics in differential cal	culus in several varia	ables, inverse function theorem,			
Intende	ed learr	ning outcomes						
central	proof r	nethods in analysis and o	can employ them to s	olve easy problems.	He/She is acquainted with the He/she is able to perform easy s precisely and clearly in written			
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) + (	Ü (2)							
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether			
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4			
Allocati	ion of p	laces						
Additio	nal info	ormation						
Workload								
240 h								
Teaching cycle								
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				

Module	Module title Abbreviation						
Reason	Reasoning and Writing in Mathematics 10-M-ASM-152-mo1						
Module	e coord	inator		Module offered by	I		
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)			
2	(not)	successfully completed		-			
Duratio	'n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
	ical wr				s in mathematics as well as ma- approach to axiomatic and de-		
Intende	ed lear	ning outcomes					
	asy mat				hematics. He/She is able to per- y and reasonably in written and		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (1) + (	Ü (1)						
		<b>sessment</b> (type, scope, langua ıle for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
		20 pages) ssessment: German and,	/or English				
Allocat	ion of <sub>l</sub>	olaces					
Additio	nal inf	ormation					
Worklo	ad						
60 h	60 h						
Teaching cycle							
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)			

Module title					Abbreviation	
E-Learning and Blended Learning Mathematics 1 10-M-VHB1-152-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)		
2	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.	
Intend	ed lear	ning outcomes				
The stu	dent is	able to employ basic me	thods of e-learning a	and blended learning	g in mathematics-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)		
Ü (2)						
		Learning, mostly Virtuell	· · · · · ·	· ·		
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
	•	based, 15 to 20 hours) ffered: Once a year, wint	er semester			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
60 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						

Modul	e title				Abbreviation		
E-Learning and Blended Learning Mathematics 2 10-M-VHB2-152-m01							
Modul	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)			
2	(not) s	successfully completed					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ster	undergraduate					
Conten	ts						
Becom	ing fam	iliar with and reflecting t	echniques in e-learni	ing and blended lea	rning in mathematics.		
Intend	ed lear	ning outcomes					
The stu	ident is	able to employ advance	d methods of e-learn	ing and blended lea	rning in mathematics-		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)			
Ü (2)							
		Learning, mostly Virtuell	· · · · · · · · · · · · · · · · · · ·				
		<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
		based, 15 to 20 hours) ffered: Once a year, sum	mer semester				
Allocat	ion of p	olaces					
Additio	onal inf	ormation					
Worklo	ad						
60 h							
Teaching cycle							
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)							

Module title Abbreviation						
Ordinary Differential Equations 10-M-DGL-152-mo1						
Module	e coord	inator		Module offered by	J	
Dean o	f Studie	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
9	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
		uniqueness theorem; co tions; matrix exponentia			itial values; systems of linear dif- igher order.	
Intende	ed learı	ning outcomes				
		acquainted with the fun /she is able to apply the			heory of ordinary differential	
Course	<b>S</b> (type, n	umber of weekly contact hours, I	anguage — if other than Ger	rman)		
V (4) +	Ü (2)					
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if n	ot every semester, information on whether	
b) oral c) oral	examin examin ge of a	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups o ssessment: German and bonus	ach (15 to 30 minutes of 2, 10 to 15 minutes	s) or		
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
270 h						
Teaching cycle						
			·			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		

Module	e title				Abbreviation	
Basic Notions and Methods of Mathematical Reasoning10-M-GBM-152-m01						
Module	e coord	inator		Module offered by	l	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
2	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	Its					
Introdu	iction t	o the basic notions and p	proof techniques in m	athematics: approa	ch to sets, formal logic and maps	
Intend	ed lear	ning outcomes				
		ets acquainted with the b s degree study programm		ques which are prere	equisites for the further courses in	
Course	<b>S</b> (type, 1	number of weekly contact hours, I	language — if other than Gei	rman)		
V (1) +	Ü (1)					
		<b>Sessment</b> (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		15 pages) ssessment: German and	/or English			
Allocat	ion of	places				
Additio	onal inf	ormation				
Additio	nal inf	ormation on module dura	ation: block taught pr	ior to the beginning	of the lecture period.	
Worklo	ad					
60 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
§ 22    Nr. 1 h) § 22    Nr. 2 f)						

Module title Abbreviation							
Linear A	Algebra	11		10-M-LNA1-152-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)			
8	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	undergraduate					
Conten	ts						
Basic n termina		and structures; vector sp	aces, linear maps, sy	stems of linear equa	ations; theory of matrices and de-		
Intende	ed learr	ning outcomes					
ted with to perfo	n the ce orm sim	entral proof methods in li pple mathematical argum	near algebra and can ents independently,	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.		
		umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + l	<u> </u>						
		s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4		
Allocati	ion of p	olaces					
Additio	nal info	ormation					
Workload							
240 h							
Teaching cycle							
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			

Module title					Abbreviation			
Linear A	Algebra	12			10-M-LNA2-152-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)				
8	(not) s	successfully completed						
Duratio	n	Module level	Other prerequisites					
1 semes	ster	undergraduate						
Conten	ts							
Eigenva	alue the	eory, bilinear forms, Eucli	dean and unitary veo	tor spaces, diagona	lisation and Jordan normal form.			
Intende	ed learr	ning outcomes						
ted with	n the ce	entral proof methods in li	near algebra and can	apply them to solve	ar algebra. He/She is acquain- e easy problems. He/She is able m adequately in written form.			
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) + l	Ü (2)							
		<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
exercise	es eacł			n exercises (approx.	12 exercise sheets with approx. 4			
Allocati	ion of p	olaces						
Additio	nal info	ormation						
Workload								
240 h								
Teaching cycle								
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				

Module title					Abbreviation
Advanced Analysis					10-M-VAN-152-m01
Module coordinator				Module offered by	
Dean of Studies Mathematik (Mathema			atics)	Institute of Mathematics	
ECTS Method of grading		od of grading	Only after succ. compl. of module(s)		
7 numerical grade					
Duration		Module level	Other prerequisites		
1 semester		undergraduate			
Contents					
Continuation of analysis in several variables, integration theorems.					
Intended learning outcomes					
The student is acquainted with advanced topics in analysis. Taking the example of the Lesbegue integral, he or she is able to understand the construction of a complex mathematical concept.					
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)					
V (4) + Ü (2)					
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)					
a) written examination (approx. 90 to 180 minutes, usually chosen) 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					
210 h					
Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					