Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided Module Catalogue

for the Subject

Mathematics

as Unterrichtsfach

with the degree "Erste Staatsprüfung für das Lehramt an Grundschulen"

Examination regulations version: 2009
Responsible: Institute of Mathematics

Abbreviations used

Course types: **E** = field trip, **K** = colloquium, **O** = conversatorium, **P** = placement/lab course, **R** = project, **S** = seminar, **T** = tutorial, **Ü** = exercise, **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:

LASPO2009

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

23-May-2012 (2012-82)

25-Sep-2014 (2014-65)

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

The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	page
Scientific Discipline (54 ECTS credits)				
Compulsory Courses (54 ECTS credits)				
10-M-EL1-092-m01	Elementary Mathematics 1 (German Grundschule/Hauptschule/Realschule)	7	NUM	11
10-M-EL2-092-m01	Elementary Mathematics 2 (German Grundschule/Hauptschule/Realschule)	11	NUM	13
10-M-M1GHR-092-m01	Basics in Mathematics (German Grundschule/Hauptschule/Gymnasium)	15	NUM	16
10-M-M2GHR-092-m01	Advances in Mathematics (German Grundschule/Hauptschule/Realschule)	18	NUM	18
10-M-M3GHR-092-m01	Revision Course in Mathematics (German Grundschule/Hauptschule/Gymnasium)	3	B/NB	20
Teaching (12 ECTS credits)				
10-M-DGGS-092-m01	Didactics of Mathematics (German Grundschule)	10	NUM	5
10-M-DVGS-092-m01	Advanced Didactics of Mathematics (German Grundschule)	2	B/NB	8
Freier Bereich (general as well as subject-specific electives) Teaching degree students must take modules worth a total of 15 ECTS credits in the area Freier Bereich (general as well as subject-specific electives) (Section 9 LASPO (general academic and examination regulations for teaching-degree programmes)). To achieve the required number of ECTS credits, students may take any modules from the areas below. Freier Bereich -- interdisciplinary: The interdisciplinary additional offer for a teaching degree can be found in the respective Annex "Ergänzende Bestimmungen für den "Freien Bereich" im Rahmen des Studiums für ein Lehramt".				
Mathematics (Freier Bereich (general as well as subject-specific electives) -- subject specific)				
10-M-DAGS-092-m01	Selected Topics in Didactics of Mathematics (German Grundschule)	2	B/NB	4
10-M-DMGS-092-m01	Methodology of Teaching in Mathematics (German Grundschule)	3	B/NB	7
10-M-DVHB-092-m01	E-Learning and Blended Learning in Mathematics at school	3	B/NB	9
10-M-VHBAri-092-m01	Basics in Arithmetics (virtual course)	3	B/NB	21
10-M-VHBGeo-092-m01	Basics in School Geometry (virtual course)	3	B/NB	23
Thesis (10 ECTS credits) Preparation of a written Hausarbeit (thesis) in accordance with the provisions of Section 29 LPO I (examination regulations for teaching-degree programmes) is a prerequisite for teaching degree students to be admitted to the Erste Staatsprüfung (First State Examination). In accordance with the provisions of Section 29 LPO I, students studying for a teaching degree Grundschule may write this thesis in the subject Didaktik der Grundschule (Didactics of Grundschule), in the subject they selected as Unterrichtsfach (subject studied with a focus on the scientific discipline) or in the subject Erziehungswissenschaften (Educational Science). Pursuant to Section 29 Subsection 1 Sentence 2 LPO I, students may also choose to write an interdisciplinary thesis.				
10-M-HMGS-092-m01	Thesis in Mathematics (teaching degree at German Grundschule)	10	NUM	15

Module title			Abbreviation
Selected Topics in Didactics of Mathematics (German Grundschule)			10-M-DAGS-092-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)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Discussion of basic topics in mathematics didactics with a focus on didactic aspects (e. g. dyscalculia, evaluation of teaching materials for mathematics in Grundschule, using computers for teaching mathematics in Grundschule, selected topics and research results in modern mathematics didactics, theoretical foundations of mathematics didactics, dealing with heterogeneity in the classroom, organising substantial learning environments).

Intended learning outcomes

The student is acquainted with theoretical concepts in the didactics of mathematics, knows important aspects of planning and analysing teaching of mathematics, masters different strategies for teaching and learning und can assess and employ them.

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

S (no information on SWS (weekly contact hours) and course language available)

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

a) talk (approx. 60 minutes) or b) project (approx. 5 to 15 pages) or c) portfolio (approx. 5 to 15 pages)
Assessment offered: once a year, winter semester

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 36 (1) 7. Didaktik der Grundschule Mathematik

Module appears in

First state examination for the teaching degree Grundschule Mathematics (2009)
First state examination for the teaching degree Grundschule Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2009)

Module title			Abbreviation
Didactics of Mathematics (German Grundschule)			10-M-DGGS-092-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)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
3 semester	undergraduate	--	

Contents

Discussion of basic topics in teaching mathematics in Grundschule taking into account modern research in mathematics didactics as well as possibilities of implementation in the classroom, also including modern technologies.

Intended learning outcomes

The student knows about the objectives of teaching mathematics in elementary school, basics in developmental psychology and didactics of mathematics, fundamentals in elementary school mathematics, as well as important models, presentations and media which can be employed in elementary school teaching of mathematics. She/he knows about common difficulties and problems of pupils in the acquisition of mathematical skills, and can employ and assess didactical principles and teaching and learning strategies.

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

This module has 4 components; information on courses listed separately for each component.

- 10-M-DGGS-P-092: M (no information on language and number of weekly contact hours available)
- 10-M-DGGS-1-092, and 10-M-DGGS-2-092: V + Ü (no information on language and number of weekly contact hours available)
- 10-M-DGGS-3-092: V (no information on language and number of weekly contact hours available)

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

This module has the following 4 assessment components. Unless stated otherwise, students must pass all of these assessment components to pass the module as a whole.

Assessment in module component 10-M-DGGS-P-092: Didaktik der Mathematik - Prüfung (Grundschule) (Assessment Mathematics Didactics, Grundschule)

- 1 ECTS credit, numerical grading
- written examination (approx. 120 minutes); if announced by the lecturer, the written examination may be replaced by an oral examination of one candidate each (approx. 30 minutes) or an oral examination in groups (groups of 2: approx. 45 minutes, groups of 3: approx. 60 minutes) or by a written and/or multi-media portfolio (as announced).
- Only after successful completion of module components: Module component 10-M-DGGS-P can only be taken by students who successfully completed the three module components 10-M-DGGS-1, 10-M-DGGS-2 and 10-M-DGGS-3.

Assessment in module component 10-M-DGGS-1-092: Didaktik der Mathematik - Arithmetik (Grundschule) (Mathematics Didactics - Arithmetic, Grundschule), **in module component 10-M-DGGS-2-092:** Didaktik der Mathematik - Geometrie (Grundschule) (Mathematics Didactics - Geometry, Grundschule)

- 4 ECTS credits, pass / fail
- exercises: at the beginning of the course, the lecturer will specify the type and scope of exercises to be successfully completed over the course of the semester for the module component to be considered successfully completed.

Assessment in module component 10-M-DGGS-3-092: Didaktik der Mathematik - Sachbezogener Mathematikunterricht (Grundschule) (Mathematics Didactics - Application of Mathematics, Grundschule)

- 1 ECTS credit, pass / fail
- exercises: at the beginning of the course, the lecturer will specify the type and scope of exercises to be successfully completed over the course of the semester for the module component to be considered successfully completed.

Allocation of places
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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 51 (1) 4. Mathematik Fachdidaktik
Module appears in
First state examination for the teaching degree Grundschule Mathematics (2009)

Module title			Abbreviation
Methodology of Teaching in Mathematics (German Grundschule)			10-M-DMGS-092-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Discussion of topics in the methodology of teaching mathematics; e. g. support for pupils who are particularly weak or particularly strong in mathematics, dealing with heterogeneity in the classroom, organisation of substantial learning environments as well as possibilities of implementation in the classroom, also including modern technologies.

Intended learning outcomes

The student knows about possibilities to promote mathematical skills, criteria für assessing media and their use in teaching mathematics and important aspects in planning and analysing the teaching of mathematics. He/She is acquainted with learning and teaching strategies and can employ and assess them.

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

S (no information on SWS (weekly contact hours) and course language available)

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

a) talk (approx. 45 minutes) or b) project (approx. 5 to 15 pages) or c) portfolio (approx. 5 to 15 pages)
Assessment offered: once a year, summer semester

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 36 (1) 7. Didaktik der Grundschule Mathematik

Module appears in

First state examination for the teaching degree Grundschule Mathematics (2009)
First state examination for the teaching degree Grundschule Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2009)

Module title			Abbreviation
Advanced Didactics of Mathematics (German Grundschule)			10-M-DVGS-092-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)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Discussion of topics in teaching mathematics in Grundschule taking into account different aspects, in particular mathematical foundations, didactic analyses, contemporary discussions in mathematics didactics as well as possible approaches in the classroom.

Intended learning outcomes

The student is able to discuss central topics and issues on teaching mathematics in elementary school (German Grundschule), considering subject-specific, didactical and methodical aspects.

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

S (no information on SWS (weekly contact hours) and course language available)

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

a) talk (approx. 60 minutes) or b) assignment to be completed at home (approx. 50 to 60 hours)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 51 (1) 4. Mathematik Fachdidaktik

Module appears in

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

Module title			Abbreviation
E-Learning and Blended Learning in Mathematics at school			10-M-DVHB-092-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. Courses offered online by Virtuelle Hochschule Bayern (vhb) in the field of mathematics are always incorporated into a module with an exercise. The respective modules can be identified by the word virtuell (online) added in brackets. Registration for the exercise must always be made via SB@Home at the beginning of the course. This registration for the exercise will be considered a declaration of will to seek admission to assessment. If the exercise was successfully completed, the lecturer will put the registration for assessment into effect at the end of the course.	

Contents

In a course offered by Virtuelle Hochschule Bayern (vhb), the student becomes acquainted with and reflects on techniques in e-learning and blended learning for teaching mathematics.

Intended learning outcomes

The student is acquainted with basic methods of e-learning and blended learning in teaching methematics, as well as their potentials and limitations.

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

Ü (no information on SWS (weekly contact hours) and course language available)

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

web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
First state examination for the teaching degree Grundschule Mathematics (2009)
First state examination for the teaching degree Grundschule Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Hauptschule Mathematics (2009)
First state examination for the teaching degree Hauptschule Didactics in Mathematics (Secondary School) (2009)
First state examination for the teaching degree Realschule Mathematics (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Secondary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2013)
First state examination for the teaching degree Mittelschule Mathematics (2013)
First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2013)

Module title			Abbreviation
Elementary Mathematics 1 (German Grundschule/Hauptschule/Realschule)			10-M-EL1-092-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)**	
7	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.	

Contents

Introduction to fundamental techniques in mathematics. Approach to the number as a basic theme in mathematics, basic topics in elementary number theory and the structure of the number system.

Intended learning outcomes

The student knows the basic ways of thinking and working in mathematics, as well as the fundamental mathematical proof methods. He/She is able to apply these skills to basic problems in the fields of number theory and the structure of the number system.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 120 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 15 minutes) or an oral examination in groups (groups of 2: approx. 20 minutes, groups of 3: approx. 30 minutes) or by a written and/or multi-media portfolio (as announced)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 51 (1) 3. Mathematik Elementare Zahlentheorie, Elementare Stochastik, Elementargeometrie

Module appears in

First state examination for the teaching degree Grundschule Mathematics (2009)
First state examination for the teaching degree Hauptschule Mathematics (2009)
First state examination for the teaching degree Realschule Mathematics (2009)

First state examination for the teaching degree Mittelschule Mathematics (2013)

Module title			Abbreviation
Elementary Mathematics 2 (German Grundschule/Hauptschule/Realschule)			10-M-EL2-092-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)**	
11	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

Introduction to fundamental and advanced techniques in mathematics. Basic topics in elementary and Euclidean geometry as well as stochastics.

Intended learning outcomes

The student knows the basic ways of thinking and working in mathematics, as well as the fundamental mathematical proof methods. He/She is able to apply these skills to basic problems in the fields of Euclidean geometry and elementary stochastics.

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

This module comprises 3 module components. Information on courses will be listed separately for each module component.

- 10-M-EL2-P-092: M (no information on SWS (weekly contact hours) and course language available)
- 10-M-EL2-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 10-M-EL2-2-092: V + Ü (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 10-M-EL2-P-092: Elementary Mathematics 2 (German Grundschule/Hauptschule/Realschule)

- 1 ECTS, Method of grading: numerical grade
- written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 45 minutes) or by a written and/or multi-media portfolio (as announced)
- Only after successful completion of module components: Successful completion of the two module components 10-M-EL2-1 and 10-M-EL2-2 is a prerequisite for participation in module component 10-M-EL2-P.

Assessment in module component 10-M-EL2-1-092: Elementary Mathematics 2: Geometry (German Grundschule/Hauptschule/Realschule) Elementary Mathematics 2: Geometry (German Grundschule/Hauptschule/Realschule)

- 6 ECTS, Method of grading: (not) successfully completed
- exercises: At the beginning of the course, the lecturer will specify the type and scope of exercises to be successfully completed over the course of the semester for the module component to be considered successfully completed.

Assessment in module component 10-M-EL2-2-092: Elementary Mathematics 2: Stochastics (German Grundschule/Hauptschule/Realschule) Elementary Mathematics 2: Stochastics (German Grundschule/Hauptschule/Realschule)

- 4 ECTS, Method of grading: (not) successfully completed
- exercises: At the beginning of the course, the lecturer will specify the type and scope of exercises to be successfully completed over the course of the semester for the module component to be considered successfully completed.

Allocation of places
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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 51 (1) 3. Mathematik Elementare Zahlentheorie, Elementare Stochastik, Elementargeometrie
Module appears in
First state examination for the teaching degree Grundschule Mathematics (2009) First state examination for the teaching degree Hauptschule Mathematics (2009) First state examination for the teaching degree Realschule Mathematics (2009) First state examination for the teaching degree Mittelschule Mathematics (2013)

Module title			Abbreviation
Thesis in Mathematics (teaching degree at German Grundschule)			10-M-HMGS-092-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)**	
10	numerical grade	Where applicable, specific modules/module components as specified by supervisor.	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Independently researching and writing on a topic in mathematics or mathematics didactics selected in consultation with the supervisor.

Intended learning outcomes

The student is able to work independently on a given mathematical topic and apply the skills and methods obtained during his/her studies in the teaching degree programme. He/She can write down the result of his/her work in a suitable form, incorporating aspects of the didactics of mathematics.

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

no courses assigned

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

written thesis (approx. 250 to 300 hours total)
Language of assessment: German, exceptions in accordance with Section 29 Subsection 4 LPO I (examination regulations for teaching degree programmes)

Allocation of places

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Additional information

Additional information on module duration: 1 to 2 semesters.

Workload

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Teaching cycle

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

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Module appears in

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

Module title			Abbreviation
Basics in Mathematics (German Grundschule/Hauptschule/Gymnasium)			10-M-M1GHR-092-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)**	
15	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

Introduction to the two most important basic fields of mathematics: linear algebra and analysis.

Intended learning outcomes

The students is acquainted with the basic methods, concepts and results in analysis and linear algebra. He/She is able to comprehend the central proof methods, can perform easy mathematical arguments and present them orally and in written form. He/She can analyse basic mathematical problems and employ methods of analysis and linear algebra to solve them.

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

This module comprises 3 module components. Information on courses will be listed separately for each module component.

- 10-M-M1GHR-P-092: M (no information on SWS (weekly contact hours) and course language available)
- 10-M-M1GHR-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 10-M-M1GHR-2-092: V + Ü (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 10-M-M1GHR-P-092: Basics in Mathematics (German Grundschule/Hauptschule/Gymnasium)

- 1 ECTS, Method of grading: numerical grade
- written examination (approx. 120 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 30 minutes) or an oral examination in groups (groups of 2: approx. 45 minutes, groups of 3: approx. 60 minutes) or by a written and/or multi-media portfolio (as announced)
- Only after successful completion of module components: Successful completion of the two module components 10-M-M1GHR-1 and 10-M-M1GHR-2 is a prerequisite for participation in module component 10-M-M1GHR-P.

Assessment in module component 10-M-M1GHR-1-092: Basics in Mathematics - Linear Algebra (German Grundschule/Hauptschule/Gymnasium) Basics in Mathematics - Linear Algebra (German Grundschule/Hauptschule/Gymnasium)

- 8 ECTS, Method of grading: (not) successfully completed
- exercises: At the beginning of the course, the lecturer will specify the type and scope of exercises to be successfully completed over the course of the semester for the module component to be considered successfully completed.

Assessment in module component 10-M-M1GHR-2-092: Basics in Mathematics - Analysis in one Variable (German Grundschule/Hauptschule/Gymnasium) Basics in Mathematics - Analysis in one Variable (German Grundschule/Hauptschule/Gymnasium)

- 6 ECTS, Method of grading: (not) successfully completed
- exercises: At the beginning of the course, the lecturer will specify the type and scope of exercises to be successfully completed over the course of the semester for the module component to be considered successfully completed.

Allocation of places
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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 51 (1) 1. Mathematik Differential- und Integralrechnung, Gewöhnliche Differentialgleichungen § 51 (1) 2. Mathematik Lineare Algebra und Analytische Geometrie
Module appears in
First state examination for the teaching degree Grundschule Mathematics (2009) First state examination for the teaching degree Hauptschule Mathematics (2009) First state examination for the teaching degree Realschule Mathematics (2009) First state examination for the teaching degree Mittelschule Mathematics (2013)

Module title			Abbreviation
Advances in Mathematics (German Grundschule/Hauptschule/Realschule)			10-M-M2GHR-092-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)**	
18	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
3 semester	undergraduate	--	

Contents

Advanced topics in the two most important fields of mathematics: applications of linear algebra in analytic geometry; extension of analysis from one to several variables, basics in ordinary differential equations and application of methods of analysis and linear algebra in this field.

Intended learning outcomes

The students is acquainted with advanced methods, concepts and results in linear algebra and analytic geometry, as well as in analysis in several variables and the theory of ordinary differential equations. He/She is able to comprehend the central proof methods, can perform easy mathematical arguments and present them orally and in written form. He/She can analyse basic mathematical problems and employ methods of analysis in one and several variables, linear algebra, analytic geometry and the theory of ordinary differential equations to solve them.

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

This module has 4 components; information on courses listed separately for each component.

- 10-M-M2GHR-P-092: M (no information on language and number of weekly contact hours available)
- 10-M-M2GHR-1-092, 10-M-M2GHR-2-092, and 10-M-M2GHR-3-092: V + Ü (no information on language and number of weekly contact hours available)

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

This module has the following 4 assessment components. Unless stated otherwise, students must pass all of these assessment components to pass the module as a whole.

Assessment in module component 10-M-M2GHR-P-092: Aufbau Mathematik - Prüfung (Grund-, Haupt- und Realschule) (Assessment Advanced Mathematics, Grundschule, Hauptschule and Realschule)

- 1 ECTS credit, numerical grading
- written examination (approx. 120 minutes); if announced by the lecturer, the written examination may be replaced by an oral examination of one candidate each (approx. 30 minutes) or an oral examination in groups (groups of 2: approx. 45 minutes, groups of 3: approx. 60 minutes) or by a written and/or multi-media portfolio (as announced).
- Only after successful completion of module components: Module component 10-M-M2GHR-P can only be taken by students who successfully completed the three module components 10-M-M2GHR-1, 10-M-M2GHR-2 and 10-M-M2GHR-3.

Assessment in module component 10-M-M2GHR-1-092: Aufbau Mathematik - Analysis in mehreren Variablen (Grund- , Haupt- und Realschule) (Advanced Mathematics - Analysis in Several Variables, Grundschule, Hauptschule and Realschule), **in module component 10-M-M2GHR-3-092:** Aufbau Mathematik - Differentialgleichungen (Grund-, Haupt- und Realschule) (Advanced Mathematics - Differential Equations, Grundschule, Hauptschule and Realschule), and **in module component 10-M-M2GHR-3-092:** Aufbau Mathematik - Differentialgleichungen (Grund-, Haupt- und Realschule) (Advanced Mathematics - Differential Equations, Grundschule, Hauptschule and Realschule) **:**

- 5 ECTS credits (10-M-M2GHR-2-092: 7 ECTS credits), pass / fail
- exercises: at the beginning of the course, the lecturer will specify the type and scope of exercises to be successfully completed over the course of the semester for the module component to be considered successfully completed.

Allocation of places
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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 51 (1) 1. Mathematik Differential- und Integralrechnung, Gewöhnliche Differentialgleichungen § 51 (1) 2. Mathematik Lineare Algebra und Analytische Geometrie
Module appears in
First state examination for the teaching degree Grundschule Mathematics (2009) First state examination for the teaching degree Hauptschule Mathematics (2009) First state examination for the teaching degree Realschule Mathematics (2009) First state examination for the teaching degree Mittelschule Mathematics (2013)

Module title			Abbreviation
Revision Course in Mathematics (German Grundschule/Hauptschule/Gymnasium)			10-M-M3GHR-092-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.	

Contents

Revision and consolidation of the topics covered in modules 10-M-M1GHR and 10-M-M2GHR by completing exercises and answering past state examination questions.

Intended learning outcomes

The student has advanced knowledge in the topics stated in LPO I (examination regulations for teaching degree programmes), §51 (2) 1, 2, and is able to apply them on the level of the state examination.

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

Ü (no information on SWS (weekly contact hours) and course language available)

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

talk (approx. 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

First state examination for the teaching degree Grundschule Mathematics (2009)
First state examination for the teaching degree Hauptschule Mathematics (2009)
First state examination for the teaching degree Realschule Mathematics (2009)
First state examination for the teaching degree Mittelschule Mathematics (2013)

Module title			Abbreviation
Basics in Arithmetics (virtual course)			10-M-VHBAri-092-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. Courses offered online by Virtuelle Hochschule Bayern (vhb) in the field of mathematics are always incorporated into a module with an exercise. The respective modules can be identified by the word virtuell (online) added in brackets. Registration for the exercise must always be made via SB@Home at the beginning of the course. This registration for the exercise will be considered a declaration of will to seek admission to assessment. If the exercise was successfully completed, the lecturer will put the registration for assessment into effect at the end of the course.	

Contents

Basic topics on teaching arithmetics in school, e. g. divisability theory, prime numbers, set theory.

Intended learning outcomes

The student learns basic topics in the teaching of arithmetics and the related mathematical backgrounds and proofs. He/She is acquainted with the employment of new technologies for teaching arithmetic in school.

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

Ü (no information on SWS (weekly contact hours) and course language available)

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

web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in
First state examination for the teaching degree Grundschule Mathematics (2009)
First state examination for the teaching degree Grundschule Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Hauptschule Mathematics (2009)
First state examination for the teaching degree Hauptschule Didactics in Mathematics (Secondary School) (2009)
First state examination for the teaching degree Realschule Mathematics (2009)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Secondary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2013)
First state examination for the teaching degree Mittelschule Mathematics (2013)
First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2013)

Module title			Abbreviation
Basics in School Geometry (virtual course)			10-M-VHBGeo-092-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. Courses offered online by Virtuelle Hochschule Bayern (vhb) in the field of mathematics are always incorporated into a module with an exercise. The respective modules can be identified by the word virtuell (online) added in brackets. Registration for the exercise must always be made via SB@Home at the beginning of the course. This registration for the exercise will be considered a declaration of will to seek admission to assessment. If the exercise was successfully completed, the lecturer will put the registration for assessment into effect at the end of the course.	

Contents

Revision and consolidation of the fundamental topics in elementary geometry that are prerequisites for the subject-specific and didactic courses (in particular teaching degrees Grundschule, Hauptschule, Realschule) in geometry.

Intended learning outcomes

The student has basic knowledge of school geometry, as required for the study of mathematics and its didactics.He/She is acquainted with the employment of new technologies for teaching geometry in school.

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

Ü (no information on SWS (weekly contact hours) and course language available)

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

web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
First state examination for the teaching degree Grundschule Mathematics (2009)
First state examination for the teaching degree Grundschule Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Hauptschule Mathematics (2009)
First state examination for the teaching degree Hauptschule Didactics in Mathematics (Secondary School) (2009)
First state examination for the teaching degree Realschule Mathematics (2009)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Primary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Secondary School) (2009)
First state examination for the teaching degree Sonderpädagogik Didactics in Mathematics (Middle School) (2013)
First state examination for the teaching degree Mittelschule Mathematics (2013)
First state examination for the teaching degree Mittelschule Didactics in Mathematics (Middle School) (2013)