Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Annex SFB

Studienfachbeschreibung (subject description, SFB) for the subject Mathematics as vertieft studiertes Fach (studied with a focus on the scientific discipline)

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

Responsible: Institute of Mathematics

Examination regulations version: 2009

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 for the modules in this SFB:

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Information on assessment procedures:

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 a 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)):

11-Jul-2012 (2012-79)

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.

Every module will be described using the following form:

Abbreviation	**Module title**							
	ECTS		Duration	(in semesters)	Method of grading		Module level	
	Courses	To be specified in the form X (y) with course type X abbreviated as specified above and number of weekly contact hours y						
	Method of assessment							
	Only after successful completion of	if applicable						
	Other prerequisites	if applicable						
	Participants and allocation of places	if applicable						
	Additional information	if applicable						
	Referred to in LPO I	if applicable (examination regulations for teaching-degree programmes)						

Scientific Discipline (92 ECTS credits)								
Compulsory Courses (76 ECTS credits)								
10-M-PPM-082-m01	**Propaedeutics of Mathematics**							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	V + Ü (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course) Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner						
	other prerequisites	Admission prerequisite to assessment: regular attendance of courses (as specified at the beginning of the course).						

10-M-GEO-082-mo1	**Introduction to Geometry**							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	This module has 2 components; information on courses listed separately for each component. • 10-M-GEO-1-082: V + Ü (no information on language and number of weekly contact hours available) • 10-M-GEO-2-082: V + Ü (no information on language and number of weekly contact hours available)						
	Method of assessment	This module has the following 2 assessment components. To pass the module as a whole students must pass one of the two assessment components. **Assessment component to module component 10-M-GEO-1-082:** Einführung in die Projektive Geometrie • 8 ECTS credits, method of grading: numerical grade • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: English, German if agreed upon with the examiner • Other prerequisites: Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment component to module component 10-M-GEO-2-082:** Einführung in die Differentialgeometrie • 8 ECTS credits, method of grading: numerical grade • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: English, German if agreed upon with the examiner • Other prerequisites: Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.						
	other prerequisites	By way of exception, additional prerequisites are listed in the section on assessments.						
	Referred to in LPO I	§ 73 (1) 4. Mathematik Geometrie						

10-M-ZAL-082-m01	**Number Theory and Algebra**							
	ECTS	13	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		This module comprises 3 module components. Information on courses will be listed separately for each module component. • 10-M-ZAL-1-082: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-ZAL-2-082: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-ZAL-P-082: M (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		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-ZAL-1-082:** Introduction to Number Theory Introduction to Number Theory • 4 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment in module component 10-M-ZAL-2-082:** Introduction to Algebra Introduction to Algebra • 7 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment in module component 10-M-ZAL-P-082:** Examination in Number Theory and Algebra • 2 ECTS, Method of grading: numerical grade • oral examination of one candidate each (approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Only after successful completion of module components: Successful completion of module component 10-M-ZAL-1 or module component 10-M-ZAL-2 is a prerequisite for participation in module component 10-M-ZAL-P.					
	other prerequisites		By way of exception, additional prerequisites are listed in the section on assessments.					
	Referred to in LPO I		§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie					

10-M-NM1-082-m01	**Numerical Mathematics 1**							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 5. Mathematik Angewandte Mathematik					

10-M-LNA-082-mo1	**Linear Algebra**							
	ECTS	14	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		This module comprises 3 module components. Information on courses will be listed separately for each module component. • 10-M-LNA-1-082: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-LNA-2-082: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-LNA-P-082: M (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		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-LNA-1-082:** Linear Algebra 1 Linear Algebra 1 • 7 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment in module component 10-M-LNA-2-082:** Linear Algebra 2 Linear Algebra 2 • 5 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment in module component 10-M-LNA-P-082:** Examination in Linear Algebra • 2 ECTS, Method of grading: numerical grade • oral examination of one candidate each (approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Only after successful completion of module components: Successful completion of module component 10-M-LNA-1 or module component 10-M-LNA-2 is a prerequisite for participation in module component 10-M-LNA-P.					
	other prerequisites		By way of exception, additional prerequisites are listed in the section on assessments.					
	Referred to in LPO I		§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie					

10-M-VKM-082-m01	**Preparatory Course Mathematics**							
	ECTS	1	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		project assignments (type and expenditure of time to be specified by the lecturer at the beginning of the course) Assessment offered: once a year, winter semester Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Admission prerequisite to assessment: regular attendance of courses (as specified at the beginning of the course).					

10-M-DFT-082-m01	**Ordinary Differential Equations and Complex Analysis**							
	ECTS	13	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		This module comprises 3 module components. Information on courses will be listed separately for each module component. • 10-M-DFT-1-082: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-DFT-2-082: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-DFT-P-082: M (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		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-DFT-1-082:** Ordinary Differential Equations Ordinary Differential Equations • 4 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment in module component 10-M-DFT-2-082:** Introduction to Complex Analysis Introduction to Complex Analysis • 7 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment in module component 10-M-DFT-P-082:** Examination in Ordinary Differential Equations and Complex Analysis • 2 ECTS, Method of grading: numerical grade • oral examination of one candidate each (approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Only after successful completion of module components: Successful completion of module component 10-M-DFT-1 or module component 10-M-DFT-2 is a prerequisite for participation in module component 10-M-DFT-P.					
	other prerequisites		By way of exception, additional prerequisites are listed in the section on assessments.					
	Referred to in LPO I		§ 73 (1) 1. Mathematik Analysis					

10-M-ANL-092-m01	**Analysis for students teaching at a German Gymnasium**							
	ECTS	17	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		This module comprises 3 module components. Information on courses will be listed separately for each module component. • 10-M-ANA-P-082: M (no information on SWS (weekly contact hours) and course language available) • 10-M-ANL-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-ANL-2-092: V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		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-ANA-P-082:** Examination in Analysis • 2 ECTS, Method of grading: numerical grade • oral examination of one candidate each (approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Only after successful completion of module components: Successful completion of any one of the module components 10-M-ANA-1, 10-M-ANL-1, 10-M-ANA-2, 10-M-ANL-2 is a prerequisite for participation in module component 10-M-ANA-P. **Assessment in module component 10-M-ANL-1-092:** Analysis 1 for students teaching at a German Gymnasium Analysis 1 for students teaching at a German Gymnasium • 6 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. **Assessment in module component 10-M-ANL-2-092:** Analysis 2 for students teaching at a German Gymnasium Analysis 2 for students teaching at a German Gymnasium • 9 ECTS, Method of grading: (not) successfully completed • written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) • Language of assessment: German, English if agreed upon with the examiner • Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	other prerequisites		By way of exception, additional prerequisites are listed in the section on assessments.					
	Referred to in LPO I		§ 73 (1) 1. Mathematik Analysis					

Compulsory Electives (16 ECTS credits)								
10-M-BSA-072-m01	**Seminar in Analysis**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner						
	Referred to in LPO I	§ 73 (1) 1. Mathematik Analysis						
10-M-BSL-072-m01	**Seminar in Linear Algebra**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner						
	Referred to in LPO I	§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie						
10-M-BSE-072-m01	**Seminar in Algebra**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner						
	Referred to in LPO I	§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie						
10-M-BSG-072-m01	**Seminar in Geometry**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner						
	Referred to in LPO I	§ 73 (1) 4. Mathematik Geometrie						
10-M-BSZ-072-m01	**Seminar in Number Theory**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner						
	Referred to in LPO I	§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie						

10-M-BSW-072-m01	**Seminar in Ordinary Differential Equations**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		S (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner					
	Referred to in LPO I		§ 73 (1) 1. Mathematik Analysis					
10-M-BSC-072-m01	**Seminar in Complex Analysis**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		S (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner					
	Referred to in LPO I		§ 73 (1) 1. Mathematik Analysis					
10-M-BSN-072-m01	**Seminar in Numerical Mathematics**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		S (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner					
	Referred to in LPO I		§ 73 (1) 5. Mathematik Angewandte Mathematik					
10-M-BSS-072-m01	**Seminar in Stochastics**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		S (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		talk (approx. 60 minutes) Assessment offered: in the semester in which the course is offered Language of assessment: German, English if agreed upon with the examiner					
	Referred to in LPO I		§ 73 (1) 3. Mathematik Stochastik					

10-M-EDM-072-m01	**Introduction to Discrete Mathematics**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 2. Mathematik Lineare Algebra, Algebra und Elemente der Zahlentheorie					
10-M-FAN-072-m01	**Introduction to Functional Analysis**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 1. Mathematik Analysis					
10-M-ORS-072-m01	**Operations Research**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 5. Mathematik Angewandte Mathematik					

10-M-NLD-072-m01	**Non-Linear Dynamics**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 1. Mathematik Analysis					
10-M-COMg-082-m01	**Computational Mathematics, advanced**							
	ECTS	4	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		Ü + V (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		project in the form of programming exercises (type and expenditure of time to be specified by the lecturer at the beginning of the course) Assessment offered: once a year, summer semester Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Admission prerequisite to assessment: regular attendance of exercises (attendance monitored, a maximum of one incident of unexcused absence).					
	Referred to in LPO I		§ 73 (1) 5. Mathematik Angewandte Mathematik					
10-M-PRGk-082-m01	**Programming course for students of Mathematics and other subjects, simple**							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		P (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		project in the form of programming exercises (type and expenditure of time to be specified by the lecturer at the beginning of the course) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Admission prerequisite to assessment: regular attendance (attendance monitored, a maximum of one incident of unexcused absence).					
	Referred to in LPO I		§ 73 (1) 5. Mathematik Angewandte Mathematik					

10-M-ST1-082-m01	**Stochastics 1**							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 3. Mathematik Stochastik					
10-M-NM2-082-m01	**Numerical Mathematics 2**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 5. Mathematik Angewandte Mathematik					
10-M-ST2-082-m01	**Stochastics 2**							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 3. Mathematik Stochastik					

10-M-PRG-082-m01	**Programming course for students of Mathematics and other subjects**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	P (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	project in the form of programming exercises (as specified at the beginning of the course) Language of assessment: German, English if agreed upon with the examiner						
	other prerequisites	Admission prerequisite to assessment: regular attendance (attendance monitored, a maximum of one incident of unexcused absence).						
	Referred to in LPO I	§ 73 (1) 5. Mathematik Angewandte Mathematik						
10-M-COM-082-m01	**Computeroriented Mathematics**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	V + Ü (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	project in the form of programming exercises (as specified at the beginning of the course) Assessment offered: once a year, summer semester Language of assessment: German, English if agreed upon with the examiner						
	other prerequisites	Admission prerequisite to assessment: regular attendance of exercises (attendance monitored, a maximum of one incident of unexcused absence).						
	Referred to in LPO I	§ 73 (1) 5. Mathematik Angewandte Mathematik						
10-M-VAN-082-m01	**Advanced Analysis**							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	Ü + V (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner						
	other prerequisites	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.						
	Referred to in LPO I	§ 73 (1) 1. Mathematik Analysis						

10-M-STL-092-m01	**Stochastics for students teaching at a German Gymnasium**							
	ECTS	9	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V + Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English if agreed upon with the examiner					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
	Referred to in LPO I		§ 73 (1) 3. Mathematik Stochastik					
10-M-RCL-092-m01	**Reading Course for students teaching at a German Gymnasium**							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		A (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		talk (approx. 30 minutes) or written elaboration (approx. 5 to 10 pages) Language of assessment: German, English if agreed upon with the examiner					
Teaching (10 ECTS credits)								
10-M-D1GY-092-m01	**Didactics of Mathematics: Algebra (German Gymnasium)**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		a) written examination (approx. 60 minutes) or b) oral examination of one candidate each (approx. 15 minutes) or c) oral examination in groups (groups of 3, approx. 30 minutes) or d) written elaboration (approx. 5 to 10 pages) or e) project (as specified at the beginning of the course)					
	Referred to in LPO I		§ 73 (1) 6. Mathematik Didaktik					

10-M-D2GY-092-m01	**Didactics of Mathematics: Geometry/Calculus (German Gymnasium)**							
	ECTS	7	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	This module comprises 3 module components. Information on courses will be listed separately for each module component. • 10-M-D2GY-P-092: M (no information on SWS (weekly contact hours) and course language available) • 10-M-D2GY-2-092: V + Ü (no information on SWS (weekly contact hours) and course language available) • 10-M-D2GY-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	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-D2GY-P-092:** Didactics of Mathematics: Exam Geometry/Calculus (German Gymnasium) • 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. 40 minutes) • Only after successful completion of module components: Successful completion of the module components 10-M-D2GY-1 and 10-M-D2GY-2 is a prerequisite for participation in module component 10-M-D2GY-P. **Assessment in module component 10-M-D2GY-2-092:** Didactics of Mathematics: Calculus (German Gymnasium) Didactics of Mathematics: Calculus (German Gymnasium) • 2 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-D2GY-1-092:** Didactics of Mathematics: Geometry (German Gymnasium) Didactics of Mathematics: Geometry (German Gymnasium) • 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.						
	Referred to in LPO I	§ 73 (1) 6. Mathematik Didaktik						
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-DCMU-092-m01	**Computers in Mathematical Teaching**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	V (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	project (type and expenditure of time to be specified by the lecturer at the beginning of the course) Assessment offered: every two years, summer semester						

10-M-D3GY-092-m01	**Didactics of Mathematics: Analytic Geometry/Stochastics (German Gymnasium)**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		a) written examination (approx. 60 minutes) or b) oral examination of one candidate each (approx. 15 minutes) or c) oral examination in groups (groups of 3, approx. 30 minutes) or d) written elaboration (approx. 5 to 10 pages) or e) project (as specified at the beginning of the course) Assessment offered: every two years, summer semester					
10-M-DV-GY-092-m01	**Advanced Didactics of Mathematics (German Gymnasium)**							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		S (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		talk (approx. 60 minutes) Assessment offered: once a year, summer semester					
10-M-PRM-092-m01	**Hands-on Mathematics**							
	ECTS	8	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		P + S (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		project and implementation thereof: drawing up a project plan (approx. 10 pages) and practical implementation with pupils (type and expenditure of time to be specified by the lecturer at the beginning of the course)					
10-M-DV-HB-092-m01	**E-Learning and Blended Learning in Mathematics at school**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. 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.					

10-M-VH-BSto-092-m01	**Stochastics in Sekundarstufe I (virtual course)**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	Ü (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)						
	other prerequisites	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. 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.						
10-M-VHBA-ri-092-m01	**Basics in Arithmetics (virtual course)**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	Ü (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)						
	other prerequisites	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. 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.						
10-M-VHBGeo-092-m01	**Basics in School Geometry (virtual course)**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	Ü (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment	web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)						
	other prerequisites	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. 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.						

10-M-VHBM10-092-m01	**Mathematics in Class 10 (virtual course)**							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		Ü (no information on SWS (weekly contact hours) and course language available)					
	Method of assessment		web-based project assignments and tests (length/expenditure of time to be announced at the beginning of the course)					
	other prerequisites		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew. 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.					

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 Gymnasium may write this thesis in one of the subjects they selected as vertieft studiertes Fach (subject studied with a focus on the scientific discipline) or in the subject Erziehungswissenschaften (Educational Science). Pursuant to Section 29 Subsection 1 Sentence 2 LPO I, students may also choose to write an interdisciplinary thesis.

10-M-HM-GY-092-m01	**Thesis in Mathematics (teaching degree at German Gymnasium)**							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		no courses assigned					
	Method of assessment		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)					
	Modules successfully completed		Where applicable, specific modules/module components as specified by supervisor.					
	Additional Information		Additional information on module duration: 1 to 2 semesters.					