

## Annex SFB

### Studienfachbeschreibung (subject description, SFB) for the subject Mathematical Physics as a Bachelor's with 1 major with the degree "Bachelor of Science" (180 ECTS credits)

Responsible: Faculty of Mathematics and Computer Science

Responsible: Institute of Mathematics

Responsible: Faculty of Physics and Astronomy

Examination regulations version: 2024

Examination regulations version: 2024

Examination regulations version: 2024

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:

**ASPO2015**

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

**06-Sep-2023 (2023-72)**

**??-??-2024 (2024-??)**

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	<b>Module title</b>						
	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)					

Compulsory Courses (104 ECTS credits)								
Subfield Analysis (25 ECTS credits)								
10-M-ANP-Ü-202-m01	Overview Analysis for Mathematical Physics							
	ECTS	16	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to the contents of modules 10-M-ANAP1 and 10-M-ANAP2. Language of assessment: German and/or English					
10-M-VAN-202-m01	Advanced Analysis							
	ECTS	9	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) creditable for bonus Language of assessment: German and/or English					
Subfield Linear Algebra (16 ECTS credits)								
10-M-LNP-Ü-202-m01	Overview Linear Algebra for Mathematical Physics							
	ECTS	16	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to the contents of modules 10-M-LNAP1 and 10-M-LNP-Ü. Language of assessment: German and/or English					

Subfield Classical Physics (16 ECTS credits)								
11-E-M-152-m01	Classical Physics 1 (Mechanics)							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2) Module taught in: Ü: German or English						
	Method of assessment	written examination (approx. 120 minutes) Language of assessment: German and/or English						
	other prerequisites	Admission prerequisite to assessment: completion of exercises (approx. 13 exercise sheets per semester). Students who successfully completed approx. 50% of exercises will qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the semester.						
	Additional Information	Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.						
	Referred to in LPO I	§ 53 I Nr. 1 a) § 77 I Nr. 1 a)						
11-E-E-152-m01	Classical Physics 2 (Heat and Electromagnetism)							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2) Module taught in: Ü: German or English						
	Method of assessment	written examination (approx. 120 minutes) Language of assessment: German and/or English						
	other prerequisites	Admission prerequisite to assessment: completion of exercises (approx. 13 exercise sheets per semester). Students who successfully completed approx. 50% of exercises will qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the semester.						
	Additional Information	Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.						
	Referred to in LPO I	§ 53 I Nr. 1 a) § 77 I Nr. 1 a)						

Subfield Theoretical Mechanics and Quantum Mechanics (16 ECTS credits)								
11-T-M-152-m01	Theoretical Mechanics							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2) Module taught in: Ü: German or English						
	Method of assessment	written examination (approx. 120 minutes) Language of assessment: German and/or English						
	other prerequisites	Admission prerequisite to assessment: completion of exercises (approx. 13 exercise sheets per semester). Students who successfully completed approx. 50% of exercises will qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the semester.						
	Additional Information	Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.						
11-T-Q-152-m01	Quantum Mechanics							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2) Module taught in: Ü: German or English						
	Method of assessment	written examination (approx. 120 minutes) Language of assessment: German and/or English						
	other prerequisites	Admission prerequisite to assessment: completion of exercises (approx. 13 exercise sheets per semester). Students who successfully completed approx. 50% of exercises will qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the semester.						
	Additional Information	Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.						

Subfield Statistical Physics and Electrodynamics (16 ECTS credits)								
11-T-SE-152-m01	Statistical Physics and Electrodynamics							
	ECTS	6	Duration	2 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + V (4)					
	Method of assessment		oral examination of one candidate each (approx. 30 minutes) Language of assessment: German and/or English					
11-T-SA-152-m01	Statistical Physics - Exercises							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		Ü (2) Module taught in: Ü: German or English					
	Method of assessment		written examination (approx. 120 minutes) Language of assessment: German and/or English					
11-T-EA-152-m01	Electrodynamics - Exercises							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		Ü (2) Module taught in: Ü: German or English					
	Method of assessment		written examination (approx. 120 minutes) Language of assessment: German and/or English					
Subfield Laboratory Course Physics (15 ECTS credits)								
11-P-PA-152-m01	Laboratory Course Physics A (Mechanics, Heat, Electromagnetism)							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		P (2)					
	Method of assessment		practical assignment with talk (approx. 30 minutes) Preparing, performing and evaluating (record of readings or lab report) the experiments will be considered successfully completed if a Testat (exam) is passed. Exactly one experiment that was not successfully completed can be repeated once. After completion of all experiments, talk (with discussion; approx. 30 minutes) to test the candidate's understanding of the physics-related contents of the module. Talks that were not successfully completed can be repeated once. Both components of the assessment have to be successfully completed.					

11-P-FR1-152-mo1	Data and Error Analysis							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	V (1) + Ü (1) Module taught in: Ü: German or English						
	Method of assessment	written examination (approx. 120 minutes) Language of assessment: German and/or English						
	other prerequisites	Admission prerequisite to assessment: completion of exercises (approx. 13 exercise sheets per semester). Students who successfully completed approx. 50% of exercises will qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the semester.						
	Additional Information	Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.						
	Referred to in LPO I	§ 53 I Nr. 1 c) § 77 I Nr. 1 d)						
11-P-MPB-152-mo1	Laboratory Course Physics B for Students of Mathematical Physics							
	ECTS	4	Duration		Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	P (2)						
	Method of assessment	practical assignment with talk (approx. 30 minutes) Preparing, performing and evaluating (record of readings or lab report) the experiments will be considered successfully completed if a Testat (exam) is passed. Exactly one experiment that was not successfully completed can be repeated once. After completion of all experiments, talk (with discussion; approx. 30 minutes) to test the candidate's understanding of the physics-related contents of the module. Talks that were not successfully completed can be repeated once. Both components of the assessment have to be successfully completed.						
	other prerequisites	Students are highly recommended to complete modules 11-P-PA and 11-P-FR1 prior to completing module 11-P-MPB.						
11-P-MPC-152-mo1	Laboratory Course Physics C for Students of Mathematical Physics							
	ECTS	4	Duration		Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	P (2)						
	Method of assessment	practical assignment with talk (approx. 30 minutes) Preparing, performing and evaluating (record of readings or lab report) the experiments will be considered successfully completed if a Testat (exam) is passed. Exactly one experiment that was not successfully completed can be repeated once. After completion of all experiments, talk (with discussion; approx. 30 minutes) to test the candidate's understanding of the physics-related contents of the module. Talks that were not successfully completed can be repeated once. Both components of the assessment have to be successfully completed.						
	other prerequisites	Students are highly recommended to complete module 11-P-MPB prior to completing module 11-P-MPC.						

11-P-FR2-152-m01	Advanced and Computational Data Analysis							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (1) + Ü (1)					
	Method of assessment		Exercises (successful completion of approx. 50% of approx. 10 exercise sheets) Assessment offered: Once a year, summer semester					
	other prerequisites		Students are highly recommended to complete module 11-P-FR1 prior to completing module 11-P-FR2.					
Compulsory Electives Analysis and Linear Algebra (10 ECTS credits)								
Subgroup Basics of Mathematical Methods (5 ECTS credits)								
10-M-ANAP1-202-m01	Analysis 1 for Mathematical Physics							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		Ü (2)					
	Method of assessment		written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each) Language of assessment: German and/or English					
10-M-ANAP2-202-m01	Analysis 2 for Mathematical Physics							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		Ü (2)					
	Method of assessment		written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each) Language of assessment: German and/or English					
Subfield Linear Algebra (5 ECTS credits)								
10-M-LNAP1-202-m01	Linear Algebra 1 for Mathematical Physics							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		Ü (2)					
	Method of assessment		written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each) Language of assessment: German and/or English					
10-M-LNAP2-202-m01	Linear Algebra 2 for Mathematical Physics							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		Ü (2)					
	Method of assessment		written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each) Language of assessment: German and/or English					



Mathematical Methods (18 ECTS credits)								
Subgroup Basics of Mathematical Methods (5 ECTS credits)								
10-M-DGE-202-m01	Introduction to Differential Geometry							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) creditable for bonus Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester					
10-M-DGL-202-m01	Ordinary Differential Equations							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) creditable for bonus Language of assessment: German and/or English					
10-M-FTH-202-m01	Introduction to Complex Analysis							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) creditable for bonus Language of assessment: German and/or English					
10-M-GAN-202-m01	Geometric Analysis							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) creditable for bonus Language of assessment: German and/or English					

10-M-FAN-202-mo1	Introduction to Functional Analysis							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) creditable for bonus Language of assessment: German and/or English					
10-M-PAR-202-mo1	Introduction to Partial Differential Equations							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) creditable for bonus Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester					
Subfield Overview Mathematical Methods (13 ECTS credits)								
10-M-DGGD-PÜ-152-mo1	Overview Differential Geometry and Ordinary Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-FTDG-PÜ-152-mo1	Overview Complex Analysis and Differential Geometry for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					

10-M-FTGD-PÜ-152-mo1	Overview Complex Analysis and Ordinary Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-GADG-PÜ-152-mo1	Overview Geometric Analysis and Differential Geometry for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-GAGD-PÜ-152-mo1	Overview Geometric Analysis and Ordinary Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-GAFT-PÜ-152-mo1	Overview Geometric Analysis and Complex Analysis for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-FADG-PÜ-152-mo1	Overview Functional Analysis and Differential Geometry for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					

10-M-FAGD-PÜ-152-mo1	Overview Functional Analysis and Ordinary Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-FAFT-PÜ-152-mo1	Overview Functional Analysis and Complex Analysis for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-FA-GA-PÜ-152-mo1	Overview Functional Analysis and Geometric Analysis for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-DG-PA-PÜ-152-mo1	Overview Differential Geometry and Partial Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-GD-PA-PÜ-152-mo1	Overview Ordinary Differential Equations and Partial Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					

10-M-FTPA-PÜ-152-mo1	Overview Complex Analysis and Partial Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-GA-PA-PÜ-152-mo1	Overview Geometric Analysis and Partial Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-FAPA-PÜ-152-mo1	Overview Functional Analysis and Partial Differential Equations for Mathematical Physics							
	ECTS	13	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
Mathematical Physics (18 ECTS credits)								
Module Group Supplementary Topics in Mathematics								
10-M-NUM1P-152-mo1	Numerical Mathematics 1 for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					

10-M-NUM2P-152-m01	Numerical Mathematics 2 for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-STO1P-152-m01	Stochastics 1 for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-STO2P-152-m01	Stochastics 2 for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-ALGP-152-m01	Introduction to Algebra for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-AAL-222-m01	Applied Algebra							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					

10-M-DIMP-152-mo1	Introduction to Discrete Mathematics for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-PGEP-152-mo1	Introduction to Projective Geometry for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English creditable for bonus					
10-M-ZTHP-152-mo1	Introduction to Number Theory for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-OML-222-mo1	Optimization for Machine Learning							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2) Module taught in: German and/or English					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English Assessment offered: Only when announced in the semester in which the courses are offered and in the subsequent semester creditable for bonus					

10-M-LOGP-232-mo1	Introduction to Mathematical Logic							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	
	Courses		V (4) + Ü (2) Module taught in: German and/or English					
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English Creditable for bonus Assessment offered: In the semester in which the course is offered and in the following semester					
10-M-DGEP-152-mo1	Introduction to Differential Geometry for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English creditable for bonus					
10-M-DGLP-152-mo1	Ordinary Differential Equations for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus					
10-M-FT-HP-152-mo1	Introduction to Complex Analysis for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2)					
	Method of assessment		a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus					



10-M-GANP-152-mo1	Geometric Analysis for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2)						
	Method of assessment	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus						
10-M-FANP-152-mo1	Introduction to Functional Analysis for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2)						
	Method of assessment	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus						
10-M-PARP-152-mo1	Introduction to Partial Differential Equations for Mathematical Physics							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2)						
	Method of assessment	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English creditable for bonus						
10-M-MWR-222-mo1	Modelling and Computational Science							
	ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + Ü (2) Module taught in: German and/or English						
	Method of assessment	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English Assessment offered: Only when announced in the semester in which the courses are offered and in the subsequent semester creditable for bonus						

Module Group Experimental Physics								
11-E-O-152-m01	Optics and Waves							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2) Module taught in: Ü: German or English					
	Method of assessment		written examination (approx. 120 minutes) Language of assessment: German and/or English					
11-E-A-152-m01	Atoms and Quanta							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2) Module taught in: Ü: German or English					
	Method of assessment		written examination (approx. 120 minutes) Language of assessment: German and/or English					
11-E-F-152-m01	Introduction to Solid State Physics							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (4) + Ü (2) Module taught in: Ü: German or English					
	Method of assessment		written examination (approx. 120 minutes) Language of assessment: German and/or English					
11-E-T-152-m01	Nuclear and Elementary Particle Physics							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (3) + Ü (1) Module taught in: Ü: German or English					
	Method of assessment		written examination (approx. 120 minutes) Language of assessment: German and/or English					
Module Group Supplementary Topics in Physics								
11-RRF-202-m01	Introduction to Relativistic Physics and Classical Field Theory							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (3) + R (1) Module taught in: German or English					
	Method of assessment		a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English Assessment offered: Once a year, summer semester					

11-QUI-202-m01	Introduction to Quantum Computing and Quantum Information							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (3) + R (1) Module taught in: German or English					
	Method of assessment		a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester					
11-GRT-152-m01	Group Theory							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	graduate
	Courses		V (2) + R (2) Module taught in: German or English					
	Method of assessment		written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English					
11-QFT1B-202-m01	Quantum Field Theory I							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	graduate
	Courses		V (4) + R (2) Module taught in: German or English					
	Method of assessment		a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester					

11-CP-152-m01	Computational Physics							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (3) + R (1) Module taught in: German or English					
	Method of assessment		written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Assessment offered: Once a year, winter semester Language of assessment: German and/or English					
11-SDC-152-m01	Statistics, Data Analysis and Computer Physics							
	ECTS	4	Duration	1 semester	Method of grading	numerical grade	Modul level	graduate
	Courses		V (2) + R (1) Module taught in: German or English					
	Method of assessment		written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Assessment offered: Once a year, winter semester Language of assessment: German and/or English					
11-AP-152-m01	Astrophysics							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses		V (2) + R (2) Module taught in: German or English					
	Method of assessment		a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English					
	Referred to in LPO I		§ 22 II Nr. 1 h) § 22 II Nr. 2 f) § 22 II Nr. 3 f)					

11-TPS-152-m01	Particle Physics (Standard Model)							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + R (2) Module taught in: German or English						
	Method of assessment	written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English						
11-RTTB-232-m01	Theory of Relativity							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (3) + R (1) Module taught in: German or English						
	Method of assessment	a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the following semester						
	Additional Information	Approval from examination committee required						
Module Group Current Topics in Mathematical Physics								
11-BXMP5-152-m01	Current Topics in Mathematical Physics							
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (2) + R (2)						
	Method of assessment	written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English						
	other prerequisites	Approval from examination committee required.						

11-BXMP6-152-mo1	Current Topics in Mathematical Physics							
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (3) + R (1)						
	Method of assessment	written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English						
	other prerequisites	Approval from examination committee required.						
11-BXMP8-152-mo1	Current Topics in Mathematical Physics							
	ECTS	8	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	V (4) + R (2)						
	Method of assessment	written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Language of assessment: German and/or English						
	other prerequisites	Approval from examination committee required.						
Key Skills Area (20 ECTS credits)								
General Key Skills (5 ECTS credits)								
In addition to the modules listed below, students may also take modules offered by JMU as part of the pool of general transferable skills (ASQ).								
General Key Skills (subject-specific)								
10-M-Tu-Ko-152-mo1	Exercise tutor or proof-reading in Mathematics							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	T (o)						
	Method of assessment	Assessment of tutoring activities or correcting work by supervising lecturers or exercise supervisors (1 to 2 teaching units or approx. 5 pieces of correcting work)						
	Additional Information	Please direct application to teaching coordinator Mathematics, he/she will select participants.						
	Referred to in LPO I	§ 22 II Nr. 3 f)						
10-M-VHB1-152-mo1	E-Learning and Blended Learning Mathematics 1							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	Ü (2) Course type: eLearning, mostly Virtuelle Hochschule Bayern (vhb)						
	Method of assessment	project (web-based, 15 to 20 hours) Assessment offered: Once a year, winter semester						

10-M-VHB2-152-m01	<b>E-Learning and Blended Learning Mathematics 2</b>							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	Ü (2) Course type: eLearning, mostly Virtuelle Hochschule Bayern (vhb)						
	Method of assessment	project (web-based, 15 to 20 hours) Assessment offered: Once a year, summer semester						
11-P-VKM-202-m01	<b>MINT Preparatory Course Mathematical Methods of Physics</b>							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	V (1) + Ü (2) Module taught in: German or English						
	Method of assessment	a) exercises (successful completion of approx. 50% of approx. 6 exercise sheets) or b) talk (approx. 15 minutes) Assessment offered: Once a year, winter semester						
	Referred to in LPO I	§ 22 II Nr. 1 h) § 22 II Nr. 2 f) § 22 II Nr. 3 f)						
Subject-specific Key Skills (15 ECTS credits)								
Compulsory Courses (9 ECTS credits)								
10-M-GBM-152-m01	<b>Basic Notions and Methods of Mathematical Reasoning</b>							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	V (1) + Ü (1)						
	Method of assessment	project (10 to 15 pages) Language of assessment: German and/or English						
	Additional Information	Additional information on module duration: block taught prior to the beginning of the lecture period.						
	Referred to in LPO I	§ 22 II Nr. 1 h) § 22 II Nr. 2 f)						
10-M-ASM-152-m01	<b>Reasoning and Writing in Mathematics</b>							
	ECTS	2	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	V (1) + Ü (1)						
	Method of assessment	project (10 to 20 pages) Language of assessment: German and/or English						
11-SMP-162-m01	<b>Seminar Mathematical Physics</b>							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses	S (2) Module taught in: German or English						
	Method of assessment	talk (60 to 120 minutes) Language of assessment: German and/or English						

Subject-specific Key Skills, Compulsory Electives (6 ECTS credits)							
10-M-SEM2-152-m01	Supplementary Seminar Mathematics						
	ECTS	4	Duration	1 semester	Method of grading	(not) successfully completed	Modul level undergraduate
	Courses	S (2)					
	Method of assessment	talk (60 to 120 minutes) Language of assessment: German and/or English					
11-HS-152-m01	Seminar Experimental/Theoretical Physics						
	ECTS	5	Duration	1 semester	Method of grading	numerical grade	Modul level undergraduate
	Courses	S (2) Module taught in: German or English					
	Method of assessment	talk with discussion (30 to 45 minutes)					
	other prerequisites	Admission prerequisite to assessment: regular attendance (minimum 85% of sessions).					
	Additional Information	Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.					
10-M-TOP-152-m01	Introduction to Topology						
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level undergraduate
	Courses	V (2) + Ü (2)					
	Method of assessment	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English creditable for bonus					
10-M-KRY-232-m01	Mathematical Aspects of Modern Cryptography						
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level undergraduate
	Courses	V (3) + Ü (1)					
	Method of assessment	a) written examination (approx. 60 to 120 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English Assessment offered: Only when announced in the semester in which the courses are offered and in the subsequent semester creditable for bonus					



10-M-COM-152-mo1	<b>Computational Mathematics</b>							
	ECTS	4	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (1) + Ü (2)					
	Method of assessment		project in the form of programming exercises (approx. 20 to 25 hours) Assessment offered: Once a year, winter semester Language of assessment: German and/or English					
	Referred to in LPO I		§ 22 II Nr. 3 f)					
10-M-PRG-152-mo1	<b>Programming course for students of Mathematics and other subjects</b>							
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		P (2)					
	Method of assessment		project in the form of programming exercises (approx. 20 to 25 hours) Assessment offered: Once a year, summer semester Language of assessment: German and/or English					
	Referred to in LPO I		§ 22 II Nr. 3 f)					
10-M-GES-152-mo1	<b>Selected Topics in History of Mathematics</b>							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (2) + Ü (2)					
	Method of assessment		a) talk (45 to 90 minutes) or b) term paper (10 to 15 pages) or c) project (15 to 25 hours) Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English					
	Referred to in LPO I		§ 22 II Nr. 3 f)					
10-M-MSC-152-mo1	<b>Mathematical Writing</b>							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (2) + Ü (2)					
	Method of assessment		a) talk (45 to 90 minutes) or b) term paper (10 to 15 pages) or c) project (15 to 25 hours) Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English					
	Referred to in LPO I		§ 22 II Nr. 3 f)					
10-M-SCH-152-mo1	<b>School Mathematics from a Higher Perspective</b>							
	ECTS	5	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate
	Courses		V (2) + Ü (2)					
	Method of assessment		a) talk (approx. 45 minutes) or b) term paper (10 to 15 pages) or c) project (15 to 25 hours) Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English					
	Referred to in LPO I		§ 22 II Nr. 1 h) § 22 II Nr. 2 f) § 22 II Nr. 3 f)					

10-M-PRO-152-m01	Proseminar Mathematics								
	ECTS	4	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate	
	Courses	S (2)							
	Method of assessment	talk (60 to 120 minutes) Assessment offered: In the semester in which the course is offered Language of assessment: German and/or English							
11-M-MR-202-m01	Mathematical Methods of Physics								
	ECTS	6	Duration	2 semester	Method of grading	(not) successfully completed	Modul level	undergraduate	
	Courses	V (2) + Ü (2) + V (2) + Ü (2) Module taught in: German or English							
	Method of assessment	Exercises (successful completion of approx. 50% of approx. 13 exercise sheets) or Talk (approx. 15 minutes)							
11-CP-152-m01	Referred to in LPO I	§ 53 I Nr. 1 a) § 77 I Nr. 1 a)							
	Computational Physics								
	ECTS	6	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Courses	V (3) + R (1) Module taught in: German or English							
	Method of assessment	written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest. Assessment offered: Once a year, winter semester Language of assessment: German and/or English							
	Thesis (10 ECTS credits)								
	10-M-BAP-152-m01	Bachelor Thesis Mathematical Physics							
		ECTS	10	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate
Courses		No courses assigned to module							
Method of assessment		written thesis (approx. 250 to 300 hours total)							
other prerequisites		Where applicable, topic-specific modules as specified by supervisor.							
Additional Information		Time to complete: 10 weeks.							