

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: $\mathbf{E} = \text{field trip}$, $\mathbf{K} = \text{colloquium}$, $\mathbf{O} = \text{conversatorium}$, $\mathbf{P} = \text{placement/lab course}$, $\mathbf{R} = \text{project}$, $\mathbf{S} = \text{seminar}$, $\mathbf{T} = \text{tutorial}$, $\mathbf{U} = \text{exercise}$, $\mathbf{V} = \text{conversatorium}$

= 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

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not cre-

modules in this SFB: ditable for bonus.

Information on Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the meassessment procedures: thod 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:

ASP02015

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

06-Sep-2023 (2023-72)

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 spe	be specified in the form X (y) with course type X abbreviated as specified above and number of weekly contact hours y							
	Method of as	ssessm	ent								
	Only after su completion of		ıl if applica	applicable							
	Other prereq	uisites	if applica	if applicable							
	Participants on of places		ocati- if applica	if applicable							
	Additional information		ion if applica	if applicable							
	Referred to in	n LPO I	if applica	if applicable (examination regulations for teaching-degree programmes)							

Compulsory Course	es (104 E	CTS cre	dits)									
Subfield Analysis (25 ECTS	credits)									
10-M-ANP-Ü-202-	Overvi	Overview Analysis for Mathematical Physics										
mo1	ECTS 16 Duration			n	2 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S		V (4) -	V (4) + V (4) + Ü (2)							
	Method of assessment			Asses	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-	Advanc	ed Anal	lysis									
mo1	ECTS	9	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S		V (4) -	+ Ü (2)							
	Method of assessment			b) ora c) ora credit	l examination of one l examination in gro able for bonus	e candidate each (15	to 15 minutes per candidate)					
Subfield Linear Alg	ebra (16	ECTS c	redits)									
10-M-LNP-Ü-202-	Overvi	ew Linea	ar Algebra	a for M	athematical Physics							
mo1	ECTS 16 Duration			n	2 semester	Method of grading	numerical grade	Modul level	undergraduate			
				ourses 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 EC	TS credits)										
11-E-M-152-m01	Classical Phy	/sics 1 (Me	chanic	s)								
	ECTS 8	Duratio	n	1 semester	Method of grading numerical gr	ade	Modul level	undergraduate				
	Courses	•		+ Ü (2)			•	•				
				ıle taught in: Ü: Ger								
	Method of as	sessment		n examination (appuage of assessment	orox. 120 minutes) :: German and/or English							
	other prerequ	uisites	succe	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 In	formation	consi neral the q stude for ar sessr	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 ir	LPO I	§ 53 l § 77 l	Nr. 1 a) Nr. 1 a)								
11-E-E-152-m01	Classical Physics 2 (Heat and Electromagnetism)											
	ECTS 8	Duratio	n	1 semester Method of grading numerical grade Modul level undergraduate								
	Courses		V (4) Modu	V (4) + Ü (2) Module taught in: Ü: German or English								
	Method of as	sessment	written examination (approx. 120 minutes) Language of assessment: German and/or English									
	other prerequ	uisites	succe	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 In		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 ir	n LPO I	§ 53 l § 77 l	Nr. 1 a) Nr. 1 a)			_					

11-T-M-152-m01	Theore	etical M	echanics									
-	ECTS	8	Duratio	n	1 semester	Method of grading numerical grade	Modul level	undergraduate				
	Course	es			V (4) + Ü (2) Module taught in: Ü: German or English							
	Metho	d of ass	essment	writte	written examination (approx. 120 minutes) Language of assessment: German and/or English							
	other p	prerequi	sites	succe	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			consi neral the q stude for ar sessr	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		n	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Course	es		V (4) + Ü (2) Module taught in: Ü: German or English								
	Metho	d of ass	essment	written examination (approx. 120 minutes) Language of assessment: German and/or English								
	other prerequ		sites	succe	essfully completed	to assessment: completion of exercises (appraprox. 50% of exercises will qualify for admitals at the beginning of the semester.						
	Addition	onal Info	ormation	consi neral the q stude for ar sessr	dered a declaratio academic and exa ualification for adnents that meet the inassessment or wh	It registers for the exercises and obtains the q n of will to seek admission to assessment pur imination regulations). If the module coordina mission to assessment, they will put the stude respective prerequisites can successfully reginose registration for an assessment was not p akes an assessment to which he/she has not	rsuant to Section 20 Sul stors subsequently find ent's registration for ass ster for an assessment. out into effect will not be	bsection 3 Sentence 4 ASPO (gethat the student has obtained tessment into effect. Only those Students who did not register admitted to the respective as-				

11-T-SE-152-m01			amics (16 ECTS credit	(S)							
11 1 32 152 11101	ECTS 6	Duration		Method of grading	numerical grade	Modul level	undergraduate				
	Courses	1 - 5.7 5.5 5	V (4) + V (4)		· · · · · · · · · · · · · · · · · · ·						
	Method of as	ssessment		one candidate each (appr ment: German and/or Eng							
11-T-SA-152-m01	Statistical Pl	nysics - Exe	rcises								
	ECTS 5	Duration	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Courses		Ü (2) Module taught in: Ü	(2) odule taught in: Ü: German or English							
	Method of as	sessment	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 as	sessment	written examination (approx. 120 minutes) Language of assessment: German and/or English								
Subfield Laborator	y Course Phys	ics (15 ECT	S credits)								
11-P-PA-152-m01	Laboratory C	ourse Phys	ics A (Mechanics, He	at, Electromagnetism)							
	ECTS 3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Courses		P (2)			•					
	Method of as	ssessment	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-m01	Data an	d Error	Analysis	-		-							
	ECTS	2	Duration	1	1 semester	Method of grading	(not) successfully	y completed	Modul level	undergraduate			
	Courses	5		V (1) + Modul	Ü (1) e taught in: Ü: Geri	man or English			,				
	Method	of ass	essment		written examination (approx. 120 minutes) Language of assessment: German and/or English 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.								
	other pr	rerequi	sites	succe									
				consideral at the questuder for an sessmith not a sessmith to the constant of	egistration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be onsidered 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 e qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those udents that meet the respective prerequisites can successfully register for an assessment. Students who did not register ran 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 ill not be considered.								
	Referred	d to in l			§ 53 Nr. 1 c) § 77 Nr. 1 d)								
11-P-MPB-152-m01													
	ECTS	4	Duration		Method of grading (not) successfully completed Modul level undergraduate								
	Courses	5		P (2)									
				Prepar pleted compl sics-re the as	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 pr					<u> </u>	te modules 11-P-PA	and 11-P-FR1	prior to comple	ting module 11-P-MPB.			
11-P-MPC-152-m01		ory Co	,		r Students of Math	<u>. </u>	_						
	ECTS	4	Duration			Method of grading	(not) successfully	y completed	Modul level	undergraduate			
	Courses			P (2)									
				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 pr	rerequi	sites	Stude	nts are highly recor	nmended to complet	te module 11-P-MPI	B prior to com	pleting module	11-P-MPC.			

11-P-FR2-152-m01	Advanc	ed and	Computa	tional	Data Analysis			-				
	ECTS	2	Duration	n .	1 semester	Method of grading (n	ot) successfully completed	Modul level	undergraduate			
	Courses	S		V (1) +	- Ü (1)							
	Method	d of ass	essment	Exerci	ises (successful cor	mpletion of approx. 50%	of approx. 10 exercise shee	ts)				
					assessment offered: Once a year, summer semester							
	other p			Students are highly recommended to complete module 11-P-FR1 prior to completing module 11-P-FR2.								
Compulsory Elective					· · · · · · · · · · · · · · · · · · ·							
Subgroup Basics o	f Mathen	matical	Methods	(5 ECT:	S credits)							
10-M-ANAP1-202-			Mathema		nysics							
mo1	ECTS	5	Duratio		1 semester	Method of grading (n	ot) successfully completed	Modul level	undergraduate			
				Ü (2)								
	Method of assessment				tten examination (approx. 90 to 180 minutes) and tten exercises (approx. 12 exercise sheets with approx. 4 exercises each) Iguage of assessment: German and/or English							
10-M-ANAP2-202-	Analysi	is 2 for	Mathema	tical P	hysics							
mo1	ECTS 5 Duratio			1	1 semester	Method of grading (n	ot) successfully completed	Modul level	undergraduate			
	Courses		Ü (2)									
	Method of assessment			writte	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 Lineare Al	gebra (5	ECTS o	redits)									
10-M-LNAP1-202-	Linear A	Algebra	a 1 for Mat	hemat	ical Physics							
mo1	ECTS	5	Duration	1	1 semester	Method of grading (n	ot) successfully completed	Modul level	undergraduate			
	Course	S	·	Ü (2)								
	Method	d of ass	essment	each)		orox. 90 to 180 minutes) : German and/or English		ox. 12 exercise s	sheets with approx. 4 exercises			
10-M-LNAP2-202-	Linear A	Algebra	a 2 for Mai	hemat	ical Physics							
mo1	ECTS	5	Duratio		1 semester	Method of grading (n	ot) 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 Meth	ods (18	ECTS c	redits)								
Subgroup Basics of	Mather	natical	Methods	(5 ECT	S credits)						
10-M-DGE-202-	Introdu	ction to	Differen	tial Ge	ometry						
mo1	ECTS	5	Duration	n	1 semester	Method of grading	(not) successfully completed	d Modul level	undergraduate		
	Course	S		V (4)	+ Ü (2)						
	Method	d of ass	essment	b) ora c) ora credi Lang	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-	Ordina	ry Diffe	rential Eq	uatior	S			'	,		
mo1	ECTS	5	Duratio	n	1 semester	Method of grading	(not) successfully completed	d Modul level	undergraduate		
	Course	S		V (4)	+ Ü (2)			P			
M ITU a a a sur	Method of assessment			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 		oduction to Complex Analysis									
		5	Duratio		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course			. ,,	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-	Geome	tric Ana	llysis								
mo1	ECTS	5	Duration	n	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course	S		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-	Introdu	ction to	Function	al Ana	lysis							
mo1	ECTS	5	Duration	n	1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Course	S	•	V (4) +	+ Ü (2)							
	Method	d of asso	essment	b) ora c) ora credit	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-	Introdu	ction to	Partial D	ifferen	itial Equations		,					
mo1	ECTS	5	Duration	1	1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)							
	Method of assessment			b) ora c) ora credit Langu	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	Mathem	atical N	lethods (:	13 ECTS	S credits)							
10-M-DGGD-	Overvie	w Diffe	rential Ge	eometr	y and Ordinary Diffe	erential Equations for Mathematical Physics						
PÜ-152-mo1	ECTS	13	Duration	n	1 semester	Method of grading numerical grade	Modul level	undergraduate				
	Course	S		V (4) +	+ Ü (2)							
	Method	d of asso	essment	Asses select cal Me	sment will have refe ted as the subject of ethods) or in modul	andidate each (20 to 40 minutes) erence to two topics in pure mathematics as agreed f one examination in the sub-field Gesamtüberblick e group Ergänzung Mathematik (Supplementary Top e German and/or English	Mathematische	Methoden (Overview Mathemati-				
	Overvie	w Com	plex Anal	ysis an	d Differential Geom	etry for Mathematical Physics						
mo1	ECTS	13	Duration	1	1 semester	Method of grading numerical grade	Modul level	undergraduate				
	Course	s		V (4) +	+ Ü (2)							
	Method of assessment				sment will have refe ted as the subject of ethods) or in modul	andidate each (20 to 40 minutes) erence to two topics in pure mathematics as agreed f one examination in the sub-field Gesamtüberblick e group Ergänzung Mathematik (Supplementary Top German and/or English	Mathematische	Methoden (Overview Mathemati-				

10-M-FTGD-PÜ-152-	Overvie	w Com	plex Anal	sis and Ordinary Diffe	rential Equations for Mathematical Physics							
mo1	ECTS	13	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses	S		V (4) + Ü (2)		•						
	Method	of ass	essment	oral examination of or	oral examination of one candidate each (20 to 40 minutes)							
				ssessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be elected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathemati-								
					l Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). nguage of assessment: German and/or English							
10-M-GADG-	Overview Geometric Analysis and Differential Geometry for Mathematical Physics											
PÜ-152-mo1		13	Duration	<u> </u>	Method of grading numerical grade	Modul level	undergraduate					
	Course	S		V (4) + Ü (2)								
	Method of assessment			Assessment will have selected as the subjected as the subject cal Methods) or in mo	al examination of one candidate each (20 to 40 minutes) is essessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be lected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematil Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Inguage of assessment: German and/or English							
10-M-GAGD-	Overvie	w Geor	metric Ana	llysis and Ordinary Dif	ferential Equations for Mathematical Physics							
PÜ-152-m01	ECTS	13	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses	S		V (4) + Ü (2)								
				selected as the subject cal Methods) or in mo	reference to two topics in pure mathematics as as ct of one examination in the sub-field Gesamtüber dule group Ergänzung Mathematik (Supplementa ent: German and/or English	rblick Mathematische	e Methoden (Overview Mathemati-					
_	Overvie	w Geor	metric Ana	llysis and Complex Ana	alysis for Mathematical Physics							
mo1	ECTS	13	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses	S		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 selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Macal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								
10-M-FADG-	Overvie	w Func	tional Ana	alysis and Differential	Geometry for Mathematical Physics							
PÜ-152-mo1	ECTS	13	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses	S		V (4) + Ü (2)								
				Assessment will have selected as the subjected as the subject cal Methods) or in mo	ne candidate each (20 to 40 minutes) reference to two topics in pure mathematics as a to of one examination in the sub-field Gesamtüber dule group Ergänzung Mathematik (Supplementa ent: German and/or English	rblick Mathematische	e Methoden (Overview Mathemati-					

10-M-FAGD-	Overvie	w Func	tional An	alysis and Ordinary	Differential Equations for Mathemat	ical Physics						
PÜ-152-m01	ECTS	13	Duration	1 semester	Method of grading numeric	al grade	Modul level	undergraduate				
	Course	S		V (4) + Ü (2)								
	Method	of ass	essment	oral examination of	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							
					ject of one examination in the sub-f nodule group Ergänzung Mathemati							
					ment: German and/or English	k (Supplementary Top	nes in mathema	atics).				
10-M-FAFT-PÜ-152-	Overview Functional Analysis and Complex Analysis for Mathematical Physics											
mo1	ECTS	13	Duration	1 semester	Method of grading numeric	al grade	Modul level	undergraduate				
	Course	S		V (4) + Ü (2)			•					
	Method of assessment			Assessment will ha selected as the sub cal Methods) or in r	al examination of one candidate each (20 to 40 minutes) is essment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be lected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematil Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Inguage of assessment: German and/or English							
10-M-FA-	Overvie	w Func	tional An	alysis and Geometri	is and Geometric Analysis for Mathematical Physics							
GA-PÜ-152-m01	ECTS	13	Duration	1 semester	Method of grading numeric	al grade	Modul level	undergraduate				
	Course	S		V (4) + Ü (2)			•					
				selected as the sub cal Methods) or in r	Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may or selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Matheal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English							
10-M-DG-	Overview Differential Geometry and Partial Differential Equations for Mathematical Physics											
PA-PÜ-152-m01	ECTS	13	Duration	1 semester	Method of grading numeric	al grade	Modul level	undergraduate				
	Course	S		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 on selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathecal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								
10-M-GD-	Overvie	w Ordi	nary Diffe	rential Equations an	d Partial Differential Equations for I	Mathematical Physics	•					
PA-PÜ-152-m01	ECTS	13	Duration	1 semester	Method of grading numeric	al grade	Modul level	undergraduate				
	Course	S		V (4) + Ü (2)								
				Assessment will ha selected as the sub cal Methods) or in r	one candidate each (20 to 40 minuve reference to two topics in pure m ject of one examination in the sub-f nodule group Ergänzung Mathemati ment: German and/or English	athematics as agreed ield Gesamtüberblick	Mathematische	e Methoden (Overview Mathemati-				

10-M-FTPA-PÜ-152-	Overvie	w Com	plex Anal	ysis an	d Partial Differenti	al Equations for Math	nematical Physics		-			
mo1	ECTS	13	Duration	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S		V (4) +	+ Ü (2)							
	Method	d of asse	essment	Asses select cal Me	ral examination of one candidate each (20 to 40 minutes) ssessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be elected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathemati- al Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). anguage of assessment: German and/or English							
10-M-GA-	Overvie	w Geon	netric Ana	alysis a	and Partial Differen	tial Equations for Ma	thematical Physics					
PA-PÜ-152-m01	ECTS	13	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S	•	V (4) +	+ Ü (2)							
M 500 50				Asses select cal Me Langu	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 b Selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathema cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Canguage of assessment: German and/or English							
10-M-FAPA-PÜ-152-	Overview Functional Analysis and Partial Differential Equations for Mathematical Physics ECTS 13 Duration 1 semester Method of grading numerical grade Modul level undergraduate											
mo1		13	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course			V (4) +								
	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 n selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								
Mathematical Phys	ics (18 E	CTS cre	edits)									
Module Group Supp	olement	ary Top	ics in Ma	hemat	ics							
10-M-NUM1P-152-	Numeri	cal Mat	hematics	1 for N	Nathematical Physi	ics						
mo1	ECTS	10	Duration	ı	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S	,	V (4) -	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 m nutes) 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-	Num	erical Mat	hematics	2 for I	Mathematical Physic	 :s						
mo1	ECTS	10	Duration	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Cour	ses		V (4) -	+ Ü (2)	•						
	Meth	od of asse	essment	nutes Langu	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-	Stock	nastics 1 f	or Mathe	matica	natical Physics							
mo1	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Cour	ses		V (4) -	+ Ü (2)							
				nutes Langu credit	written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 mi- utes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) anguage of assessment: German and/or English reditable for bonus							
10-M-STO2P-152-		nastics 2 f	or Mathe	matica	l Physics							
mo1	ECTS	ECTS 10 Duration			1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Cour		_	V (4) -								
				nutes Langu credit	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-	Introduction to Algebra for Mathematical Physics											
mo1	ECTS	10	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Cour			1 12	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 nutes) 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	Appli	ied Algebr	a									
	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Cour	ses	-	V (4) -	+ Ü (2)	-						
	Meth	od of asse	essment	b) ora c) ora Langu	l examination of one l examination in gro	e candidate each (15	to 15 minutes per candidat	te)				

10-M-DIMP-152-	Introdu	ction to	Discrete	Mathe	ematics for Mather	matical Physics						
mo1	ECTS	10	Duration	1	1 semester	Method of grading numerical grade	Modul level	undergraduate				
	Course	S	•	V (4) -	+ Ü (2)		•					
	Method	d of asso	essment	nutes Langu	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-	Introdu	ction to	Projectiv	e Geo	metry for Mathem	atical Physics						
mo1	ECTS	10	Duration	1	1 semester	Method of grading numerical grade	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)		·					
				nutes Asses Langu credit	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-	Introduction to Number Theory for Mathematical Physics											
mo1	ECTS 10 Duration		1	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Course	S		V (4) -	+ Ü (2)							
	Method	d of asso	essment	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-	Optimi	zation f	or Machir	ie Lear	ning							
mo1	ECTS	10	Duration	1	1 semester	Method of grading numerical grade	Modul level	undergraduate				
	Course	S		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								

Introduction to Mathematical Logic											
ECTS	10	Duration	1	1 semester	Method of grading	numerical grade	Modul level				
Courses	S										
Method	d of asso	essment									
			Language of assessment: German and/or English								
						the engine is affected and	in the fall accions a series				
Introdu	ction to	Different									
		_		<u>-</u>		numorical grado	Madullaval	undergraduate			
					Method of grading	numerical grade	Modul level	undergraduate			
					o candidate each (15	to an minutes) or h) oral	ovamination in group	s of a candidates (10 to 15 minu			
Method	ı 01 a550	essinent			ie candidate each (15	to 30 illillutes) of b) orat o	exammation in groups	S of 2 candidates (10 to 15 illinu-			
			Assess	sment will have ref							
				Language of assessment: German and/or English							
					, 3						
Ordina	ry Diffei	rential Eq	uations	for Mathematical	Physics						
ECTS	10			1 semester	Method of grading	numerical grade	Modul level	undergraduate			
Method	d of asso	essment	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minu-								
			lected 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).								
					: German and/or Eng	lish					
Introdu	ction to	Complex			al Dhysics						
			<u>-</u>			numerical grade	Modul level	undergraduate			
					Method of glading	Indinencal grade	Modulitevel	undergraduate			
			· ''	` '	ne candidate each (15	to 20 minutes) or h) oral	examination in ground	s of a candidates (10 to 15 minus			
Method	ı 01 assı	essillelli									
			Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be se-								
			lected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical								
			creditable for bonus								
	Introdu ECTS Course Method Ordinal ECTS Course Method Introdu ECTS Course Course Course Course Course	ECTS 10 Courses Method of ass Introduction to ass Courses Method of ass Method of ass Method of ass Introduction to ass Introduction to ass Courses Method of ass	ECTS 10 Duration Method of assessment Introduction to Different ECTS 10 Duration Courses Method of assessment Ordinary Differential Equation Course Method of assessment Introduction to Complex Method of assessment Introduction to Complex ECTS 10 Duration Courses Introduction to Complex ECTS 10 Duration Courses	ECTS 10 Duration Method of assessment a) writes nutes? Langua Credita Assess Introduction to Differential Geo ECTS 10 Duration Courses V (4) + Method of assessment a) oral tes each Assess lected Method Assess Langua Credita Ordinary Differential Equations ECTS 10 Duration ECTS 10 Duration Courses V (4) + Method of assessment a) oral tes each Assess lected Method Langua Credita Introduction to Complex Analys ECTS 10 Duration Courses V (4) + Method of assessment a) oral tes each Assess lected Method Langua Credita Introduction to Complex Analys ECTS 10 Duration Courses V (4) + Method of assessment a) oral tes each Assess lected Method Langua Credita Assess lected Method Langua Credita Method Langua Credita Assess lected Method Langua Credita Assess lected Method Langua Credita Method Langua Credita Assess lected Method Langua Credita Assess lected Method Langua Credita Assess lected Method Langua Credita Method Langua Credita Assess lected Method Langua Credita Assess	ECTS 10 Duration 1 semester Courses	ECTS 10 Duration 1 semester Method of grading Courses V(4) + Ü(2) Module taught in: German and/or English Method of assessment a) written examination (approx. 90 to 180 min nutes) or c) oral examination in groups (group Language of assessment: German and/or English or Courses V(4) + Ü(2) Method of assessment 1 semester Method of grading Courses V(4) + Ü(2) Method of assessment 3 oral examination of one candidate each (15 tes each) Assessment will have reference to a topic in p lected as the subject of one examination in the Methods) or in module group Ergänzung Math Assessment offered: In the semester in which Language of assessment: German and/or Engliched Scholars Course V(4) + Ü(2) Method of assessment 1 semester Method of grading Course V(4) + Ü(2) Method of assessment 3 oral examination of one candidate each (15 tes each) Assessment will have reference to a topic in p lected as the subject of one examination in the Methods) or in module group Ergänzung Math Language of assessment: German and/or Engliched Scholars 1 semester Method of grading Course V(4) + Ü(2) Method of assessment 3 oral examination of one candidate each (15 tes each) Assessment will have reference to a topic in p lected as the subject of one examination in the Methods) or in module group Ergänzung Math Language of assessment: German and/or Engliched Scholars 1 semester Method of grading Course V(4) + Ü(2) Method of assessment 1 semester Method of grading 1 semester 1 semester Method of grading 1 semester 1 semester 1 seme	ECTS 10 Duration 1 semester Method of grading numerical grade	ECTS 10 Duration 1 semester Method of grading numerical grade Modul level Courses			

10-M-GANP-152-	Geometric	Analysis for I	Mathematical Ph	ysics		,				
mo1	ECTS 10	Duratio	1 semest	er Method of grad	ing numerical grade	Mod	dul 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-	Introduction	on to Function		Nathematical Physics		,				
mo1	ECTS 10				ing numerical grade	Mod	dul level	undergraduate		
	Courses	l.	V (4) + Ü (2)	_	-					
	Method of	assessment	tes each) Assessment will lected as the su Methods) or in Language of ass	and) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to es each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may orected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mat Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Anguage of assessment: German and/or English reditable for bonus						
10-M-PARP-152-	Introduction to Partial Differential Equations for Mathematical Physics									
mo1	ECTS 10	Duratio	1 semest	er Method of grad	ing numerical grade	Mod	dul level	undergraduate		
	Courses	·	V (4) + Ü (2)	•	·					
	Method of	assessment	tes each) Assessment will lected as the su Methods) or in Assessment off	l have reference to a topic bject of one examination i module group Ergänzung N ered: In the semester in wh sessment: German and/or	in pure mathematics as n the sub-field Gesamtü lathematik (Supplemen lich the course is offere	agreed upon wit iberblick Mathem tary Topics in Ma	th the exan natische M athematics			
10-M-MWR-222-	Modelling	and Computa	tional Science			,				
mo1	ECTS 10	Duratio	1 semest	er Method of grad	ing numerical grade	Mod	dul 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 seme creditable for bonus							

Module Group Exp	erimenta	l Physi	cs								
11-E-O-152-m01	Optics a	and Wa	ives								
	ECTS	8	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses	5			+ Ü (2)						
					ıle taught in: Ü: G	<u>-</u>					
	Method	of ass	essment		written examination (approx. 120 minutes) Language of assessment: German and/or English						
11-E-A-152-m01	Atoms a	and Ou	anta	-anguage of accessment definition and/or English							
		8	Duratio	on 1 semester Method of grading numerical grade				Modul level	undergraduate		
	Courses	5			+ Ü (2) ıle taught in: Ü: G	erman or English			,		
	Method	of ass	essment	written examination (approx. 120 minutes) Language of assessment: German and/or English							
11-E-F-152-m01	Introdu	ction to	Solid St	ate Ph	ysics			'			
	ECTS	8	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses	5		V (4) + Ü (2) Module taught in: Ü: German or English							
	Method	of ass	essment			pprox. 120 minutes) nt: German and/or Engli	sh				
11-E-T-152-m01	Nuclear	and El	ementary	tary Particle Physics							
	ECTS 6 Duratio		Duratio			Method of grading	numerical grade	Modul level	undergraduate		
	Courses	5			V (3) + Ü (1) Module taught in: Ü: German or English						
	Method	of ass	essment	written examination (approx. 120 minutes) Language of assessment: German and/or English							
Module Group Sup	plementa	ary Top	ics in Phy	/sics							
11-RRF-202-m01	Introdu	ction to	Relativi	stic Ph	ysics and Classic	al Field Theory					
	ECTS	6	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses	5			+ R (1) ıle taught in: Gern	nan or English					
	Method	of ass	essment	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	Introdu	ction to	Quantur	n Com	puting and Quantum	n Information						
	ECTS	6	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S		V (3) - Modu	+ R (1) lle taught in: Germar	n or English		-				
	Method				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 1	Theory										
	ECTS	6	Duration	1	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Course	S		V (2) + R (2) Module taught in: German or English								
	Method	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	Quantu	ım Field	Theory I									
	ECTS	8	Duration	1	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Course	S		V (4) + R (2) Module taught in: German or English								
	Method	l of asse	essment	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	Comput	tationa	l Physics					,				
	ECTS	6	Duration	n	1 semester	Method of grading	g numerical grade	Me	odul level	undergraduate		
	Courses	5			+ R (1) ule taught in: Gern	nan or English		-				
	Method	of asse	essment	amin on/ta If a w form the la Asse	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	Statisti	cs, Dat	a Analysi	s and	Computer Physics	,		1				
	ECTS	4	Duration	n	1 semester	Method of grading	g numerical grade	Me	odul level	graduate		
	Courses				V (2) + R (1) Module taught in: German or English							
				amination 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 change 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						sessment may instead take the lethod of assessment is changed,		
11-AP-152-m01	Astrophysics											
	ECTS	6	Duration		1 semester	Method of grading	g numerical grade	Me	odul level	undergraduate		
	Courses	5		V (2) + R (2) Module taught in: German or English								
				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	d to in L	-PO I	§ 22 Nr. 1 h) § 22 Nr. 2 f) § 22 Nr. 3 f)								

11-TPS-152-m01	Particle	e Physic	cs (Standa	ard Mo	del)								
	ECTS	8	Duration	ı	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Course	S			+ R (2)								
					Module taught in: German or English								
	Metho	d of ass	essment	amina on/ta If a w form the le	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								
Module Group Cur	rent Topi	ent Topics in Mathematical Physics											
11-BXMP5-152-mo1	Curren	t Topics	in Mathe	matica	al Physics								
	ECTS	5	Duration	ı	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Course	S	·	V (2)	+ R (2)	·							
	Wethor	1 OI d55	essmem	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 p	other prerequisites			Approval from examination committee required.								
11-BXMP6-152-			in Mathe	matic	al Physics								
mo1	ECTS	6	Duration		1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Course	S			+ R (1)								
	Method	d of ass	essment	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 p	rerequi	sites	Appro	oval from examina	ation committee required.							

11-BXMP8-152-	Current Top	ics in Mathe	ematical Physics		'							
mo1	ECTS 8	Duratio	n 1 semester	Method of grading numerical grade	Modul level	undergraduate						
	Courses	· ·	V (4) + R (2)		*							
	Method of a	assessment	amination in groups on/talk (approx. 30 r If a written examinat form of an oral exam the lecturer must info	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 prered	quisites	Approval from exami	nation committee required.								
Key Skills Area (2	o ECTS credits	s)										
General Key Skills In addition to the			dents may also take m	nodules offered by JMU as part of the pool of gener	al transferable skills	(ASQ).						
General Key Skills	s (subject-spe	cific)										
10-M-Tu-	Exercise tut	Exercise tutor or proof-reading in Mathematics										
Ko-152-mo1	ECTS 5	Duratio	n 1 semester	Method of grading (not) successfully comp	eted Modul level	undergraduate						
	Courses	,	T (o)									
	Method of a	ssessment	Assessment of tutori approx. 5 pieces of c	ng activities or correcting work by supervising lector orrecting work)	urers or exercise supe	ervisors (1 to 2 teaching units or						
	Additional I	nformation	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-	E-Learning	and Blended	Learning Mathematic	CS 1	'							
mo1	ECTS 2	Duratio		Method of grading (not) successfully comp	eted Modul level	undergraduate						
	Courses		Ü (2) Course type: eLearni	ng, mostly Virtuelle Hochschule Bayern (vhb)								
	Method of a	assessment	project (web-based, Assessment offered:	15 to 20 hours) Once a year, winter semester								
10-M-VHB2-152-	E-Learning	and Blended	Learning Mathematics 2									
mo1	ECTS 2	Duratio										
	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									

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11-P-VKM-202-mo:					1	·					
		3	Duratio		1 semester	Method of grading (not) successfully completed Modul level undergraduate					
	Courses	5		V (1) + Modu	- Ü (2) le taught in: Germa	man or English					
	Method	of ass	essment	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			§ 22 Nr. 1 h) § 22 Nr. 2 f) § 22 Nr. 3 f)							
Subject-specific K		• •									
Compulsory Cours			•								
10-M-GBM-152-	Basic N	otions	and Meth	ods of	Mathematical Rea						
mo1	ECTS	2	Duratio	1	1 semester	Method of grading (not) successfully completed Modul level undergraduate					
	Courses			V (1) +	_ ` ` `						
	Method				project (10 to 15 pages) Language of assessment: German and/or English						
	Addition	nal Info	rmation	Addit	onal information o	n on module duration: block taught prior to the beginning of the lecture period.					
	Referred	Referred to in LPO I			l Nr. 1 h) l Nr. 2 f)						
10-M-ASM-152-	Reason	ing and	d Writing	in Mathematics							
mo1	ECTS	2	Duratio	1	1 semester	Method of grading (not) successfully completed Modul level undergraduate					
	Courses	5		V (1) + Ü (1)							
	Method	of ass	essment	project (10 to 20 pages) Language of assessment: German and/or English							
11-SMP-162-m01	Semina	r Math	ematical I	Physic	5						
	ECTS	5	Duration	1	1 semester	Method of grading (not) successfully completed Modul level undergraduate					
	Courses	5		S (2) Modu	le taught in: Germa	man or English					
	Method	of ass	essment		o to 120 minutes) age of assessmen	es) ent: German and/or English					
Subject-specific K	ey Skills,	Compu	ılsory Ele	ctives ((6 ECTS credits)						
10-M-SEM2-152-	Supple	mentar	y Semina	r Math	ematics						
mo1		4	Duration		1 semester	Method of grading (not) successfully completed Modul level undergraduate					
	Courses	•		S (2)							
				talk (60 to 120 minutes)							
						ent: German and/or English					

11-HS-152-m01	Semina	ar Exper	imental/1	Theore	tical Physics							
	ECTS	5	Duration	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	!S		S (2) Modu	ıle taught in: Germa	an or English						
	Method	d of ass	essment	talk v	vith discussion (30	to 45 minutes)						
	other p	rerequi	sites	Admi	ssion prerequisite	to assessment: regul	ar attendance (minimum 85%	of sessions).				
	Addition	onal Info	ormation	consi neral the q stude for ar sessr	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 or 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	Introdu	uction to	Topolog	y								
	ECTS	5	Duration	1	1 semester	Method of grading	(not) successfully complete	d Modul level	undergraduate			
	Course			` ,	+ 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	Mathe	matical	Aspects o	f Modern Cryptography								
	ECTS	5	Duration	า	1 semester	Method of grading	(not) successfully complete	d Modul level	undergraduate			
	Course	!S		V (3)	+ Ü (1)							
	Method	d of ass	essment	b) ora c) ora Langu Asses	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 sen creditable for bonus							
10-M-COM-152-	Compu	ıtationa	l Mathem	atics								
mo1	ECTS	4	Duration	1	1 semester	Method of grading	(not) successfully complete	d Modul level	undergraduate			
[Course			` '	+ 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-m01	Progr	ramming	course fo	r stude	ents of Mathematics	and other subjects							
	ECTS	3	Duratio	n	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Cours	ses	•	P (2)				•					
	Meth	od of ass	sessment	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									
	Dofor	red to in	I DO I		§ 22 II Nr. 3 f)								
10-M-GES-152-m01													
10 M GLS 132 MOT	ECTS		Duration	<u> </u>	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Cours		Baration		+ Ü (2)	metriod or grading	(not) successivity completed	modul tevel	andergraduate				
	Meth	od of ass	sessment	a) tall Asses	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 anguage of assessment: German and/or English								
	Refer	red to in	LPO I	§ 22 l	22 II Nr. 3 f)								
10-M-MSC-152-	Math	ematical	Writing										
mo1	ECTS 5 Duration		n	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Cours	ses		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									
	Refer	red to in	LPO I	§ 22 II Nr. 3 f)									
10-M-SCH-152-m01	Scho	ol Mathe	matics fro	m a Higher Perspective									
	ECTS	5	Duratio		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Cours				+ Ü (2)								
	Meth	od of ass	sessment	Asses	sment offered: In the	s) or b) term paper (1 e semester in which t German and/or Engli	o to 15 pages) or c) project (15 the course is offered and in th sh	to 25 hours) e subsequent so	emester				
	Referred to in LPO I			§ 22 l	l Nr. 1 h) l Nr. 2 f) l Nr. 3 f)								
10-M-PRO-152-m01	Prose	eminar M	athematic	:s									
	ECTS	4	Duratio	n	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		า	2 semester	Method of grading	(not) successfully completed	Modul level	undergraduate	
	Courses			$V(2) + \ddot{U}(2) + V(2) + \ddot{U}(2)$ 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)					
	Referred to in LPO I			§ 53 Nr. 1 a) § 77 Nr. 1 a)					
11-CP-152-m01	Computational Physics								
	ECTS	6	Duratio	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses			V (3) + R (1) Module taught in: German or English					
	method of discissificate			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-mo1 Bachelor Thesis Mathematical Physics									
	ECTS 10 Duration Courses			า	1 semester	Method of grading	numerical grade	Modul level	undergraduate
				No courses assigned to module					
	Method	d of ass	essment	written thesis (approx. 250 to 300 hours total)					
	other p			Where applicable, topic-specific modules as specified by supervisor.					
	Additional Information			Time to complete: 10 weeks.					