



# **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: $\mathbf{E}$ = field trip, $\mathbf{K}$ = colloquium, $\mathbf{O}$ = conversatorium, $\mathbf{P}$ = placement/lab course, $\mathbf{R}$ = project, $\mathbf{S}$ = seminar, $\mathbf{T}$ = tutorial, $\mathbf{\ddot{U}}$ = exercise, $\mathbf{V}$ = lecture
	Term: <b>SS</b> = summer semester, <b>WS</b> = winter semester
	Methods of grading: <b>NUM</b> = numerical grade, <b>B/NB</b> = (not) successfully completed
	Regulations: (L)ASPO = general academic and examination regulations (for teaching-degree programmes), FSB = subject-specific provisions, SFB = list of modules
	Other: <b>A</b> = thesis, <b>LV</b> = course(s), <b>PL</b> = assessment(s), <b>TN</b> = participants, <b>VL</b> = 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 cre- ditable 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 me- 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:

#### 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	Module title										
	ECTS	Dura	ation	(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	sessment									
	Only after su completion o		if applica	fapplicable							
	Other prereq	uisites	if applica	if applicable							
	Participants on of places		i- if applica	if applicable							
	Additional in	formation	if applica	if applicable							
	Referred to ir	n LPO I	if applica	ble (examination	regulations for teaching-	degree programmes)					

Compulsory Course	es (104 F	ECTS cre	dits)								
Subfield Analysis (	25 ECTS	credits	)								
10-M-ANP-Ü-202-	Overvi	ew Anal	ysis for N	lathem	atical Physics						
m01	ECTS			n	2 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses			V (4) -	$V(4) + V(4) + \ddot{U}(2)$						
	Metho	d of ass	essment	Asses	xamination of one ca ssment will have refe Jage of assessment:	erence to the content	s of modules 10-M-ANAP1 and	10-M-ANAP2.			
10-M-VAN-202-	Advand	ced Ana	lysis								
m01	ECTS	-			1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	25		V (4) -	+ Ü (2)						
	Metho	d of ass	essment	b) ora c) ora credit	al examination of one	e candidate each (15 ups (groups of 2, 10	to 15 minutes per candidate)				
Subfield Linear Alg	gebra (16	δ ECTS c	redits)								
10-M-LNP-Ü-202-	Overvi	ew Line	ar Algebr	a for M	athematical Physics	5					
m01	ECTS	16	Duratio	n	2 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	2S		V (4) -	$V(4) + V(4) + \ddot{U}(2)$						
	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		•	ics 1 (Med		5)							
11-E-10-152-11101	J	8	Duration		1 semester Method of grading numerical grade Modul level undergradua							
	Courses		Duration									
	Courses	0			/ (4) + Ü (2) Nodule taught in: Ü: German or English							
	Method	ofass			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.								
	Addition	nal Info	rmation	consid neral the qu stude for an sessm	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	d to in L	.PO I	§ 53   § 77	Nr. 1 a) Nr. 1 a)							
11-E-E-152-m01	Classical Physics 2 (Heat and Electromagnetism)											
	ECTS	8	Duration									
	Courses	5		V (4) + Ü (2) Module taught in: Ü: German or English								
	Method	of ass	essment	written examination (approx. 120 minutes) Language of assessment: German and/or English								
	other pr	rerequi	sites	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.								
	Addition	nal Info	rmation	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   § 77	Nr. 1 a) Nr. 1 a)							

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11-T-M-152-m01	Theore	tical M	echanics									
	ECTS	8	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S	,	V (4) - Modu	⊦ Ü (2) le taught in: Ü: Ger	man or English						
	Metho	d of ass	essment		written examination (approx. 120 minutes) Language of assessment: German and/or English							
	other p	orerequi	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.							
	Additic	onal Info	ormation	consid neral the qu stude for an sessm	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	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S		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 p	orerequi	sites	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.								
	Additio	onal Info	ormation	consid neral the qu stude for an sessm	dered a declaratior academic and exar ualification for adm nts that meet the r assessment or wh	n of will to seek admis nination regulations). ission to assessment, espective prerequisite ose registration for an	sion to assessment pu If the module coordina they will put the stude s can successfully reg assessment was not p	irsuant to Section 20 Sul ators subsequently find t ent's registration for ass ister for an assessment. put into effect will not be	on to assessment, this will be osection 3 Sentence 4 ASPO (ge- that the student has obtained essment into effect. Only those Students who did not register admitted to the respective as- de achieved in this assessment			

Subfield Statistica	atistical Physics and Electrodynamics (16 ECTS credits)												
11-T-SE-152-m01	Statis	tical Phy	sics and I	Electro	lectrodynamics								
	ECTS	6	Duration	า	2 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	es		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	Statis	tical Phy	sics - Exe	rcises									
	ECTS	5	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	es		Ü (2) Modu	le taught in: Ü: Ger	man or English							
	Metho	d of asse	essment		n examination (app lage of assessment	orox. 120 minutes) t: German and/or Engl	lish						
11-T-EA-152-m01	Electro	odynami	cs - Exerc	ises									
	ECTS	5	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	es		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 Laborator	y Cours	e Physic	s (15 ECTS	5 credi	ts)								
11-P-PA-152-m01	Labora	atory Cou	ırse Phys	ics A (	Mechanics, Heat, E	lectromagnetism)							
	ECTS	3	Duration	า	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Course	es		P (2)									
	Metho				practical assignment with talk (approx. 30 minutes) Preparing, performing and evaluating (record of readings or lab report) the experiments will be considered successfully com- pleted 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 phy- sics-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 and	d Error	Analysis									
	ECTS 2	2	Duratior	ו ו	1 semester	Method of grading	(not) successfully c	ompleted	Modul level	undergraduate		
	Courses			V (1) + Modul	Ü (1) e taught in: Ü: Ger	man or English						
-	Method	of asse	ssment		written examination (approx. 120 minutes) anguage 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 pre	erequis	ites	succes								
	Addition			consic neral a the qu studer for an sessm will no	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 (ge- eral academic and examination regulations). If the module coordinators subsequently find that the student has obtained ne qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those tudents 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 as- essment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment vill not be considered.							
	Referred	to in Ll	PO I		§ 53   Nr. 1 c) § 77   Nr. 1 d)							
11-P-MPB-152-m01	Laborato	ory Cou	rse Phys	ics B fo	cs B for Students of Mathematical Physics							
	ECTS	4	Duratior			Method of grading	(not) successfully c	ompleted	Modul level	undergraduate		
	Courses			P (2)								
	Method	of asse	ssment	Prepar pleted compl sics-re	practical assignment with talk (approx. 30 minutes) Preparing, performing and evaluating (record of readings or lab report) the experiments will be considered successfully com- pleted 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 phy- sics-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 pre				÷ ,		e modules 11-P-PA ai	nd 11-P-FR1	prior to comple	eting module 11-P-MPB.		
11-P-MPC-152-m01		ory Cou			r Students of Math							
	ECTS	4	Duratior			Method of grading	(not) successfully c	ompleted	Modul level	undergraduate		
	Courses			P (2)								
	Method	of asse	ssment	practical assignment with talk (approx. 30 minutes) Preparing, performing and evaluating (record of readings or lab report) the experiments will be considered successfully com- pleted 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 phy- sics-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 pre	erequis	ites	Stude	nts are highly reco	mmended to complet	e module 11-P-MPB p	orior to com	pleting module	e 11-P-MPC.		

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11-P-FR2-152-m01													
	ECTS 2	Duration	า	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Courses		V (1) +	- Ü (1)									
	Method of a	assessment		xercises (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.												
<b>Compulsory Electiv</b>	sory Electives Analysis and Linear Algebra (10 ECTS credits)												
Subgroup Basics of	o Basics of Mathematical Methods (5 ECTS credits)												
10-M-ANAP1-202-	Analysis 1 f	or Mathema	tical Pł	nysics									
m01	ECTS 5	Duratio	ı	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Courses		Ü (2)										
	Method of a	assessment			rox. 90 to 180 minute								
					. 12 exercise sheets w : German and/or Engl	vith approx. 4 exercises each)							
10-M-ANAP2-202-	Analysis 2 f	or Mathema	•	<u> </u>		1511		_					
mo1	· · ·			·	Mathad of grading	(not) successfully completed	Madullaval	undergreduete					
				1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Courses Method of assessment		Ü (2)			e) and							
	Method of a	issessment		written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each)									
					German and/or Engl								
Subfield Lineare Al	gebra (5 ECT	S credits)											
10-M-LNAP1-202-	Linear Alge	bra 1 for Mat	hemat	ical Physics									
m01	ECTS 5	Duratio	า	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Courses		Ü (2)										
	Method of a	assessment			rox. 90 to 180 minute	s) and written exercises (appro	ox. 12 exercise s	sheets with approx. 4 exercises					
			each)			i - h							
	Language of assessment: German and/or English 2- Linear Algebra 2 for Mathematical Physics												
10-M-LNAP2-202- m01		1		, <u>, , , , , , , , , , , , , , , , , , </u>		(		Lundaning durate					
	ECTS 5	Duratio		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Courses		Ü (2)	· /			· ·	1					
	Method of a	issessment	writte each)		rox. 90 to 180 minute	s) and written exercises (appro	DX. 12 EXERCISE S	sheets with approx. 4 exercises					
			,		: German and/or Engl	ish							

Mathematical Met	hods (18	ECTS c	redits)									
Subgroup Basics o	f Mather	natical	Methods	(5 ECT	S credits)							
10-M-DGE-202-	Introdu	iction to	Differen	tial Ge	ometry							
m01	ECTS	5	Duratio	n	1 semester	Method of grading	(not) successfully complete	d 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 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 Diffei	rential Eq	uation	5							
m01	ECTS	5	Duration	n	1 semester	Method of grading	(not) successfully complete	d Modul level	undergraduate			
	Course	s		V (4)	+ Ü (2)							
				b) ora c) ora credi Lang	al examination of one Il examination in gro table for bonus uage of assessment:	e candidate each (15	o 15 minutes per candidate)					
10-M-FTH-202-m01					1							
		5	Duration		1 semester	Method of grading	(not) successfully complete	d Modul level	undergraduate			
	Course			× 17	+ Ü (2)							
	Methoc	d of asso	essment	b) ora c) ora credi	al examination of one Il examination in gro table for bonus	e candidate each (15	o 15 minutes per candidate)					
10-M-GAN-202-	Geome	tric Ana	lysis									
m01	ECTS	5	Duration	n	1 semester	Method of grading	(not) successfully complete	d Modul level	undergraduate			
	Course	S		V (4)	+ Ü (2)	· · · · ·						
	Methoc	d of asso	essment	<ul> <li>a) written examination (approx. 90 to 180 minutes, usually chosen) or</li> <li>b) oral examination of one candidate each (15 to 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)</li> <li>creditable for bonus</li> <li>Language of assessment: German and/or English</li> </ul>								

10-M-FAN-202-	Introd	luction to	o Functior	al Ana	lysis						
m01	ECTS	5	Duratio		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Cours	-	1	V (4) -	r (4) + Ü (2)						
	Metho	od of ass	essment		a) written examination (approx. 90 to 180 minutes, usually chosen) or						
				b) ora	b) oral examination of one candidate each (15 to 30 minutes) or						
					) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)						
					able for bonus	: German and/or Engl	ich				
10-M-PAR-202-	Introd	luction to									
m01	ECTS		Duratio		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Cours	1	Duratio	V (4) -		Method of glading	(not) successfully completed	Modulievei	undergraduate		
			essment			norox oo to 180 min	utes, usually chosen) or				
	Metho	Ju 01 ass	essment			e candidate each (15					
							to 15 minutes per candidate)				
					able for bonus						
						German and/or Engl		subsequent s	mastar		
<u> </u>						ie semester in which	the course is offered and in the	e subsequent se	eniestei		
Subfield Overview	r			-	· · · · · · · · · · · · · · · · · · ·						
10-M-DGGD-				-	· · · · · · · · · · · · · · · · · · ·		Mathematical Physics	· · · · · · · · · · · · · · · · · · ·			
PÜ-152-m01	ECTS	13	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Cours			V (4) + Ü (2)							
	Metho	od of ass	essment	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 Mathemati-						
							athematik (Supplementary Top				
						German and/or Engl					
10-M-FTDG-PÜ-152-	Overv	iew Com	plex Anal	ysis an	d Differential Geom	etry for Mathematica	al Physics				
m01	ECTS	13	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Cours	es		V (4) -	+ Ü (2)	•					
	Metho	od of ass	essment	oral e	xamination of one c	andidate 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 Mathemati- cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics).						
						e group Erganzung m German and/or Engl			ucs).		

10-M-FTGD-PÜ-152-	Overvie	ew Com	plex Anal	ysis a	nd Ordinary Differ	ential Equations for M	athematical Physics		
m01	ECTS	13	Duratio	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S		V (4)	+ Ü (2)				
	Method	l of asso	essment	Asses selec cal M	ssment will have re ted as the subject ethods) or in mod	of one examination in	in pure mathematics the sub-field Gesamt Aathematik (Suppleme		examiner. Each topic may only be e Methoden (Overview Mathemati- atics).
10-M-GADG-	Overvie	w Geor	netric Ana	_	_	eometry for Mathema			
PÜ-152-m01	ECTS	13	Duration	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S		V (4)	+ Ü (2)	- <b>I</b>	•		
				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 Mathemati- cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English					
10-M-GAGD-					, ,	!	Mathematical Physics		
PÜ-152-m01	ECTS	13	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	-			+ 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 Mathemati- cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								
10-M-GAFT-PÜ-152-	Overvie	w Geor	netric Ana	alysis	and Complex Anal	ysis for Mathematica	Physics		
m01	ECTS	13	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Courses	S		V (4)	+ Ü (2)	•		•	
	Method	l of asso	essment	Asses selec cal M	ssment will have ro ted as the subject ethods) or in mod	of one examination in	in pure mathematics the sub-field Gesamt Aathematik (Suppleme		examiner. Each topic may only be e Methoden (Overview Mathemati- atics).
10-M-FADG-	Overvie	w Func	tional Ana	alysis	and Differential G	eometry for Mathema	tical Physics		
PÜ-152-m01	ECTS	13	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate
	Course		_		+ Ü (2)				
	Method of assessment oral examination of one candidate each Assessment will have reference to two to selected as the subject of one examinati cal Methods) or in module group Ergänze Language of assessment: German and/o					eference to two topics of one examination ir ule group Ergänzung <i>l</i>	in pure mathematics the sub-field Gesamt Aathematik (Suppleme	überblick Mathematisch	e Methoden (Overview Mathemati-
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10-M-FAGD-	Overvie	w Func	r Functional Analysis and Ordinary Differential Equations for Mathematical Physics							
PÜ-152-m01	ECTS	13	Duratio	า	1 semester	Method of grading	numerical grade	Modul leve	undergraduate	
	Course	S		V (4)	+ Ü (2)					
	Methoc	l of asse	essment	Asses selec cal M	ssment will have re ted as the subject ethods) or in modu	of one examination in	in pure mathematics a the sub-field Gesamu Aathematik (Suppleme	as agreed upon with th überblick Mathematisc entary Topics in Mather	e examiner. Each topic may only be he Methoden (Overview Mathemati- natics).	
10-M-FAFT-PÜ-152-	152- Overview Functional Analysis and Complex Analysis for Mathematical Physics									
m01	ECTS	13	Duratio				numerical grade	Modul leve	undergraduate	
	Course			V (4)	+ Ü (2)					
	Methoc	l of asse	essment	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 Mathemati- cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English						
10-M-FA-	Overvie	ew Func	tional Ana	alysis	and Geometric Ana	alysis for Mathematic		<u>.</u>		
GA-PÜ-152-m01	ECTS	13	Duration		1 semester	Method of grading	numerical grade	Modul leve	undergraduate	
	Course	-			+ Ü (2)					
	Method of assessmentoral 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-	Overview Differential Geometry and Partial Differential Equations for Mathematical Physics									
PA-PÜ-152-m01	ECTS	13	Duration	า	1 semester	Method of grading	numerical grade	Modul leve	undergraduate	
	Course	S		V (4)	+ Ü (2)			•	· · ·	
	Methoc	l of asse	essment	Asses selec cal M	ssment will have re ted as the subject ethods) or in modu	of one examination in	in pure mathematics a the sub-field Gesamti Aathematik (Suppleme		e examiner. Each topic may only be he Methoden (Overview Mathemati- natics).	
10-M-GD-	Overvie	w Ordiı	nary Diffe	rentia	l Equations and Pa	rtial Differential Equa	tions for Mathematica	l Physics		
PA-PÜ-152-m01	ECTS	13	Duration	1	1 semester	Method of grading	numerical grade	Modul leve	undergraduate	
	Course				+ Ü (2)					
	Methoc	l of asse	essment	Asses selec cal M	ssment will have re ted as the subject ethods) or in modu	of one examination in	in pure mathematics a the sub-field Gesamti Aathematik (Suppleme	as agreed upon with th überblick Mathematisc entary Topics in Mather	e examiner. Each topic may only be he Methoden (Overview Mathemati- natics).	
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10-M-FTPA-PÜ-152-	Overvi	ew Comp	lex Anal	ysis an	d Partial Differentia	al Equations for Math	ematical Physics					
m01	ECTS	13	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	:S		V (4) +	+ Ü (2)			•				
	Method of assessmentoral 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 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								Methoden (Overview Mathemati-			
10-M-GA-	Overvi	verview Geometric Analysis and Partial Differential Equations for Mathematical Physics										
PA-PÜ-152-m01	ECTS	13	Duration		1 semester	Method of grading		Modul level	undergraduate			
	Courses			V (4) +	(4) + Ü (2)							
	Method of assessmentoral 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 o selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Math cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English							Methoden (Overview Mathemati-				
10-M-FAPA-PÜ-152-	Overvi	ew Funct	ional Ana	alysis a	and Partial Different	tial Equations for Ma	thematical Physics					
m01	ECTS 13 Duration			l	1 semester	Method of grading	numerical 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 examination in the sub-field Gesamtüberblick Mathematische cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematic Language of assessment: German and/or English						Methoden (Overview Mathemati-					
Mathematical Phys	sics (18	ECTS cre	dits)									
Module Group Sup	plement	tary Topi	cs in Mat	hemat	ics							
10-M-NUM1P-152-	Numer	ical Mat	hematics	1 for N	Aathematical Physic	:5						
m01	ECTS	10	Duration	ı	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	!S		V (4) +	- + Ü (2)			•	- -			
	Metho	d of asse	essment	nutes) Langu	) or c) oral examinat		s of 2, 10 to 15 minutes per cano		one candidate each (15 to 30 mi-			

10-M-NUM2P-152-	Numer	ical Mat	hematics	2 for Math	nematical Physic	cs					
m01	ECTS	10	Duratio	1 1 Se	emester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	S		V (4) + Ü (	(2)	<u>.</u>					
	Metho	d of ass	of assessment a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (1) 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-ST01P-152-	Stocha	stics 1 f	for Mathe	natical Physics							
m01	ECTS	10	Duratio	1 1 Se	emester	Method of grading	numerical grade	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 mi- 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-ST02P-152-		stics 2	for Mathe	matical Ph	natical Physics						
m01	ECTS	10	Duratio		emester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	Courses			(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 mi- 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-ALGP-152-		iction to	_	bra for Mathematical Physics							
m01	ECTS	10	Duratio		emester	Method of grading	numerical grade	Modul level	undergraduate		
	Course			V (4) + Ü (							
	Metho	d of ass	essment	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					f one candidate each (15 to 30 mi-		
10-M-AAL-222-m01	Applie	d Algeb	ra								
	ECTS	10	Duratio		emester	Method of grading	numerical grade	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) Language of assessment: German and/or English creditable for bonus							

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10-M-DIMP-152-	Introdu	uction to	Discrete	Introduction to Discrete Mathematics for Mathematical Physics										
m01	ECTS	10	Duratio	า	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 mi- 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-PGEP-152-	Introdu	uction to	Projectiv	ve Geometry for Mathematical Physics										
m01	ECTS	10	Duratio	ı	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Courses			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 mi- nutes) 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													
m01	ECTS 10 Duration		1	1 semester	Method of grading	numerical grade	Modul level	undergraduate						
	Course	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 mi- 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-OML-222-	Optimization for Machine Learning													
m01	ECTS	10	Duratio	า	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										

10-M-LOGP-232-	Introdu	ction to	o Mathem	atical	Logic						
m01	ECTS	10	Duration	1	1 semester	Method of grading	numerical grade	Modul level			
	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 Creditable for bonus Assessment offered: In the semester in which the course is offered and in the following semester							
10-M-DGEP-152-	Introduction to Differential Geometry for Mathematical Physics										
m01	ECTS	10	Duratio	n 1 semester Method of grading numerical grade		Modul level	undergraduate				
	Course	S		V (4)	+ Ü (2)	·					
	Method of assessment			tes ea Asses	ach) ssment will have re	eference to a topic in	oure mathematics as ag	reed upon with the exan	s of 2 candidates (10 to 15 minu- niner. Each topic may only be se-		
				Meth Asses Langu	ods) or in module ; ssment offered: In	group Ergänzung Mat	hematik (Supplementar n the course is offered a	rblick Mathematische M y Topics in Mathematics nd in the subsequent se			
10-M-DGLP-152-	Ordina	Ordinary Differential Equations for Mathematical Physics									
mo1		10	Duration		1 semester		numerical grade	Modul level	undergraduate		
	Course	S		V (4)	+ Ü (2)				. –		
				a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minu- tes each) 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 Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus							
10-M-FT-	Introdu	ction to	o Complex	Analy	sis for Mathemati	cal Physics					
HP-152-m01	ECTS	10	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	S		V (4)	+ Ü (2)						
	Method of assessment			tes ea Asses lected Meth Langu	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minu- tes each) 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 Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus						

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10-M-GANP-152-	Geometric Ana	alysis for l	Mather	matical Physics						
m01	ECTS 10	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses		V (4) -	+ Ü (2)						
	Method of ass	essment	tes ea Asses lected Metho Langu	ich) sment will have refe l as the subject of o ods) or in module gr	erence to a topic in pu ne examination in the	re mathematics as agreed upo sub-field Gesamtüberblick Ma ematik (Supplementary Topics	on with the exan athematische M	s of 2 candidates (10 to 15 minu- niner. Each topic may only be se- lethoden (Overview Mathematical ).		
10-M-FANP-152-	Introduction to	<b>Functior</b>	al Ana	lysis for Mathemati	ical Physics					
m01	ECTS 10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses		V (4) -	+ Ü (2)			*			
	Method of ass		tes ea Asses lected Metho Langu credit	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minu- tes each) 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 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-	Introduction to Partial Differential Equations for Mathematical Physics									
m01	ECTS 10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses		V (4) + Ü (2)							
	Method of ass	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- tes each) 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 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-	Modelling and	Computa	tional	Science						
m01	ECTS 10	Duratio		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		<ul> <li>a) written examination (approx. 90 to 180 minutes, usually chosen) or</li> <li>b) oral examination of one candidate each (15 to 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)</li> <li>Language of assessment: German and/or English</li> <li>Assessment offered: Only when announced in the semester in which the courses are offered and in the subsequent semester creditable for bonus</li> </ul>							

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Module Group Expe	erimental Physic	cs							
11-E-O-152-m01	Optics and Wa	ves							
	ECTS 8	Duratior	1 I	1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Courses		$V(4) + \ddot{U}(2)$						
	Mathedates		Module taught in: Ü: German or English written examination (approx. 120 minutes) Language of assessment: German and/or English						
	Method of ass	essment							
11-E-A-152-m01	Atoms and Qua	anta				-			
	ECTS 8	Duratior	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Courses		V (4) + Modul	Ü (2) e taught in: Ü: Ge	rman or English				
	Method of ass				prox. 120 minutes) ht: German and/or Engl	ish			
11-E-F-152-m01	Introduction to	Solid Sta	ate Phy	sics					
	ECTS 8	Duratior		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 El	ementary	Particl	Particle Physics					
	ECTS 6	Duration	า	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 Sup	plementary Top	ics in Phy	sics						
11-RRF-202-m01	Introduction to	Relativis	tic Phy	sics and Classica	ll Field Theory				
	ECTS 6	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Courses		V (3) + Modul	R (1) e taught in: Germ	an or English				
	Method of assessmenta) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is ch 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								

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11-QUI-202-m01	Introdu	iction to	Quantur	n Com	puting and Quantu	n Information					
	ECTS	6	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses				V (3) + R (1) Module taught in: German or English						
	Method	d of ass	essment	oral e prese If a w form the le Langu	b) 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) oresentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the orm of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, he lecturer must inform students about this by four weeks prior to the original examination date at the latest. anguage 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	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate		
	Course	Courses			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 ora amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presen on/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is ch 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	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate		
	Course	Courses			V (4) + R (2) Module taught in: German or English						
	Methoo	d of ass	essment	oral e prese If a w form the le Langu	xamination in grou ntation/talk (appro ritten examination v of an oral examinat cturer must inform uage of assessment	ps (groups of 2, appro x. 30 minutes). was chosen as methor ion of one candidate of students about this b :: German and/or Engl	ox. 30 minutes per cano d of assessment, this r each or an oral examin y four weeks prior to th ish	didate) or d) project repo nay be changed and ass			

11-CP-152-m01	Compu	Itationa	l Physics									
	ECTS	6	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses				+ R (1) ule taught in: Germ	an or English						
	Methoo	d of ass		written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral ex- amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentati- on/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	Statist	ics, Dat	a Analysi:	s and (	<b>Computer Physics</b>							
	ECTS	4	Duratior	า	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Course	!S			/ (2) + R (1) Aodule 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 pro on/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment i 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	Astrop											
		6	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	!S		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								
	Referre	ed to in I		§ 22	ll Nr. 1 h) Il Nr. 2 f) Il Nr. 3 f)							

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11-TPS-152-m01	Particle	Physic	s (Standa	ard Model)							
	ECTS	8	Duratio	ı	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses				V (4) + R (2) Module taught in: German or English						
	Method	l of asse		written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral ex- amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentati- on/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 Relat	tivity								
	ECTS	6	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses			V (3) · Modu	+ R (1) lle taught in: Germ	an or English					
	Additional Information			prese If a w form the le Langu Asses	oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) presentation/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead take form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is chosen 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						
				Approval from examination committee required							
Module Group Curr											
11-BXMP5-152-m01			i		al Physics						
		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 ex- amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentati- on/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	rerequis	sites	Appro	oval from examinat	tion committee require	d.				

11-BXMP6-152-	Current	Topics	in Mathe	matica	al Physics						
m01	ECTS	6	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses	S		V (3) ·	+ R (1)						
	Method	l of ass	essment	amina on/ta If a w form o the le	written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral ex- amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentati- on/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 examinat	ion committee require	d.				
11-BXMP8-152-	Current	Topics	in Mathe	matica	al Physics						
m01	ECTS	8	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses	s		V (4) ·	+ R (2)						
				amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentati- on/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 pi	rerequi	sites	Approval from examination committee required.							
Key Skills Area (2	o ECTS cre	edits)									
General Key Skill In addition to the				dents r	nay also take mod	ules offered by JMU as	part of the pool of general t	ransferable skills	(ASQ).		
General Key Skill	s (subject-	-specifi	ic)								
10-M-Tu-	Exercis	e tutor	or proof-r	eading	g in Mathematics						
Ko-152-mo1		5	Duration		1 semester	Method of grading	(not) successfully complete	ed Modul level	undergraduate		
	Courses	S		Τ (0)							
	Method	l of ass	essment	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)							
	Additio	nal Info	ormation	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-Learn	ing and	d Blended	l Learning Mathematics 1							
m01	ECTS 2 Duratio			۱	1 semester	Method of grading	(not) successfully complete	ed Modul level	undergraduate		
	Courses	Courses		Ü (2) Course type: eLearning, mostly Virtuelle Hochschule Bayern (vhb)							
	Method	l of ass	essment	project (web-based, 15 to 20 hours) Assessment offered: Once a year, winter semester							
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10-M-VHB2-152-	E-Learr	ning and	Blended	Learning Mathematics	2					
m01	ECTS	2	Duration	n 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	MINT Preparatory Course Mathematical Methods of Physics									
	ECTS	3	Duration	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course			V (1) + Ü (2) Module taught in: Gerr						
	Methoo	d of asse	essment	Assessment offered: O	Il completion of approx. nce a year, winter semes	50% of approx. 6 exercise she ter	eets) or b) talk (a	approx. 15 minutes)		
	Referred to in LPO I			§ 22    Nr. 1 h) § 22    Nr. 2 f) § 22    Nr. 3 f)						
Subject-specific Ke	y Skills	(15 ECT	S credits)							
Compulsory Course	es (9 EC1	S credi	ts)							
10-M-GBM-152-	Basic Notions and Methods of Mathematical Reasoning									
m01	ECTS 2 Duratio			1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Courses			V (1) + Ü (1)						
	Method of assessment		essment	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    Nr. 1 h) § 22    Nr. 2 f)						
10-M-ASM-152-		ing and		in Mathematics						
m01	ECTS	2	Duration	n 1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course	S		V (1) + Ü (1)						
	Method of assessment			project (10 to 20 pages) Language of assessment: German and/or English						
11-SMP-162-m01	Semina	ar Mathe	ematical I	Physics						
	ECTS	5	Duration	n 1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course	S		S (2) Module taught in: Gerr	nan or English					
	Method	d of asse	essment	talk (60 to 120 minute Language of assessme	s) nt: German and/or Engli	sh				

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10-M-SEM2-152-	Supple	ementai	y Semina	r Math	ematics						
m01	ECTS	4	Duratio		1 semester Method of grading (not) successfully completed Modul level undergraduate						
	Course		Duration	S (2)	1 Semester	Method of glading	(ibt) successfully completed	Modulievei			
			essment	• • •	60 to 120 minutes)						
	meeno	u oi uss	<i>cooncilie</i>			: German and/or Engl	ish				
11-HS-152-m01	Semina	ar Expe	rimental/1	Theore	tical Physics						
	ECTS	5	Duratio	ı	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	es		S (2) Modu	le taught in: Germa	n or English					
	Metho	d of ass	essment	talk w	ith discussion (30 t	o 45 minutes)					
	other p	orerequi	isites	Admi	ssion prerequisite t	o assessment: regula	r attendance (minimum 85% of	sessions).			
				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	Duratio	ı	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course	es		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 nutes) 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 of	of Mod	ern Cryptography						
	ECTS	5	Duratio		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Courses				V (3) + Ü (1)						
	Metho	d of ass	sessment	<ul> <li>a) written examination (approx. 60 to 120 minutes, usually chosen) or</li> <li>b) oral examination of one candidate each (15 to 30 minutes) or</li> <li>c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)</li> <li>Language of assessment: German and/or English</li> <li>Assessment offered: Only when announced in the semester in which the courses are offered and in the subsequent semester creditable for bonus</li> </ul>							

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10-M-COM-152-	Computational Mathematics										
m01	ECTS 4 Duration			n	1 semester	Method of grading (not) successfully completed Modul level undergraduate	e				
	Courses			V (1) +	- Ü (2)						
	Method	ofasse	essment	project in the form of programming exercises (approx. 20 to 25 hours)							
				Assessment offered: Once a year, winter semester							
	Referred	4 a		Language of assessment: German and/or English							
				§ 22    Nr. 3 f)							
10-M-PRG-152-m01			r	r students of Mathematics and other subjects							
	ECTS 3 Duration				1 semester	Method of grading (not) successfully completed Modul level undergraduate	<u>e</u>				
	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 Il Nr. 3 f)							
10-M-GES-152-m01	Selected	l Topic	s in Histo	ory of N	Aathematics						
	ECTS 5 Duration		n	1 semester	Method of grading (not) successfully completed Modul level undergraduate	e					
	Courses			V (2) ·	+ Ü (2)						
	Method	ofasse	essment	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							
	Referred to in LPO I			Language of assessment: German and/or English							
				§ 22    Nr. 3 f)							
10-M-MSC-152- m01	Mathematical Writing										
	ECTS 5 Duration			-	1 semester	Method of grading (not) successfully completed Modul level undergraduate	<u>e</u>				
	Courses			$V(2) + \ddot{U}(2)$							
	Method	or asse	essment	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 L	.PO I	§ 22	I Nr. 3 f)						
10-M-SCH-152-m01	School N	Nather	natics fro	m a Hi	gher Perspective						
	ECTS 5 Duration			n	1 semester	Method of grading (not) successfully completed Modul level undergraduate	e				
	Courses			V (2) + Ü (2)							
				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    Nr. 2  ) § 22    Nr. 3 f)							
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10-M-PRO-152-m01	Proseminar Mathematics											
	ECTS 4 Duration			ı	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate			
	Courses			S (2)	S (2)							
	Metho	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												
11-M-MR-202-m01			1									
	ECTS 6 Duration				2 semester		(not) successfully completed	Modul level	undergraduate			
	Courses			V (2) + Ü (2) + V (2) + Ü (2) Module taught in: German or English								
	Metho	d of asse	essment	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											
5	ECTS	6	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	es	,	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 ex- amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentati- on/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	Bache	lor Thesi	s Mather									
	ECTS 10 Duratio		Duration	1	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)								
	otherp	prerequis	sites	Where applicable, topic-specific modules as specified by supervisor.								
	Additio	onal Info	rmation	Time to complete: 10 weeks.								