

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: 2015

Examination regulations version: 2015

Examination regulations version: 2015

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)):

12-Aug-2015 (2015-80)

12-Jun-2024 (2024-74)

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	Module title											
	ECTS	I	Duration	(in semesters)	Method of grading		Module level						
	Courses		To be spe	o 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	sessme	ent										
	Only after succompletion o		l if applica	f applicable									
	Other prereq	uisites	if applica	if applicable									
	Participants and allocation of places		cati- if applica	if applicable									
	Additional information		on if applica	if applicable									
	Referred to in	ı LPO I	if applica	if applicable (examination regulations for teaching-degree programmes)									

Compulsory Course	es (110 EC	CTS cred	dits)									
Subfield Analysis ((27 ECTS	credits)										
10-M-ANA1-152-	Analysi	S 1										
mo1	ECTS	8	Duratio		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate			
	Courses	5		V (4) -	+ Ü (2)	,		•				
	Method	of asse	essment	each)	written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises each) Language of assessment: German and/or English							
10-M-ANP-Ü-152-	Overvie	w Analy	sis for N	athem	atical Physics							
mo1	ECTS	12	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses	5		V (4) -	+ Ü (2)							
	Method	of asse	essment	Asses	ral examination of one candidate each (20 to 40 minutes) ssessment will have reference to the contents of modules 10-M-ANA-1 and 10-M-ANP-Ü. anguage of assessment: German and/or English							
10-M-VAN-152-m01	Advance	ed Anal	ysis		•			•				
	ECTS	7	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses	5		V (4) -	+ Ü (2)							
	Method	of asse	essment	b) ora c) ora 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							
Subfield Linear Alg	gebra (20	ECTS cı	redits)									
10-M-LNA1-152-	Linear A	Algebra	1									
mo1	ECTS	8	Duration	1	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate			
	Courses	5		V (4) -	+ Ü (2)	•		•	•			
	Method	of asse	essment	each)	written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercise							
10-M-LNP-Ü-152-	Overvie	w Linea	r Algebra	for M	athematical Physic	S						
mo1	ECTS	12	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses	5	•	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-LNA-1 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	•		(4) + Ü (2)									
				ıle taught in: Ü: Ger									
	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	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										
	Courses		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	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	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	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										
	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 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	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-					

Subfield Statistica	l Physics	s and El	ectrodyna	amics I	(6 ECTS credits)							
11-T-SE-152-m01	Statist	ical Phy	sics and	Electro	dynamics							
	ECTS	6	Duration	1	2 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S		V (4) -	+ V (4)							
	Method	d of asse	essment		oral examination of one candidate each (approx. 30 minutes) Language of assessment: German and/or English							
Subfield Statistica	l Physics	s and Ele	ectrodyna	amics I	l (10 ECTS credits)							
11-T-SA-152-m01	Statist	ical Phy	sics - Exe	rcises								
	ECTS 5 Duration			n	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S	Ü (2) Module taught in: Ü: German or English									
	Method	d of asse	written examination (approx. 120 minutes) Language of assessment: German and/or English									
11-T-EA-152-m01	Electrodynamics - Exercises											
	ECTS 5 Duratio			1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses			Ü (2) Module taught in: Ü: German or English								
	Method	d of asse			written examination (approx. 120 minutes) Language of assessment: German and/or English							
Subfield Laborator	y Course	Physic	s (15 ECT:	S credi	ts)							
11-P-PA-152-m01	Labora	tory Cou	urse Phys	ics A (Mechanics, Heat, El	ectromagnetism)						
	ECTS	3	Duration	1	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate			
	Course	S		P (2)				•				
	Method of assessment			practical assignment with talk (approx. 30 minutes) Preparing, performing and evaluating (record of readings or lab report) the experiments will be considered successfully completed if a Testat (exam) is passed. Exactly one experiment that was not successfully completed can be repeated once. After completion of all experiments, talk (with discussion; approx. 30 minutes) to test the candidate's understanding of the physics-related contents of the module. Talks that were not successfully completed can be repeated once. Both components of the assessment have to be successfully completed.								

11-P-FR1-152-m01	Data and 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	l 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.									
				consideral at the questuder for an sessmith not a sessmith to the constant of	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 I		§ 53 I § 77 I	Nr. 1 c) Nr. 1 d)								
11-P-MPB-152-m01													
	ECTS	4	Duration			Method of grading	(not) successfully	y completed	Modul level	undergraduate			
	Courses	S		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			Students are highly recommended to complete modules 11-P-PA and 11-P-FR1 prior to completing module 11-P-MPB.									
11-P-MPC-152-m01		tory Co			r Students of Math	<u> </u>	_						
	ECTS	4	Duration			Method of grading	(not) successfully	y completed	Modul level	undergraduate			
	Courses			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 prerequisites			Stude	Students are highly recommended to complete module 11-P-MPB prior to completing module 11-P-MPC.								

11-P-FR2-152-m01	Advanc	ed and	Computa	tional	Data Analysis							
	ECTS	2	Duratio	1	1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Course	S		V (1) +	$V(1) + \ddot{U}(1)$							
	Method	d of ass	essment		Exercises (successful completion of approx. 50% of approx. 10 exercise sheets) Assessment offered: Once a year, summer semester							
	other p	rerequi	sites	Stude	Students are highly recommended to complete module 11-P-FR1 prior to completing module 11-P-FR2.							
Compulsory Electiv	es Math	ematic	s (22 ECT:	TS credits)								
Subgroup Basics of	f Mathe	matical	Methods	(9 ECT	S credits)							
10-M-DGE-152-m01	Introdu	ıction to	Differen	tial Ge	ometry							
	ECTS	9	Duratio	า	1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)							
	Method	d of ass	essment	b) ora c) ora Langu	emester							
10-M-DGL-152-m01	Ordina	ry Diffe	rential Eq									
	ECTS	9	Duratio		1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Course			V (4) -								
	Method of assessment			b) ora c) ora Langu	ll examination of on I examination in gro	pprox. 90 to 180 minutes, usually chosen) or e candidate each (15 to 30 minutes) or sups (groups of 2, 10 to 15 minutes per candidate) German and/or English						
10-M-FTH-152-m01	Introdu	ıction to	Complex	(Analy	sis							
	ECTS	9	Duration		1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Course			V (4) -								
	Method	d of ass	essment	b) ora c) ora Langu	ll examination of on I examination in gro	pprox. 90 to 180 minutes, usually chosen) or e candidate each (15 to 30 minutes) or oups (groups of 2, 10 to 15 minutes per candidate) German and/or English						

10-M-GAN-152-	Geome	tric Ana	lysis		"								
mo1	ECTS	9	Duration	ı	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Courses	S		V (4)	+ Ü (2)			-					
	Method	of asse	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								
	Referre	d to in L	PO I	§ 22 l	§ 22 Nr. 3 f)								
10-M-FAN-152-m01	Introdu	ction to	Function	al Ana	llysis								
	ECTS	9	Duration	ı	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Courses	S		V (4)	+ Ü (2)								
	Method	d of asse	essment	a) wri	tten examination (a	pprox. 90 to 180 min	utes, usually chosen) or						
				c) ora	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								
i	D (1											
	Referre				I Nr. 3 f)								
10-M-PAR-152-m01			_		· ·	1		1	T				
		9	Duration		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate				
	Courses			$V(4) + \ddot{U}(2)$									
	Method	of asse	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) ora	ll examination in gr	oups (groups of 2, 10	to 35 minutes) of						
				Langu	uage of assessment	: German and/or Eng	lish						
					ssment offered: In t table for bonus	ne semester in which	the course is offered and in th	e subsequent se	emester				
Subfield Overview I	Mathara	atical M	lothede (
					<u> </u>								
10-M-DGGD- PÜ-152-m01					i i		r Mathematical Physics	NA 1	Turn danning divista				
10152 11101		13	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Courses				+ Ü (2)								
	Method	of asse	essment			candidate each (20 to		upon with the	evaminer Fach tonic may only be				
				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-FTDG-PÜ-152-	Overvie	w Com	plex Analy	ysis ar	sis and Differential Geometry for Mathematical Physics								
mo1	ECTS	13	Duration	n .	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)								
	Method	d of ass	essment		oral examination of one candidate each (20 to 40 minutes)								
				Asses	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-								
					Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics).								
					anguage of assessment: German and/or English								
10-M-FTGD-PÜ-152-	Overview Complex Analysis and Ordinary Differential Equations 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			Asses select cal M	al examination of one candidate each (20 to 40 minutes) sessment 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								
_/\	Overvie	ew Geor	metric Ana	alysis a	is and Differential Geometry for Mathematical Physics								
PÜ-152-mo1	ECTS 13 Duration			1	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)								
	Method of assessment		essmem	Asses select cal M	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 Math cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								
10-M-GAGD-	Overvie	ew Geor	metric Ana	alysis a	and Ordinary Differ	ential Equations for	Mathematical Physics						
PÜ-152-mo1	ECTS	13	Duration	1	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 examiner. Each topic melected 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									
		w Geor			and Complex Analy	sis for Mathematica							
mo1	ECTS	13	Duration		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 may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English									

10-M-FADG-	Overvie	Overview Functional Analysis and Differential Geometry for Mathematical Physics												
PÜ-152-mo1	ECTS	13	Duration	1 semester	Method of grading numerical 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										
					elected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematial Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). anguage of assessment: German and/or English									
10-M-FAGD-	Overvie	ew Func	tional Ana	• •	Differential Equations for Mathematical Physics	vsics								
PÜ-152-m01	ECTS	13	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate							
	Course	S	,	V (4) + Ü (2)	<u> </u>	•								
	Method of assessment			Assessment will hav selected as the subj cal Methods) or in m	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 Mathematial Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Inguage of assessment: German and/or English									
10-M-FAFT-PÜ-152-	Overvie	ew Func	tional Ana	alysis and Complex A	sis and Complex Analysis for Mathematical Physics									
mo1	ECTS	13	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate							
	Course	S		V (4) + Ü (2)										
				selected as the subj cal Methods) or in m	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 (Overvical 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	Analysis for Mathematical Physics	•								
GA-PÜ-152-m01	ECTS	13	Duration	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 examiner. Each topic may of selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mat cal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English										
10-M-DG-	Overvie	ew Diffe	rential Ge	eometry and Partial D	oifferential Equations for Mathematical Physics									
PA-PÜ-152-m01	ECTS	13	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate							
	Course	S		V (4) + Ü (2)	V (4) + Ü (2)									
	Method of assessment			oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English										

10-M-GD-	Overv	iew Ordi	nary Diffe	rential	Equations and Part	al Differential Equat	ions for Mathematical Physic	s					
PA-PÜ-152-m01	ECTS	13	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Cours	es		V (4) +	+ Ü (2)								
	Metho	od of ass	essment	Asses select cal Me	oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								
10-M-FTPA-PÜ-152-	Overv	iew Com	plex Analy	ysis an	d Partial Differentia	l Equations for Math	ematical Physics						
mo1	ECTS	13	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Courses			V (4) +	+ Ü (2)								
				Asses select cal Me Langu	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 Mathemat al Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). anguage of assessment: German and/or English								
10-M-GA-	Overview Geometric Analysis and Partial Differential Equations for Mathematical Physics												
PA-PÜ-152-m01	ECTS	13	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Cours			- ,-	(4) + Ü (2)								
				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 selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Matcal Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								
_	Overv	iew Func	tional Ana	alysis a	and Partial Different	ial Equations for Ma	thematical Physics						
m01	ECTS	13	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Cours	es		V (4) +	V (4) + Ü (2)								
	Method of assessment			Asses select cal Me	oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to two topics in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English								

Mathematical Phys	sics (18 E	CTS cre	edits)								
Module Group Sup	plementa	ry Top	ics in Ma	themat	tics						
10-M-NUM1P-152-	Numerio	al Mat	hematics	1 for N	Nathematical Physic	:s					
mo1	ECTS	10	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses				+ Ü (2)						
	Method	of asse	essment	b) ora c) ora Langu	ll examination of one l examination in gro	oprox. 90 to 180 min e candidate each (15 ups (groups of 2, 10 German and/or Engl					
10-M-NUM2P-152-	Numeric	al Mat	hematics	2 for l	Mathematical Physic	cs					
mo1		10	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses			` ' '	+ Ü (2)	-			_		
	Method	oi asse	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-STO1P-152-	Stochastics 1 for Mathematical Physics										
mo1	ECTS	10	Duratio	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses			V (4)	+ Ü (2)						
	Method	of asse	essment	b) ora c) ora Langu	l examination of one l examination in gro	oprox. 90 to 180 min e candidate each (15 ups (groups of 2, 10 German and/or Engl					
10-M-STO2P-152-	Stochas	tics 2 f	or Mathe	matica	al Physics						
mo1	ECTS	10	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses			V (4) + Ü (2)							
	Method of assessment			b) ora c) ora Langu	ll examination of one l examination in gro	oprox. 90 to 180 min e candidate each (15 ups (groups of 2, 10 German and/or Engl					

10-M-ALGP-152-	Introduction 1	to Algebra	for Ma	thematical Physics										
mo1	ECTS 10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate						
	Courses		V (4) ·	+ Ü (2)										
	Method of ass	sessment	b) ora c) ora Langu	n) written examination (approx. 90 to 180 minutes, usually chosen) or n) oral examination of one candidate each (15 to 30 minutes) or n) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) anguage of assessment: German and/or English treditable for bonus										
10-M-DIMP-152-	Introduction t	Introduction to Discrete Mathematics for Mathematical Physics												
mo1	ECTS 10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate						
	Courses		V (4) ·) + Ü (2)										
	Method of ass	sessment	b) ora c) ora Langu) written examination (approx. 90 to 180 minutes, usually chosen) or) oral examination of one candidate each (15 to 30 minutes) or) 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-PGEP-152-	Introduction to Projective Geometry for Mathematical Physics													
mo1	ECTS 10	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate						
	Courses			+ Ü (2)										
	Method of ass	sessment	b) ora c) ora Langu Asses	Il examination of one I examination in grou lage of assessment:	pprox. 90 to 180 minu e candidate each (15 ups (groups of 2, 10 t German and/or Engl e semester in which	e subsequent se	emester							
10-M-ZTHP-152-	Introduction t	to Number	Theory	for Mathematical P	hysics									
mo1	ECTS 10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate						
	Courses		V (4) ·	V (4) + Ü (2)										
	Method of ass	sessment	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-OR-	Operat	ions Re	search fo	r Math	ematical Physics								
SP-152-m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)								
	Method	d of ass	essment	b) ora c) ora Langu Asses	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) c.anguage of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus								
10-M-DGEP-152-	Introdu	iction to	Differen	tial Ge	ometry for Mathema	atical Physics							
mo1	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
j	Course	S	·	V (4) -	+ Ü (2)	•		•	·				
10-M-DGLP-152-			essment	b) ora Asses lected Methol Langu Asses credit	oral examination of one candidate each (15 to 30 minutes) or 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 exted as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematics) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). anguage of assessment: German and/or English assessment offered: In the semester in which the course is offered and in the subsequent semester reditable for bonus								
mo1			Duration		1		numarical arada	Madullaval	Lundararaduata				
	Course	10	Duration	n V (4) -	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
			essment	a) ora b) ora Asses lected Methol Langu	l examination of on all examination in gro sment will have refo d as the subject of o ods) or in module gr	erence to a topic in place in the examination in the	(10 to 15 minutes each) ure mathematics as agreed e sub-field Gesamtüberblic ematik (Supplementary To	k Mathematische M	niner. Each topic may only be selethoden (Overview Mathematical				
10-M-FT-	Introdu	iction to	Complex	Analy	sis for Mathematic	al Physics							
HP-152-m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)	•							
	Method of assessment			b) ora Asses lected Metho Langu	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus								

10-M-GANP-152-	Geome	Geometric Analysis for Mathematical Physics												
mo1	ECTS	10	Duration)	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Course	S		V (4) +	· Ü (2)			,						
	Method	d of asse	essment	b) oral Assess lected Metho Langua	a) oral examination of one candidate each (15 to 30 minutes) or o) 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 seected 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-	Introdu	ction to	Function	al Anal	lysis for Mathemat	ical Physics								
mo1	ECTS	10	Duration	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Courses			V (4) +	· Ü (2)			•						
				b) oral Assess lected Metho Langu credita	a) oral examination of one candidate each (15 to 30 minutes) or b) oral examination in groups of 2 candidates (10 to 15 minutes each) Assessment will have reference to a topic in pure mathematics as agreed upon with the examiner. Each topic may only be selected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview Mathematical Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English creditable for bonus									
10-M-PARP-152-		Introduction to Partial Differential Equations for Mathematical Physics												
mo1	ECTS	10	Duration		1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Course			V (4) +										
	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 lected as the subject of one examination in the sub-field Gesamtüberblick Mathematische Methoden (Overview M Methods) or in module group Ergänzung Mathematik (Supplementary Topics in Mathematics). Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus										
10-M-MWR-152-	Modeli	ng and (Computat	ional S	icience									
mo1	ECTS	8	Duration)	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Course	Courses			V (4) + Ü (2) Module taught in: German and/or English									
	Method of assessment			b) oral c) oral Langu	l examination of on examination in gro	e candidate each (15	to 15 minutes per candida	ate)						

Module Group Exp	erimental Phys	sics											
11-E-O-152-m01	Optics and W	aves											
	ECTS 8	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Courses		V (4) + Modul	· Ü (2) e taught in: Ü: Ge	erman or English								
	Method of as	sessment	written Langua	n examination (apage of assessmer	oprox. 120 minutes) nt: German and/or Eng	lish							
11-E-A-152-m01	Atoms and Q	uanta											
	ECTS 8	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Courses			V (4) + Ü (2) Module taught in: Ü: German or English									
			Langua	vritten examination (approx. 120 minutes) .anguage of assessment: German and/or English									
11-E-F-152-m01	Introduction	to Solid St	ate Phy	Physics									
	ECTS 8	Duratio		1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Courses	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									
11-E-T-152-m01	Nuclear and I	Nuclear and Elementary Particle Physics											
	ECTS 6	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Courses			V (3) + Ü (1) Module taught in: Ü: German or English									
	Method of as	sessment	written examination (approx. 120 minutes) Language of assessment: German and/or English										
Module Group Sup	plementary To	pics in Phy	/sics										
11-GRT-152-mo1	Group Theory	/											
	ECTS 6	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate					
	Courses		V (2) + Modul	R (2) e taught in: Germ	ian or English								
	Method of as	sessment	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 chan 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-CP-152-m01	Computation	nal Physics										
	ECTS 6	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Courses		V (3) +		n or English							
	Mathada fa			Module taught in: German or English a) written examination (approx. 90 to 120 minutes) or								
	Method of as	ssessment	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 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, winter semester									
11-SDC-152-m01	Statistics, Data Analysis and Computer Physics											
	ECTS 4	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses	,	V (2) + R (1) Module taught in: German or English									
	Method of as	ssessment	b) ora c) ora d) pro e) pre If a wr form o the le Langu	l examination of on l examination in gro ject report (approx. sentation/talk (appritten examination vof an oral examinaticturer must inform stage of assessment:	8 to 10 pages) or prox. 30 minutes). was chosen as methor on of one candidate (prox. 30 minutes) or prox. 30 minutes per candidate of assessment, this may be ceach or an oral examination in good four weeks prior to the originalish	hanged and ass groups. If the m	sessment may instead take the ethod of assessment is changed, date at the latest.				

11-AP-152-m01	Astrophysics												
	ECTS	6	Duration	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S			V (2) + R (2) Module taught in: German or English								
	Method	l 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									
	Referre	d to in I	LPO I	§ 22 Nr. 1 h) § 22 Nr. 2 f) § 22 Nr. 3 f)									
11-TPS-152-m01	Particle	Physic	cs (Standa	ard Model)									
	ECTS	8	Duration	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S		V (4) - Modu	R (2) le taught in: Germ	an or English							
	Method	l 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									

11-RTTB-232-m01	Theory	Theory of Relativity												
	ECTS	6	Duration		1 semester	Method of grading numerical grade	Modul level	undergraduate						
	Course	S			+ R (1)	·								
					ıle taught in: Germ									
	Method	d of asse		b) ora c) ora d) pro e) pro If a w form the le	al examination of o al examination in g oject report (appro- esentation/talk (ap ritten examination of an oral examina ecturer must inform	approx. 90 to 120 minutes) or one candidate each (approx. 30 minutes) or	y be changed and ass on in groups. If the m	ethod of assessment is changed,						
				Asses	Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester									
	Additio	nal Info	rmation			tion committee required	,							
Module Group Curr	ent Topi	Topics in Mathematical Physics												
11-BXMP5-152-m01	Current	t Topics	in Mathe	nematical Physics										
	ECTS	5	Duration	l	1 semester	Method of grading numerical grade	Modul level	undergraduate						
	Course	S		V (2)	+ R (2)	·								
	Method	d of asse		amina on/ta If a w form the le	ation in groups (grould (grould) and min (ground) and min	prox. 90 to 120 minutes) or oral examination of oups of 2, approx. 30 minutes per candidate) or utes). was chosen as method of assessment, this mation of one candidate each or an oral examination students about this by four weeks prior to the out. German and/or English	r project report (appro y be changed and ass ion in groups. If the m	x. 8 to 10 pages) or presentati- sessment may instead take the ethod of assessment is changed,						
	other p	rerequis	sites	Appro	oval from examinat	tion committee required.								
11-BXMP6-152-	Current	t Topics	in Mathe	matic	al Physics									
mo1	ECTS	6	Duration	1	1 semester	Method of grading numerical grade	Modul level	undergraduate						
	Course	S		V (3)	+ R (1)		,							
				written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or amination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or preson/talk (approx. 30 minutes). If a written examination was chosen as method of assessment, this may be changed and assessment may instead to form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is 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	Approval from examination committee required.											

11-BXMP8-152-	Current	Topics	in Mathe	matica	l Physics	,								
mo1	ECTS	8	Duration	ı	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Courses	5	•	V (4) -	+ R (2)		<u> </u>	•						
	Method	of asso	essment	amina on/ta If a wi form of 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									
	other pr	erequi	sites	Appro	val from examina	tion committee require	ed.							
Key Skills Area (2	ECTS cre	edits)												
General Key Skills In addition to the				dents r	nay also take mo	dules offered by JMU as	s part of the pool of general tra	nsferable skills	(ASQ).					
General Key Skills	(subject-													
10-M-Tu-	Exercise	e tutor	or proof-r	eading	ading in Mathematics									
Ko-152-mo1	ECTS	5	Duratio	า	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Courses		T (o)		,									
	Method	Method of assessment			sment of tutoring x. 5 pieces of cor		work by supervising lecturers	or exercise supe	ervisors (1 to 2 teaching units or					
	Addition	nal Info	rmation	Pleas	Please direct application to teaching coordinator Mathematics, he/she will select participants.									
	Referred	d to in L	PO I	§ 22 l	§ 22 II Nr. 3 f)									
10-M-VHB1-152-	E-Learni	ing and	l Blended	Learn	ing Mathematics									
mo1	ECTS	2	Duration		1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate					
	Courses	5		Ü (2) Cours	e type: eLearning	, mostly Virtuelle Hoch	schule Bayern (vhb)							
	Method	Method of assessment			project (web-based, 15 to 20 hours) Assessment offered: Once a year, winter semester									
10-M-VHB2-152-	E-Learni	ing and	l Blended	Learn	ing Mathematics	2								
mo1	ECTS	2	Duration			Method of grading (not) successfully complete		Modul level	undergraduate					
	Courses	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-152-m01	Preparatory Course Mathematics											
	ECTS	2	Duration	1	1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Courses	5		T (2)			•					
	Method	of ass	essment	a) exe	rcises (successful o	ompletion of approx. 50% of approx. 6 exercise she	ets) or					
					(approx. 15 minute							
						e a year, winter semester						
	Referred	d to in			§ 22 Nr. 1 h) § 22 Nr. 2 f)							
					Nr. 2 I) Nr. 3 f)							
Subject-specific Ke	y Skills ((15 ECT		3 ==								
Compulsory Course	es (9 ECT	S credi	its)									
10-M-GBM-152-	Basic N	otions	and Meth	ods of	Mathematical Reas	oning						
mo1	ECTS	2	Duration)	1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Courses	5	- J	V (1) +	· Ü (1)		•					
	Method	of ass	essment		oject (10 to 15 pages)							
					anguage of assessment: German and/or English							
					dditional information on module duration: block taught prior to the beginning of the lecture period.							
	Referred	d to in	LPO I		3 22 Nr. 1 h) 3 22 Nr. 2 f)							
			1 1 1 1 1 1		-							
10-M-ASM-152- mo1	Reasoning and Writing in Mathematics FCTS Divertism A competer Method of grading (not) successfully completed Medul level undergraduate											
IIIOI		2	Duration		1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Courses	-		V (1) +								
				Langu	project (10 to 20 pages) Language of assessment: German and/or English							
11-SMP-152-m01	Semina	r Math	ematical F	hysic	5							
	ECTS	5	Duration		1 semester	Method of grading (not) successfully completed	Modul level	undergraduate				
	Courses	5		S (2) Modu	le taught in: Germa	n or English						
	Method	of ass	essment	talk (60 to 120 minutes) Language of assessment: German and/or English								
	other pr	rerequi	sites	Admis	sion prerequisite to	assessment: regular attendance (minimum 85% of	sessions).					
	Additional Information			considered the questude for an sessing the considered the question and the considered the consid	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.							

Subject-specific Ke	y Skills,	Compu	lsory Elec	ctives	(6 ECTS credits)								
10-M-SEM2-152-	Supple	mentary	y Semina	r Math	ematics								
mo1	ECTS	4	Duration	1	1 semester	Method of gradin	g (not) successfully co	mpleted	Modul level	undergraduate			
	Courses	5	•	S (2)	•	•	-		•	•			
	Method	of asse	essment		60 to 120 minutes)								
					anguage of assessment: German and/or English								
10-M-TOP-152-m01		ction to	Topolog	y									
	ECTS 5 Duratio				1 semester	Method of gradin	g (not) successfully co	mpleted	Modul level	undergraduate			
	Courses	S		V (2)	+ Ü (2)								
	Method	l of asse	essment	b) ora c) ora Langu Asses	written examination (approx. 90 to 180 minutes, usually chosen) or								
10-M-COM-152-	Comput	ational Mathematics											
mo1	ECTS	4	Duration	า	1 semester	Method of gradin	g (not) successfully co	mpleted	Modul level	undergraduate			
	Courses	S		V (1) ·	+ Ü (2)								
	Method of assessment			Langi	project in the form of programming exercises (approx. 20 to 25 hours) Language of assessment: German and/or English Assessment offered: Once a year, winter semester								
	Referre	d to in L	PO I	§ 22 l	§ 22 Nr. 3 f)								
10-M-PRG-152-m01	Program	nming o	course fo	r stude	students of Mathematics and other subjects								
	ECTS	3	Duration	า	1 semester	Method of gradin	g (not) successfully co	mpleted	Modul level	undergraduate			
	Courses	S		P (2)	-								
	Method	l of asse	essment	Langı	uage of assessmen	ogramming exercises t: German and/or Er ce a year, summer s		rs)					
	Referre	d to in L	PO I	§ 22 l	I Nr. 3 f)								
10-M-GES-152-m01	Selecte	d Topic	s in Histo	ry of I	Mathematics								
	ECTS	5	Duration	า	1 semester	Method of gradin	g (not) successfully co	mpleted	Modul level	undergraduate			
	Courses	5		V (2) + Ü (2)									
	Method	of asse	essment	a) talk (45 to 90 minutes) or b) term paper (10 to 15 pages) or c) project work (15 to 25 hours) Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester									
	Referred to in LPO I			§ 22	§ 22 II Nr. 3 f)								

10-M-MSC-152-	Mather	matical	Writing						·			
mo1	ECTS	5	Duration		1 semester	Method of grading (not) succes	sfully completed	Modul level	undergraduate			
	Course	S		V (2)	+ Ü (2)	<u>.</u>						
	Method	d of ass	essment	b) ter c) pro Langu	a) talk (45 to 90 minutes) or b) term paper (10 to 15 pages) or c) project work (15 to 25 hours) canguage of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester							
	Referre	d to in	LPO I	§ 22 l	22 II Nr. 3 f)							
10-M-SCH-152-m01	School	Mathe	matics fro	m a Hi	gher Perspective							
	ECTS	5	Duration	า	1 semester	Method of grading (not) succes	sfully completed	Modul level	undergraduate			
	Course	S		V (2)	'(2) + Ü(2)							
	Method	d of ass	essment	b) ter c) pro Langu	talk (approx. 45 minutes) or term paper (10 to 15 pages) or project work (15 to 25 hours) nguage of assessment: German and/or English sessment offered: In the semester in which the course is offered and in the subsequent semester							
		d to in		§ 22 § 22	§ 22 Nr. 1 h) § 22 Nr. 2 f) § 22 Nr. 3 f)							
10-M-PRO-152-mo1	Prosen	ninar M	athematic	:S								
	ECTS	4	Duration	1	1 semester	Method of grading (not) succes	sfully completed	Modul level	undergraduate			
	Course	S		S (2)								
	Method	d of ass	essment	Langi		German and/or English s semester in which the course is	offered					
11-M-MR-152-m01	Mather	matical	Methods	of Phy	sics							
	ECTS	6	Duration	า	2 semester	Method of grading (not) succes	sfully completed	Modul level	undergraduate			
	Course	S		V (2) Modu								
	Method	d of ass	essment	a) exercises (successful completion of approx. 50% of approx. 13 exercise sheets) or b) talk (approx. 15 minutes)								
	Referre	d to in	LPO I	§ 53 Nr. 1 a) § 77 Nr. 1 a)								

11-CP-152-m01	Compu	tational	l Physics	,										
	ECTS	6	Duration	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate					
	Course	S			(3) + R (1)									
					Module taught in: German or English									
	Method of assessment		b) ora c) ora d) pro If a wi form of the le Langu	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 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, winter semester										
Thesis (10 ECTS cre	dits)													
10-M-BAP-152-m01	Bachel	or Thesi	is Mather	natical	Physics									
	ECTS	10	Duration	n 1 semester Method of grading numerical grade Modul level under				undergraduate						
	Course	S		No co	urses assigned to m	nodule								
	Method of assessment			written thesis (approx. 250 to 300 hours total)										
	other prerequisites			Where	Where applicable, topic-specific modules as specified by supervisor.									
	Additional Information			Time to complete: 10 weeks.										