

Module Catalogue

for the Subject

Physics

as a Bachelor's with 1 major with the degree "Bachelor of Science" (180 ECTS credits)

Examination regulations version: 2012 Responsible: Faculty of Physics and Astronomy

JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record 82|128|-|-|H|2012

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The subject is divided into

section / sub-section	ECTS credits	starting page
Compulsory Courses	123	8
Experimental Physics	38	9
Theoretical Physics	32	15
Lab Course Physics	21	22
Mathematics	32	27
Compulsory Electives	27	32
Chemistry, Computer Science, Numerical Mathematics		33
Applied Physics and Metrology		51
Solid State Physics and Nanostructures		90
Astro Physics and Particle Physics		144
Complex Systems, Quantumcontrol and Biophysics		195
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Subject-specific Key Skills	16	216
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Content and Objectives of the Programme

The goal of the studies is it to mediate knowledge on the most important subsections of physics and to make the students familiar with the methods of physical scientific and physical thinking and working. By training of analytic thinking abilities the students acquire the ability to deal later with the various fields of applications and to compile the basic knowledge in particular necessary for a consecutive Bachelor and Master course of studies. Therefore the main emphasis is put on the understanding of the fundamental experimental and theoretical physical terms and laws as well as on basic scientific methods and the development of the typical scientific thinking and working structures. During the Bachelor thesis the student should work on a thematic and temporally limited experimental or theoretical engineering-scientific task in the field of experimental or theoretical physics using well-known procedures and scientific criteria under guidance to a large extent independently.

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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, $\ddot{\mathbf{U}}$ = exercise, \mathbf{V} = lecture

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: **A** = thesis, **LV** = course(s), **PL** = assessment(s), **TN** = participants, **VL** = prerequisite(s)

Conventions

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

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the 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:

ASP02009

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

21-Mar-2012 (2012-37) except for mandatory electives added in Fast Track procedure at a later time

04-Nov-2014 (2014-69)

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.

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Compulsory Courses

(123 ECTS credits)

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Experimental Physics

(38 ECTS credits)

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	e title				Abbreviation
Classic	al Phys	sics (Mechanics, Thermo	odynamics, Waves, Os	scillations, Electrici-	11-KP-092-m01
ty, Mag	gnetisn	n and Optics)			
Module	e coord	inator		Module offered by	
Managi	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics a	nd Astronomy
ECTS	-	od of grading	Only after succ. com		,
16		rical grade			
Duratio		Module level	Other prerequisites		
2 seme	ster	undergraduate	-	ematische Rechenme sics) for first-semeste	ethoden der Physik (Mathemati er students.
Conten	ts				
gnetic v tion. Int Non-lin rent. Me	vibratic teractic earity a echani	ons and waves, radiation ons and central forces. G and chaos. Mechanics o	and wave optics. Tim ieneral relativity. Mecl f non-rigid bodies. Ga netostatics. Electroma	e, room and motion. hanics of rigid bodie sses. Thermodynami agnetic induction. Ma	tricity, magnetism, electroma- . Physical values. Force and mo- s. Friction. Vibration and waves ics. Electrostatics. Electric cur- axwell equations. Science of al-
		ning outcomes			
ves, sci are able knowle Course Klassis	ience o e to ap dge to s (type, r che Ph	f electricity, magnetism, ply mathematical metho the solution of mathema number of weekly contact hours,	electromagnetic vibra ds to the formulation atical-physical tasks. language — if other than Ger n, Wärme) (Classical P	ations and waves, ra of physical contexts ^{man)} hysics 1 (Mechanics,	ermodynamics, vibrations, wa- diation and wave optics. They and autonomously apply their , Waves, Heat)): V (4 weekly cor
Klassis contact	che Ph hours	ysik 2 (Elektromagnetisr) + Ü (2 weekly contact h	nus, Optik) (Classical ours), once a year (su	Physics 2 (Electroma mmer semester)	agnetism, Optics)): V (4 weekly
		le for bonus)	age — If other than German, e	examination offered — if no	t every semester, information on whether
This mc 1. Topic on (a 2. Topic tion (3. Topic	odule h cs cove pprox. cs cove (approx cs cove	as the following assess red in lectures and exerc 120 minutes). red in lectures and exerc 4. 120 minutes).	cises in part 1 (Klassis cises in part 2 (Klassis cises in parts 1 and 2:	sche Physik 2 (Classi oral examination of	cal Physics 1)): written examinat cal Physics 2)): written examina one candidate each (approx. 30
Succes: ponent:	sful co s 1 and	=	of practice work each	n is a prerequisite fo	r admission to assessment com
Studen sche Pr compor Studen To pass compor The gra	ts are h nysik 2 nent 3. ts mus this m nent 3. de ach nent 3	nighly recommended to a (Classical Physics 2). Th t register for assessmen nodule, students must fi ieved in assessment con will each count 50% tow	attend both courses K le topics discussed in t components 1 throug rst pass assessment c mponent 1 or 2 (which	lassische Physik 1 (C these two courses w gh 3 online (details t component 1 or 2 and ever is better) and th	Classical Physics 1) and Klassi- vill be covered in assessment o be announced). d must then pass assessment ne grade achieved in assessmen
Studen sche Ph compor Studen To pass compor The gra compor	ts are h nysik 2 nent 3. ts mus this m nent 3. de ach nent 3	nighly recommended to a (Classical Physics 2). Th t register for assessmen nodule, students must fi ieved in assessment con will each count 50% tow	attend both courses K le topics discussed in t components 1 throug rst pass assessment c mponent 1 or 2 (which	lassische Physik 1 (C these two courses w gh 3 online (details t component 1 or 2 and ever is better) and th	Classical Physics 1) and Klassi- vill be covered in assessment o be announced). d must then pass assessment ne grade achieved in assessmen

ditional information
orkload
aching cycle
ferred to in LPO I (examination regulations for teaching-degree programmes)
odule appears in
chelor' degree (1 major) Mathematics (2012)
chelor' degree (1 major) Mathematics (2013)
chelor' degree (1 major) Physics (2010)
chelor' degree (1 major) Physics (2012)
chelor' degree (1 major) Nanostructure Technology (2010)
chelor' degree (1 major) Nanostructure Technology (2012)
chelor' degree (1 major) Mathematical Physics (2009)
chelor' degree (1 major) Mathematical Physics (2012)
chelor' degree (1 major) Computational Mathematics (2012)
chelor' degree (1 major) Computational Mathematics (2013)
chelor's degree (1 major, 1 minor) Physics (Minor, 2010)
final examination Special study offering (2010)

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Module	e title				Abbreviation
Condensed Matter (Quanta, Atoms, Molecules, Solid State Physics)			11-KM-092-m01		
Module coordinator		Module offered by			
Managi	ng Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	nd Astronomy
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
16	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
2 seme	ster	undergraduate			
Conten	ts				
Quantu Atoms i mical b (FEG). C	m Phys in exter onding Crystal	sics. Mathematical formu mal fields. Many-electror g. Molecule rotations and	lation of quantum m atoms. Optical trans vibrations. Bonding lattice. Structure dete	echanics. Quantum i sitions and spectrose in crystals. Mechani	ls. Experimental principles of mechanics of hydrogen atoms. copy. Laser. Molecules and che- cal properties. Free electron gas ibrations (phonons). Thermal
		ning outcomes	<u>, ,</u>		
The stu ding an They ar	dents l d struc e able	know the basic contexts a ture, lattice dynamics, th	nermal properties, pri ethods to the formula	nciples of electronic ation of modern phy	tomic Physics and solids (bon- properties (free electron gas)). sical contexts and autonomously
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
kly con Konder	tact ho sierte	urs) + Ü (2 weekly contac	t hours), once a year sik 1) (Condensed Ma	(winter semester) atter 2 (Solid State P	ita, Atoms, Molecules)): V (4 wee- hysics)): V (4 weekly contact
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
1. Topic amin 2. Topic amin 3. Topic minu	ation (ation (cs cove ation (cs cove tes, us	approx. 120 minutes). red in lectures and exerc approx. 120 minutes). red in lectures and exerc ually chosen) or written o	ises in part 1 (Konder ises in part 2 (Konder ises in parts 1 and 2: examination (approx.	nsierte Materie 2 (Co oral examination of 120 minutes).	ndensed Matter 1)): written ex- ondensed Matter 2)): written ex- one candidate each (approx. 30 n examiner(s).
Assessment component 3 will be offered in German; English if agreed upon with examiner(s). Successful completion of approx. 50% of practice work each is a prerequisite for admission to assessment com- ponents 1 and 2. To qualify for admission to assessment component 3, students must pass assessment component 1 and/or 2. Students are highly recommended to attend both courses Kondensierte Materie 1 (Condensed Matter 1) and Kondensierte Materie 2 (Condensed Matter 2). The topics discussed in these two courses will be covered in as- sessment component 3. Students must register for assessment components 1 through 3 online (details to be announced). To pass this module, students must first pass assessment component 1 or 2 and must then pass assessment component 3. The grade achieved in assessment component 1 or 2 (whichever is better) and the grade achieved in assessment component 3 will each count 50% towards the overall grade awarded for the module.					
		-	arus the overall grade	awarded for the mo	uule.
Allocat		naces			

Additional information
Workload
Teaching cycle
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Bachelor' degree (1 major) Mathematics (2012)
Bachelor' degree (1 major) Mathematics (2013)
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Bachelor' degree (1 major) Computational Mathematics (2012)
Bachelor' degree (1 major) Computational Mathematics (2013)
Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 13 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation	
Nuclear and Elementary Particle Physics				11-KET-122-m01		
Module coordinator			Module offered by	l		
Managing Director of the Institute of Applied Physics		oplied Physics	Faculty of Physics and Astronomy			
ECTS		od of grading	Only after succ. con	1	ind /isciellenity	
6		rical grade				
-		Module level	Othor proroquisitos			
DurationModule levelOther prerequisites1 semesterundergraduateCertain prerequisites must be met to qualify for admissi sessment. The lecturer will inform students about the re at the beginning of the course. Registration for the cours sidered a declaration of will to seek admission to asses dents have obtained the qualification for admission to a the course of the semester, the lecturer will put their reg sessment into effect. Students who meet all prerequisit ted to assessment in the current or in the subsequent s sessment at a later date, students will have to obtain the		nts about the respe- tion for the course we hission to assessme or admission to asse will put their registra et all prerequisites we e subsequent seme	ctive details vill be con- ent. If stu- essment over ation for as- vill be admit- ster. For as-			
Conten			admission to assess	sment anew.		
Nuclea	r mode s and d	of Nuclear and Element ls. Structure of nuclei. R etectors. Electromagnet hing outcomes	adioactivity and spect	troscopy. Nuclear en	ergy. Radiation and	matter. Acce
They ha scribe t	ave an o them.	understand the basic co overview of the experim number of weekly contact hours,	ental observations of	Particle Physics and		
V + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		essment (type, scope, langu le for bonus)	age — if other than German,	examination offered — if no	ot every semester, informat	ion on whether:
written	exami	nation (approx. 120 min	utes)			
Allocat	ion of p	olaces				
	onal info	ormation	_			
 Worklo	ad					
Teachir	ng cycl	e				
Referre	d to in	LPO I (examination regulatio	ns for teaching-degree progra	immes)		
Module	e appea	irs in				
Bachelo Bachelo Bachelo Bachelo Bachelo	or' deg or' deg or' deg or' deg or' deg	ree (1 major) Mathemati ree (1 major) Mathemati ree (1 major) Physics (20 ree (1 major) Mathemati ree (1 major) Computati ree (1 major) Computati	cs (2013) 012) cal Physics (2012) onal Mathematics (20			
		or Physics (2012)		rg • generated 26-Aug-2024	• exam.	page 14 / 229
	,	, . ,		ord Bachelor (180 ECTS) Phys		



Theoretical Physics

(32 ECTS credits)

For students interested in participating in the FOKUS programme, module 11-TQM-F will replace module 11-TQM. Module component 11-TQM-F-2, which will prepare students for studying in the Master's programme FOKUS Physik (FOKUS Physics), will be offered in the form of a block course between the lecture periods of the winter and summer semesters (for students who took up studies in winter semester, block course will be offered between third and fourth subject semester).

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 15 / 229
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	e title				Abbreviation	
	Statistical Mechanics, Thermodynamics and Electrodynamics			nics	11-STE-092-m01	
Module coordinator			Module offered by			
Manag and As		ector of the Institute of sics	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. co	mpl. of module(s)		
16	nume	rical grade				
Duratio	on	Module level	Other prerequisites	5		
2 seme	ster	undergraduate	10-M1-PHY and 10-	M2-PHY or 10-M1-NST	and 10-M2-NST	
Conten	ts					
ticles,	critical		al systems. Thermodyn equations, electrostati ecial relativity.			
Intend	ed lear	ning outcomes				
trodyna	amics,	hermodynamics and s	dge of the methods of tatistical mechanics. T ntly apply them to the	hey are familiar with	the corresponding of	calculation
Course	S (type, r	umber of weekly contact hou	rs, language — if other than Ge	erman)		
hours) Theore	+ Ü (2) tische	weekly contact hours),	ynamik (Statistical Me once a year (winter se etical Electrodynamics er)	mester)		
		essment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informa	tion on whether
1. Topic chan 2. Topic mics 3. Topic	cs cove nics and cs cove)): writ cs cove	l Thermodynamics)): w red in lectures and exe ren examination (appro red in lectures and exe	ercises in part 1 (Statis rritten examination (ap ercises in part 2 (Theor	prox. 120 minutes). etische Elektrodynan : oral examination of	nik (Theoretical Elec	trodyna-
Succes ponent Studen cal Med discuss Studen To pass compo The gra compo	sful co s 1 and ts are l chanics sed in t ts mus s this m nent 3. ade ach nent 3	mpletion of approx. 50 2. highly recommended to and Thermodynamics hese two courses will t register for assessme todule, students must ieved in assessment c will each count 50% to	ered in German; Englis % of practice work eac o attend both courses) and Theoretische Ele be covered in assessm ent components 1 throu first pass assessment omponent 1 or 2 (whic wards the overall grad	ch is a prerequisite for Statistische Mechani ktrodynamik (Theore ent component 3. Igh 3 online (details t component 1 or 2 an hever is better) and t	or admission to asse k und Thermodynan tical Electrodynamic to be announced). d must then pass as he grade achieved in	nik (Statisti- cs). The topics sessment
Allocat	ion of _l	olaces				
πιισται						
	onal inf	ormation				
 Additio 		ormation				
		ormation				
 Additio 		ormation				

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor' degree (1 major) Mathematics (2012)

Bachelor' degree (1 major) Mathematics (2013)

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Nanostructure Technology (2010)

Bachelor' degree (1 major) Mathematical Physics (2009)

Bachelor' degree (1 major) Mathematical Physics (2012)

Bachelor' degree (1 major) Computational Mathematics (2012)

Bachelor' degree (1 major) Computational Mathematics (2013)

Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 17 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title			Abbreviation		
Theoretical Mechanics and Quantum Mechanics			11-TQM-092-m01		
Module coordinator				Module offered by	
-	Managing Director of the Institute of Theoretical Physics and Astrophysics		eoretical Physics	Faculty of Physics and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
16	nume	rical grade			
Duratio	n	Module level	Other prerequisites	;	
2 seme	ster	undergraduate	10-M1-PHY, 10-M2-F	PHY and 11-MPI-3 or 1	o-M1-NST, 10-M2-NST and MPI-3
Conten	ts				
Probler Limits o	ns of co of class . Angul	entral forces, minor vibra ical physics. Schrödinge ar momentum and spin.	tions, rigid body, mo r equation, mathema	tion in electromagne tical principles of qu	conservation laws. Applications: etic fields. Relativistic dynamics. aantum mechanics, harmonic os- on. Motion in electric fields. Ma-
		ning outcomes			
miliar w of quar	vith the itum th retical	e principles of theoretical eory. They are able to ap	mechanics and their ply the acquired calc	r different formulatio ulation methods and	Theoretical Physics. They are fa- ns and understand the principles d techniques to simple problems d knowledge of basic mathemati-
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ge	rman)	
year (w Quante	Theoretische Mechanik (Theoretical Mechanics): V (4 weekly contact hours) + Ü (2 weekly contact hours), once a year (winter semester) Quantenmechanik (Quantum Mechanics): V (4 weekly contact hours) + Ü (2 weekly contact hours), once a year (summer semester)				
Method	l of ass		ge — if other than German,	examination offered — if no	t every semester, information on whether
 Topic amin Topic tion (3. Topic 	ation (ation (cs cove (appro)	approx. 120 minutes). red in lectures and exerc «. 120 minutes).	ises in part 1 (Theore ises in part 2 (Quant ises in parts 1 and 2:	enmechanik (Quantu oral examination of	eoretical Mechanics)): written ex- ım Mechanics)): written examina- one candidate each (approx. 30
Successful completion of approx. 50% of practice work each is a prerequisite for admission to assessment com- ponents 1 and 2. To qualify for admission to assessment component 3, students must pass assessment component 1 and/or 2. Students are highly recommended to attend both courses Theoretische Mechanik (Theoretical Mechanics) and Quantenmechanik (Quantum Mechanics). The topics discussed in these two courses will be covered in as- sessment component 3. Students must register for assessment components 1 through 3 online (details to be announced). To pass this module, students must first pass assessment component 1 or 2 and must then pass assessment component 3. The grade achieved in assessment component 1 or 2 (whichever is better) and the grade achieved in assessment component 3 will each count 50% towards the overall grade awarded for the module.					
Allocat	ion of p	olaces			

Bachelor's with 1 major Physics (20	012)
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Additional information
Workload
Teaching cycle
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Bachelor' degree (1 major) Mathematics (2012)
Bachelor' degree (1 major) Mathematics (2013)
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Bachelor' degree (1 major) Computational Mathematics (2012)
Bachelor' degree (1 major) Computational Mathematics (2013)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 19 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Modul	e title				Abbreviation	
Theore	etical M	lechanics and Quantum	Mechanics for FOKUS	Students	11-TQM-F-092-m01	
Module coordinator				Module offered by	Module offered by	
	ging Dir Strophy	ector of the Institute of sics	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	1	od of grading	Only after succ. cor	npl. of module(s)		
16		erical grade	10-M-PHY1 and 10-M 11-KP	10-M-PHY1 and 10-M-PHY2 or 10-M-NST1 and 10-M-NST2 and 11-TQM-		
Duratio	on	Module level	Other prerequisites	5		
2 seme	ester	undergraduate				
Conter	nts					
Limits cillator	of class	sical physics. Schrödin lar momentum and spir	ger equation, mathema	atical principles of qu	etic fields. Relativistic dynamics. uantum mechanics, harmonic os on. Motion in electric fields. Ma-	
Intend	ed lear	ning outcomes				
miliar v of qua	with the ntum th oretical	e principles of theoretic neory. They are able to a	al mechanics and thei apply the acquired calc	r different formulatio	Theoretical Physics. They are fa- ons and understand the principle d techniques to simple problems d knowledge of basic mathemat	
Course	es (type,	number of weekly contact hour	s, language — if other than Ge	rman)		
year (w Quante + Ü (2 v	vinter s enmecł weekly	emester) nanik für FOKUS-Studie	rende (Quantum Mech	anics for FOKUS Stuc	(2 weekly contact hours), once a dents): V (4 weekly contact hours ght during semester break bet-	
Metho	d of as		guage — if other than German,	examination offered — if no	ot every semester, information on whether	
1. Topi amir 2. Topi char 3. Topi	ics cove nation (ics cove nics for ics cove	(approx. 120 minutes). ered in lectures and exe FOKUS Students)): writ	ercises in part 1 (Theore ercises in part 2 (Quant ten examination (appr ercises in parts 1 and 2:	enmechanik für FOK ox. 120 minutes). : oral examination of	eoretical Mechanics)): written e US-Studierende (Quantum Me- one candidate each (approx. 3c	
ponent To qua Studer Quante these t Studer To pas compo The gra compo	ts 1 and llify for nts are enmech two cou nts mus s this n onent 3. ade ach onent 3	d 2. admission to assessme highly recommended to nanik für FOKUS-Studie urses will be covered in st register for assessme nodule, students must nieved in assessment co will each count 50% to	ent component 3, stude o attend both courses T rende (Quantum Mech assessment component nt components 1 throu first pass assessment omponent 1 or 2 (which	ents must pass asser Theoretische Mechar anics for FOKUS Stuc nt 3. Igh 3 online (details t component 1 or 2 an never is better) and t	d must then pass assessment he grade achieved in assessmer	
Allocat	tion of	places				
acholor's	s with 1 ma	ajor Physics (2012)		urg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		

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Additional information

Students who intend to study the FOKUS Master's degree programme must take Quantenmechanik für FO-KUS-Studierende (Quantum Mechanics for FOKUS Students) instead of Quantenmechanik (Quantum Mechanics).

Workload

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 21 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	



Lab Course Physics

(21 ECTS credits)

Modules from the area Physikalisches Praktikum (Physics Practical Course) will not factor into the overall grade of the Bachelor's degree.

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	title				Abbreviation	
Lab Course A					11-P-PA-112-m01	
Module	e coord	inator		Module offered by		
Managi	ng Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
pagatio tests, w	on, grap /riting (ohs, linear regression, av of lab reports and publica	erage values and sta		or, error approximation and pro- tribution functions, significance	
		ning outcomes				
le to ind measur principl	depenc ring pro les of s	lently plan and conduct e btocol. They are able to ev tatistics and to draw, pre	experiments, to cooperative to cooperative the measuring esent and discuss the sent and discu	erate with others, an g results on the basi conclusions.	menting techniques. They are ab- d to document the results in a s of error propagation and of the	
		umber of weekly contact hours, l				
Ü (1 we Beispie	ekly co ele aus	ntact hour), once a year	(winter semester)		ysis): V (1 weekly contact hour) + hermodynamics and Electricity,	
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
1. Topic 2. Lab c ted if	 This module has the following assessment components 1. Topics covered in lectures and exercises: written examination (approx. 120 minutes) 2. Lab course: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 					
1. To pass portuni Studen Studen re atten Electric	s asses ty to re ts mus ts mus iding B ity).	sment component 2, stu take element a) and/or e t register for assessment t attend Auswertung von	dents must pass both lement b). components 1 and 2 Messungen und Fehl Värmelehre und Elekt	n elements a) and b) online (details to be errechnung (Measur rrik (Examples from I	rements and Data Analysis) befo- Mechanics, Thermodynamics and	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ng cycl	e				

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 23 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Referred to in LPO I (examination regulations for teaching-degree programmes)					
§ 53 (1) 1. a) Physik Mechanik, Wärmelehre, Elektrizitätslehre, Optik, der speziellen Relativitätstheorie					
§ 53 (1) 1. c) Physik physikalische Grundpraktika					
§ 77 (1) 1. a) Physik "Grundlagen der Experimentalphysik"					
§ 77 (1) 1. d) Physik "physikalische Praktika"					

Module appears in

Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2012) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) First state examination for the teaching degree Grundschule Physics (2009) First state examination for the teaching degree Realschule Physics (2009) First state examination for the teaching degree Gymnasium Physics (2009) First state examination for the teaching degree Gymnasium Physics (2009) First state examination for the teaching degree Mittelschule Physics (2003)

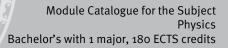
Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 24 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation	
Laboratory Course Physics B					11-P-PB-122-m01	
Module coordinator				Module offered by		
Managi	ng Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
8	(not) s	successfully completed	11-P-PA			
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Physica	l laws	of optics, vibrations and	waves, science of ele	ectricity and circuits	with electric components.	
Intende	ed learr	ning outcomes				
le to inc measur	depenc ing pro	lently plan and conduct e	experiments, to coop valuate the measurin	erate with others, an g results on the basi	menting techniques. They are ab- d to document the results in a s of error propagation and of the	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
		ysik (Classical Physics, K hre und Schaltungen (Ele			ntact hours)	
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
1. Lab c ly col phys 2. Lab c ly col phys	 This module has the following assessment components 1. Lab course in part 1: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 2. Lab course in part 2: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 					
Studen nent, th	ts will l ney mus		ty to retake element a and b).	a) and/or element b)	deadline to be announced). . To pass an assessment compo- sessment component 2.	
Allocat	ion of p	olaces				
Additio	nal infe	ormation				
Worklo	ad					
Teachir	ng cycl	e				
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)		
Module						
Bachelor' degree (1 major) Physics (2012)						

Module title					Abbreviation	
Advanced Laboratory Course Physics C					11-P-PC-122-m01	
Module coordinator				Module offered by		
Managi	ng Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
8	(not) s	successfully completed	11-P-PA and 11-P-PB			
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
		of wave optics, Molecula ised devices with exampl			n measuring methods using spe-	
Intende	ed leari	ning outcomes				
to reco by usin	rd mea: g error	suring results in a structu	ired manner, even in cs. They are able to e	case of huge data tr	erimental setups. They are able affic, and to analyse the results raw conclusions and to present	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
		s Praktikum (Physics Prac s Praktikum (Physics Prac				
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
1. Lab c ly co phys 2. Lab c ly co phys	 This module has the following assessment components 1. Lab course in part 1: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 2. Lab course in part 2: a) Preparing, performing and evaluating the experiments will be considered successfully completed if a Testat (exam) is passed. b) Talk (with discussion) to test the students' understanding of the physics-related contents of the course (approx. 30 minutes). 					
Studen nent, tł	ts will l ney mu		ty to retake element a and b).	a) and/or element b)	deadline to be announced). . To pass an assessment compo- sessment component 2.	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ıg cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module			```			
Bachel	or' deg	ree (1 major) Physics (202	12)			

Bachelor's with 1 major Physics (2012)





Mathematics (32 ECTS credits)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 27 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	1

Module title					Abbreviation	
Mathematics 1 and 2 for students in Physics					10-M-PHY12-092-m01	
Modul	e coord	inator		Module offered by		
Dean of Studies Mathematik (Mathema			natics)	Institute of Mathematics		
ECTS	Meth	od of grading	Only after succ. compl. of module(s)			
16	nume	rical grade				
Durati	on	Module level	Other prerequisites			
2 semester		undergraduate	By way of exception, additional prerequisites are listed in the section on assessments.			
Contor						

Contents

Fundamentals on numbers and functions, sequences and series, differential and integral calculus in one variable, vector spaces, simple differential equations, linear maps and systems of linear equations, matrix calculus, eigenvalue theory, differential and integral calculus in several variables, differential equations, Fourier analysis.

Intended learning outcomes

The student gets acquainted with fundamental concepts of advanced mathematics. He/She learns to apply these methods to problems in natural sciences, in particular in physics, and is able to interpret the results.

Courses (type, number of weekly contact hours, language - if other than German)

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 10-M-PHY12-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 10-M-PHY12-2-092: V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 10-M-PHY12-1-092: Mathematics 1 for Students in Physics Mathematics 1 for Students in Physics

- 8 ECTS, Method of grading: (not) successfully completed
- written examination (approx. 90 to 120 minutes, usually chosen) or oral examination of one candidate each (approx. 20 minutes) or oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: German, English if agreed upon with the examiner
- Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

Assessment in module component 10-M-PHY12-2-092: Mathematics 2 für Students in Physics Mathematics 2 für Students in Physics

- 8 ECTS, Method of grading: numerical grade
- written examination (approx. 90 to 120 minutes, usually chosen) or oral examination of one candidate each (approx. 20 minutes) or oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: German, English if agreed upon with the examiner
- Other prerequisites: Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

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assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

Allocation of places

Additional information

Workload

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012)

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title			Abbreviation		
Mathematics 3 and 4 for Physicists and Engineers			11-DFS-092-m01		
Module coordinator				Module offered by	
Managi and Ast		ector of the Institute of Th sics	eoretical Physics	Faculty of Physics a	nd Astronomy
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
16	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
2 seme	ster	undergraduate			
Conten	ts				
lecture ons and function quantu function	of the d partia nal ana m mec n creat	module component 11-DF al differential equations. alysis, which is needed in hanical states as vectors	-S-1 covers common of The lecture of the mo the course Quantum . The non-visualised	differential equation dule component 11-I n mechanics I. The de form of quantum me	action analysis and theory. The s, systems of differential equati- DFS-2 covers basic knowledge of efinition of Hilbert space explains chanics, the depiction as wave an important part of the formal
Intende	ed lear	ning outcomes			
partial	differe	ntial equations. In addition	on, they have basic k	nowledge of the mat	lution methods for common and hematics of Hilbert space and ding calculation methods.
Course	S (type, r	umber of weekly contact hours, l	anguage — if other than Ger	rman)	
Mathematik 3 (Mathematics 3): V (4 weekly contact hours) + Ü (2 weekly contact hours), once a year (winter se- mester) Mathematik 4 (Mathematics 4): V (4 weekly contact hours) + Ü (2 weekly contact hours), once a year (summer se- mester)					
		eessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	t every semester, information on whether
 This module has the following assessment components 1. Topics covered in lectures and exercises in part 1 (Mathematik 3 (Mathematics 3)): written examination (approx. 120 minutes). 2. Topics covered in lectures and exercises in part 2 (Mathematik 4 (Mathematics 4)): written examination (approx. 120 minutes). 3. Topics covered in lectures and exercises in parts 1 and 2: oral examination of one candidate each (approx. 30 minutes, usually chosen) or written examination (approx. 120 minutes). Assessment component 3 will be offered in German; English if agreed upon with examiner(s). Successful completion of approx. 50% of practice work each is a prerequisite for admission to assessment com- 					
ponents 1 and 2. To qualify for admission to assessment component 3, students must pass assessment component 1 and/or 2. Students are highly recommended to attend both courses Mathematik 3 (Mathematics 3) and Mathematik 4 (Ma- thematics 4). The topics discussed in these two courses will be covered in assessment component 3. Students must register for assessment components 1 through 3 online (details to be announced). To pass this module, students must first pass assessment component 1 or 2 and must then pass assessment component 3. The grade achieved in assessment component 1 or 2 (whichever is better) and the grade achieved in assessment component 3 will each count 50% towards the overall grade awarded for the module.					
Allocation of places					

Additional information

Workload

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 31 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	



Compulsory Electives

(27 ECTS credits)

Of a total of 27 ECTS credits in the area of mandatory electives, a total of 10 ECTS credits achieved in modules with numerical grading will factor into the overall grade of the Bachelor's degree.

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	reg. data record Bachelor (180 ECTS) Physik - 2012	



Chemistry, Computer Science, Numerical Mathematics (ECTS credits)

Modules covering fundamental principles of chemistry, computer science and numerical mathematics.

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title			Abbreviation				
General Chemistry for Physics and Engineers 08-CP1-102-m01							
Module coordinator Mo			Module offered by				
lecturer of the course Institute of Inorga			Institute of Inorgan	ic Chemistry			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
			ntal principles of both i sential methods and pe			course gives	
Intende	ed lear	ning outcomes					
to expla cal form	ain bas nulas t	ic models of the struct o describe chemical re	ciples of the periodic ta ure of matter. They hav actions and to interpret in chemistry and perfor	e developed the abil them by identifying	ity to use the langua the type of reaction	age of chemi-	
			s, language — if other than Gei				
compo • 0 • 0							
		le for bonus)	uage — if other than German,		it every semester, mornat		
Assessment in this module comprises the assessments in the individual module components as specified be- low. Unless stated otherwise, successful completion of the module will require successful completion of all indi- vidual assessments.							
 Assessment in module component o8-IOC-1-072: Organic Chemistry for students of medicine, biomedicine, dental medicine, engineering and natural science 3 ECTS, Method of grading: numerical grade written examination (approx. 60 minutes) Assessment in module component o8-CP1-3-072: General and Analytical Chemistry (lab) 2 ECTS, Method of grading: (not) successfully completed for each experiment: Vortestate (pre-experiment exams, approx. 10 minutes each), assessment of practical performance (log, 2 to 5 pages), Nachtestate (post-experiment exams, approx. 10 minutes each) Assessment offered: once a year, summer semester Only after successful completion of module component o8-CP1-3. Assessment in module component o8-CP1-1-102: Principles of Inorganic Chemistry for Physics and Engineering Majors 5 ECTS, Method of grading: numerical grade written examination (approx. 90 minutes) 							
Allocation of places							
Additional information							
Worklo	ad						
Bachelor's	with 1 ma	ior Physics (2012)	hysics (2012) JMU Würzburg • generated 26-Aug-2024 • exam. page 34 / 229 reg. data record Bachelor (180 ECTS) Physik - 2012				

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 35 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation	
Introduction to Computer Science for Students of all Faculties 10-I-EIN-072-mo1					
Module coordinator				Module offered by	
Dean of Studies Informatik (Computer Science)			Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme					
Conten	ts				
		of computer science inclu hms and data structures,		of information and w	ebsites (HTML, XML, EBNF), data
Intende	ed lear	ning outcomes			
					e areas of representation of infor- ures, programming in Java.
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü +	Ü (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
		mination (approx. 90 min nination in groups (group			date each (approx. 20 minutes) es)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
				,	
Module	annes	ors in			
			(2007)		
Bachelor' degree (1 major) Geography (2007) Bachelor' degree (1 major) Geography (2008)					
Bachelor' degree (1 major) Geography (2010)					
Bachelor' degree (1 major) Physics (2007)					
Bachelor' degree (1 major) Physics (2010)					
Bachelor' degree (1 major) Physics (2009)					
Bachelor' degree (1 major) Physics (2012)					
Bachelor' degree (1 major) Physics (2008)					
Bachelor' degree (1 major) Nanostructure Technology (2010)					
Master's degree (1 major) Physics (2010) Bachelor's degree (1 major, 1 minor) Digital Humanities (Minor, 2009)					
Bachelor's degree (2 majors) Digital Humanities (2009)					
שמרוכנסו ש מכשובב (ב ווומוסוש) שושונמו וומווומוונובש (בסטש)					

Module title				Abbreviation		
Compu	ıterorier	ited Mathematics			10-M-COM-082-mo	1
Modul	e coordi	nator		Module offered by		
Dean c	of Studie	s Mathematik (Mathema	atics)	Institute of Mathen	natics	
ECTS		d of grading	Only after succ. con			
3		uccessfully completed				
<u> </u>	<u> </u>	Module level	Other prorequisites			
			Other prerequisites			
1 seme	ester	undergraduate	Admission prerequi (attendance monito sence).		regular attendance of one incident of unex	
Conter	nts					
merica 10-M-A	l compu NL) and	modern mathematical s tation (e.g. Matlab) to s 10-M-LNA). Computer-b and integral calculus; vi	supplement the basic ased solution of prob	modules in analysis olems in linear algeb	s and linear algebra	((10-M-ANA 0
Intend	ed learn	ing outcomes				
		arns the use of advance ation to solve mathema		cal software packag	es, and is able to as	sess their
Course	es (type, ni	umber of weekly contact hours,	language — if other than Ger	rman)		
	_	nation on SWS (weekly			able)	
		essment (type, scope, langua				ion on whether
					Stevery semester, mormat	Ion on whether
module i	s creditabl	e for bonus)				
			ercises (as specified a	at the beginning of t	he course)	
project	t in the f	e for bonus) orm of programming exe fered: once a year, sum		at the beginning of t	he course)	
project Assess	t in the f	orm of programming exe	mer semester		he course)	
project Assess Langua	t in the f	orm of programming exe fered: once a year, sum ssessment: German, Eng	mer semester		he course)	
project Assess Langua	t in the f sment of age of as	orm of programming exe fered: once a year, sum ssessment: German, Eng	mer semester		he course)	
project Assess Langua Allocat	t in the f sment of age of as tion of p	orm of programming exe fered: once a year, sum ssessment: German, Eng	mer semester		he course)	
project Assess Langua Allocat	t in the f sment of age of as tion of p	orm of programming exe fered: once a year, sum ssessment: German, Eng laces	mer semester		he course)	
project Assess Langua Allocat Additio	t in the f sment of age of as tion of p onal info	orm of programming exe fered: once a year, sum ssessment: German, Eng laces	mer semester		he course)	
project Assess Langua Allocat	t in the f sment of age of as tion of p onal info	orm of programming exe fered: once a year, sum ssessment: German, Eng laces	mer semester		he course)	
project Assess Langua Allocat Additio Worklo	t in the f sment of age of as tion of p onal info	orm of programming exe fered: once a year, sum ssessment: German, Eng laces	mer semester		he course)	
project Assess Langua Allocat Additio Worklo Teachi	t in the f sment of age of as tion of p onal info	orm of programming exe fered: once a year, sum ssessment: German, Eng laces	mer semester		he course)	
project Assess Langua Allocat Additio Worklo Teachi	t in the f sment of age of as tion of p onal info oad	orm of programming exe fered: once a year, sum ssessment: German, Eng laces	mer semester glish if agreed upon w	ith the examiner	he course)	
project Assess Langua Allocat Additio Worklo Teachi Referro	t in the f ment of age of as tion of p onal info oad ng cycle	orm of programming exe fered: once a year, sum ssessment: German, Eng laces ormation	mer semester glish if agreed upon w	ith the examiner	he course)	
project Assess Langua Allocat Morklo Teachi Referro § 73 (1	t in the f sment of age of as tion of p onal info oad ng cycle ed to in l	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation	mer semester glish if agreed upon w	ith the examiner	he course)	
project Assess Langua Allocat Morklo Teachi Referro § 73 (1	t in the f ment of age of as tion of p onal info oad ng cycle	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation	mer semester glish if agreed upon w	ith the examiner	he course)	
project Assess Langua Allocat Additio Worklo Teachi S 73 (1 Bache	t in the f sment of age of as tion of p onal info oad ng cycle ed to in l) 5. Math e appea lor' degr	orm of programming exe fered: once a year, sum ssessment: German, Eng laces ormation LPO I (examination regulation nematik Angewandte Ma rs in ee (1 major) Computer S	mer semester glish if agreed upon w s for teaching-degree progra athematik cience (2010)	ith the examiner	he course)	
project Assess Langua Allocat Worklo Teachi § 73 (1 Bachel Bachel	t in the f sment of age of as tion of p onal info oad ng cycle ed to in l) 5. Math e appea lor' degr	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation Provember of the second second second provember of the second sec	mer semester glish if agreed upon w s for teaching-degree progra athematik cience (2010) cs (2008)	ith the examiner	he course)	
project Assess Langua Allocat Worklo Teachi § 73 (1 Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad oad age cycle do to in l) 5. Math e appea lor' degr lor' degr	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation LPO I (examination regulation nematik Angewandte Ma rs in ee (1 major) Computer S ee (1 major) Mathematic ee (1 major) Physics (20	mer semester glish if agreed upon w s for teaching-degree progra athematik ccience (2010) cs (2008) 10)	ith the examiner	he course)	
project Assess Langua Allocat Additio Worklo Teachi S 73 (1 Bachel Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad age cycle ad to in l) 5. Math e appea lor' degr lor' degr lor' degr	orm of programming exe fered: once a year, sum ssessment: German, Eng laces ormation commation commation commatic Angewandte Ma rs in ee (1 major) Computer S ee (1 major) Mathematic ee (1 major) Physics (20 ee (1 major) Physics (20	mer semester glish if agreed upon w s for teaching-degree progra athematik cience (2010) cs (2008) 10) 09)	ith the examiner	he course)	
project Assess Langua Allocat Additio Worklo Teachi S 73 (1 Bachel Bachel Bachel Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad age of as to a p onal info oad age of as oad age of as oad age of as oat age of age age of age	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation LPO I (examination regulation nematik Angewandte Ma rs in ee (1 major) Computer S ee (1 major) Mathematic ee (1 major) Physics (20 ee (1 major) Physics (20	mer semester glish if agreed upon w s for teaching-degree progra athematik ccience (2010) cs (2008) 10) 09) 12)	ith the examiner	he course)	
project Assess Langua Allocat Worklo Teachi § 73 (1 Bachel Bachel Bachel Bachel Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad ng cycle ed to in l) 5. Math e appea lor' degr lor' degr lor' degr lor' degr lor' degr	orm of programming exe fered: once a year, sum sessment: German, Eng laces brmation commution commution commuticat	mer semester glish if agreed upon w s for teaching-degree progra athematik cience (2010) cs (2008) 10) 09) 12) 08)	ith the examiner	he course)	
project Assess Langua Allocat Worklo Teachi § 73 (1 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad oad age cycle ad to in l b 5. Math e appea lor' degr lor' degr lor' degr lor' degr lor' degr lor' degr lor' degr	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation LPO I (examination regulation nematik Angewandte Ma rs in ee (1 major) Computer S ee (1 major) Mathematic ee (1 major) Physics (20 ee (1 major) Physics (20	mer semester glish if agreed upon w s for teaching-degree progra athematik cience (2010) :s (2008) 10) 09) 12) 08) of Functional Materia	hith the examiner	he course)	
project Assess Langua Allocat Additio Worklo Teachi S 73 (1 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad ad age of as tion of p oad ad age of as tion of p oad ad age of as tion of p age of as tion of p ad ad ad ad ad ad ad ad ad ad ad ad ad	orm of programming exe fered: once a year, sum ssessment: German, Eng laces ormation LPO I (examination regulation nematik Angewandte Ma rs in ee (1 major) Computer S ee (1 major) Mathematic ee (1 major) Physics (20 ee (1 major) Technology ee (1 major) Technology	mer semester glish if agreed upon w s for teaching-degree progra athematik cience (2010) cs (2008) 10) 09) 12) 08) of Functional Materia of Functional Materia	hith the examiner	he course)	
project Assess Langua Allocat Additio Worklo Teachi S 73 (1 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad ad age of as to age onal info oad age of as age oad age oad age of age oad age oad age of age oad age oad age of age oad age of age oad age oad age of age oad age of age oad age of age oad age of age oad age of age age oad age of age age of age age of age age of age age of age age of age age of age age age age age age age age age age	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation LPO I (examination regulation nematik Angewandte Ma rs in ee (1 major) Computer S ee (1 major) Mathematic ee (1 major) Physics (20 ee (1 major) Physics (20	mer semester glish if agreed upon w s for teaching-degree progra athematik ccience (2010) cs (2008) 10) 09) 12) 08) of Functional Materia of Functional Materia ure Technology (2010)	hith the examiner	he course)	
project Assess Langua Allocat Additio Worklo Teachi 8 73 (1 Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	t in the f sment of age of as tion of p onal info oad ad age of as ton of p onal info oad age of as oad age of age lor' degr lor' degr	orm of programming exe fered: once a year, sum sessment: German, Eng laces ormation LPO I (examination regulation nematik Angewandte Ma rs in ee (1 major) Computer S ee (1 major) Mathematic ee (1 major) Physics (20 ee (1 major) Technology ee (1 major) Technology ee (1 major) Nanostructu	mer semester glish if agreed upon w s for teaching-degree progra athematik cience (2010) cs (2008) 10) 09) 12) 08) of Functional Materia of Functional Materia ure Technology (2010) ematics (2009)	hith the examiner		page 37 / 229

Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Master's degree (1 major) Physics (2010) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Bachelor's with 1 major Physics (2012)	JMU Würzburg ● generated 26-Aug-2024 ● exam.	page 38 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title			·	Abbreviation	
Numeri	ical Ma	thematics 1		,	10-M-NM1-082-m01	
Module		inator		Module offered by		
	Dean of Studies Mathematik (Mathematics)			Institute of Mathem	atics	
ECTS	I	•			latics	
8						
o Duratio						
		Module level	Other prerequisites		-1:6 . 6	
1 seme	5161	undergraduate	sessment. The lectur at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	rer will inform stude the course. Registrat n of will to seek adn d the qualification for mester, the lecturer t. Students who mee n the current or in th date, students will h	alify for admission to nts about the respect ion for the course will hission to assessment or admission to assess will put their registrat et all prerequisites will e subsequent semest ave to obtain the qua	ive details be con- t. If stu- sment over ion for as- l be admit- er. For as-
Conten	ts					
		stems of linear equations	s and curve fitting pro	blems, nonlinear ec	uations and systems	of equati-
		tion with polynomials, s				
Intende	ed learı	ning outcomes				
		acquainted with the fun oblems and knows abou			erical mathematics, a	pplies them
Course	S (type, n	umber of weekly contact hours,	language — if other than Gei	rman)		
1) Ü + V	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		essment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, informatio	n on whether
by an o 2, appr	oral exa ox. 30	nation (approx. 90 minut mination of one candida minutes) ssessment: German, Eng	te each (approx. 20 n	ninutes) or an oral ex		
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
§ 73 (1)	5. Mat	hematik Angewandte Ma	athematik			
Module	e appea	ars in				
Bachel Bachel Bachel	or' deg or' deg or' deg	ree (1 major) Computer S ree (1 major) Mathematic ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Physics (20	:s (2008) 10) 09)			
Bachelor's	with 1 maj	or Physics (2012)		rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 39 / 229

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Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Technology of Functional Materials (2009) Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 40 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation	
Numer	ical Ma	thematics 2			10-M-NM2-082-mo	1
Modul	e coord	inator		Module offered by	-	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	semester undergraduate Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective at the beginning of the course. Registration for the course will be sidered a declaration of will to seek admission to assessment. If dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites will be ted to assessment in the current or in the subsequent semester. sessment at a later date, students will have to obtain the qualific			tive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-		
Conten	its		admission to assess			
Solutio	on meth	ods and applications fo al equations, boundary		s, linear programmir	ng, initial value probl	ems for ordi-
Intend	ed learı	ning outcomes				
about t	their ad	able to draw a distincti vantages and limitation ng sciences and econon	s concerning the poss			
Course	S (type, n	umber of weekly contact hours,	language — if other than Ger	man)		
V + Ü (I	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		e essment (type, scope, langu le for bonus)	age — if other than German, o	examination offered — if no	ot every semester, informat	ion on whether
by an c 2, appi	oral exa rox. 30	nation (approx. 90 minu mination of one candida minutes) ssessment: German, En	ate each (approx. 20 n	ninutes) or an oral e		
	ion of p					
Additio	onal info	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	ns for teaching-degree progra	mmes)		
§ 73 (1)) 5. Mat	hematik Angewandte M	athematik			
Module	e appea	in and a second s				
Bachel		ree (1 major) Mathemati ree (1 major) Physics (20	010)			
Bachel Bachel	-	ree (1 major) Physics (20 ree (1 major) Physics (20	•			

UNIVERSITÄT WÜRZBURG

Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Technology of Functional Materials (2009) Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 42 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Programming				Abbreviation						
Programming course for students of Mathematics and othe			r subjects	10-M-PRG-082-m01						
Module coor	dinator		Module offered by	1						
Dean of Stud	ies Mathematik (Mather	natics)	Institute of Mathen	natics						
-	nod of grading	Only after succ. com	nl. of module(s)							
	successfully completed									
Duration	Module level	Other prerequisites								
1 semester	undergraduate			regular attendance (of unexcused absend						
Contents										
Basics of a m matics.	nodern programming lan	guage (e. g. C or Fortrai	n) taking into accou	nt the particular need	ds in mathe-					
Intended lea	rning outcomes									
The student i in mathemat	s able to work independ ics.	lently on small program	nming exercises and	standard programm	ing problems					
Courses (type,	number of weekly contact hours	s, language — if other than Ger	man)							
P (no informa	ation on SWS (weekly co	ntact hours) and course	e language available	e)						
Method of as module is credita	sessment (type, scope, lang Ible for bonus)	uage — if other than German, e	examination offered — if no	ot every semester, informati	ion on whether					
	e form of programming e assessment: German, Er	· ·		he course)						
Allocation of		<u></u>								
Additional in	formation									
Workload										
Teaching cyc	le									
Referred to i	n LPO I (examination regulation	ons for teaching-degree progra	mmes)							
§ 73 (1) 5. Ma	athematik Angewandte M	Nathematik								
Module appe	ars in									
	gree (1 major) Mathemat	rics (2008)								
	gree (1 major) Physics (2									
	gree (1 major) Physics (2									
	gree (1 major) Physics (2	•								
	gree (1 major) Physics (2									
Bachelor' degree (1 major) Technology of Functional Materials (2009)										
Bachelor' degree (1 major) Technology of Functional Materials (2010)										
Bachelor' degree (1 major) Nanostructure Technology (2010)										
Bachelor' degree (1 major) Economathematics (2009)										
Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008)										
Bachelor' degree (1 major) Athematical Physics (2009)										
		• •	09)		Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Computational Mathematics (2009)					
Bachelor' de										
Bachelor' de Bachelor' de	Master's degree (1 major) Physics (2010)									
Bachelor' de Bachelor' de Master's deg	ree (1 major) Physics (20 ree (1 major) Technology		s (2010)							

Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008) First state examination for the teaching degree Gymnasium Mathematics (2009)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 44 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title A				Abbreviation
Current Topics in Experimental Physics				11-BXE5-112-m01
Module coord	Module coordinator			
chairperson c	of examination committee		Faculty of Physics a	ind Astronomy
ECTS Meth	od of grading	Only after succ. com	npl. of module(s)	
5 nume	erical grade			
Duration	Module level	Other prerequisites		
1 semester	undergraduate	Approval by examin	ation committee req	uired.
Contents				
Current topics or study abro		. Accredited academi	c achievements, e.g	. in case of change of university
Intended lear	ning outcomes			
sics of the Ba understand tl	chelor's programme. They	y have knowledge of a uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Method of as module is credital		ge — if other than German, e	examination offered — if no	ot every semester, information on whether
in groups (ap weeks) or d) j		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocation of		. –		
Additional in	formation			
Workload				
Teaching cycle				
Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module appe	ars in			
-	gree (1 major) Physics (20			
Bachelor' deg	gree (1 major) Physics (20	12)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 45 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation
Current Topics in Experimental Physics				11-BXE6-112-m01
Module coordinator			Module offered by	
chairperso	on of examination committee		Faculty of Physics a	nd Astronomy
ECTS M	ethod of grading	Only after succ. com	npl. of module(s)	
6 nι	umerical grade			
Duration	Module level	Other prerequisites		
1 semeste	er undergraduate	Approval by examin	ation committee req	uired.
Contents				
Current to study abro		Credited academic a	achievements, e.g. ir	n case of change of university or
Intended l	learning outcomes			
sics of the understan	e Bachelor's programme. They	/ have knowledge of a uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ne of Experimental Physics and s knowledge. They are able to
Courses (ty	ype, number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + R (no i	nformation on SWS (weekly o	contact hours) and co	ourse language availa	able)
	f assessment (type, scope, langua; editable for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
in groups weeks) or		lidate) or c) project re sentation (approx. 30	eport (approx. 8 to 10	lidate each or oral examination o pages, time to complete: 1 to 4
Allocation	of places			
Additiona	linformation			
Workload				
Teaching cycle				
Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module ap	ppears in			
	degree (1 major) Physics (201			
Bachelor'	degree (1 major) Physics (201	12)		

Module title				Abbreviation	
Current Topics in Experimental Physics				11-BXE8-112-m01	
Module coordinator			Module offered by		
chairperson o	f examination committee		Faculty of Physics a	ind Astronomy	
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)		
8 nume	rical grade				
Duration	Module level	Other prerequisites			
1 semester	undergraduate	Approval by examin	ation committee req	uired.	
Contents					
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or	
Intended lear	ning outcomes				
sics of the Ba understand th	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to	
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
in groups (ap weeks) or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4	
Allocation of	places				
Additional inf	ormation				
Workload					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appea	ars in				
-	ree (1 major) Physics (20				
Bachelor' degree (1 major) Physics (2012)					

Module	e title				Abbreviation
Curren	t Topic	s in Theoretical Physics			11-BXT5-112-m01
Module	e coord	inator		Module offered by	
chairpe	erson o	f examination committee	1	Faculty of Physics a	nd Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a	•	in Theoretical Physics. C	redited academic ac	hievements, e.g. in c	ase of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project reservation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat					
Additio	onal inf	ormation			
Worklo	ad				
Teaching cycle					
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

reg. data record Bachelor (180 FCTS) Physik - 2012	Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 48 / 229
		reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	title				Abbreviation
Current	Topics	s in Theoretical Physics			11-BXT6-112-m01
Module	Module coordinator			Module offered by	
chairpe	rson o	f examination committee		Faculty of Physics a	ind Astronomy
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Current study a	•	of Theoretical Physics. A	ccredited academic a	achievements, e.g. ir	n case of change of university or
Intende	ed lear	ning outcomes			
sics of Physics	the Bao and h	chelor's programme. They	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V + R (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	appea	ars in			
	-	ree (1 major) Physics (20:			
Bachel	or' deg	ree (1 major) Physics (20:	12)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 49 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Current	t Topic	s in Theoretical Physics			11-BXT8-112-m01
Module coordinator			Module offered by		
chairpe	erson o	f examination committee		Faculty of Physics a	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
8	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a		of Theoretical Physics. A	Accredited academic a	achievements, e.g. ir	n case of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	t every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat			0		
			-		
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		



Applied Physics and Metrology

(ECTS credits)

Modules offered by the Faculty in the area of Angewandte Physik und Messtechnik (Applied Physics and Measurement Technology).

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 51 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation		
Electron	nics				11-A2-092-m01	
Module	coord	inator		Module offered by		
Managi	ng Dire	ector of the Institute of	Applied Physics	pplied Physics Faculty of Physics and Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites	i		
1 semester undergraduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Content	s					
coils an	d diod	es) and active compor	and circuits. Analogous Jents (bipolar and field 10S circuits. Microcont	-effect transistors, of		•
		ning outcomes				
	dents ł	nave knowledge of the	practical setup of elect	ronic circuits from th	ne field of analogous	and digital
Courses	S (type, n	umber of weekly contact hour	s, language — if other than Ge	rman)		
V + Ü (n	o infor	mation on SWS (week	y contact hours) and co	ourse language avail	able)	
		e ssment (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether
Assessn and will	nent o be an		utes) often assessment will l nder observance of Sec	•		
Allocati	on of p	olaces				
Only as	part of	f pool of general key sl	kills (ASQ): 15 places. P	laces will be allocate	ed by lot.	
		ormation				
Workloa	ad					
Teachin	g cycl	9				
Referred	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	appea	rs in				
Bachelo Bachelo	or' degi or' degi	ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Nanostru ee (1 major) Physics (2)	2012) Sture Technology (2012))		
Bachelor's w	vith 1 maj	or Physics (2012)		urg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 52 / 229



Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) FOKUS Physics (2011) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 53 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation			
Labora	atory an	d Measurement Techno	ology		11-A3-072-m01			
Modul	e coord	inator		Module offered by				
		ector of the Institute of A	Applied Physics					
			T T	Faculty of Physics and Astronomy				
ECTS	1	od of grading	Only after succ. con	npl. of module(s)				
6		rical grade						
Duratio	on	Module level	Other prerequisites	Other prerequisites				
1 semester undergraduate			Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admis- sion to assessment. The lecturer will inform students about the respecti- ve details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be ad- mitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
Conten	nts			cosment unew.				
		o electronic and optical cs, light sources, specti				y and cryoge-		
		ning outcomes	<u> </u>					
cal met red val Course	trology lue acq es (type, r	have acquired the follow , cryogenics and vacuur uisition. number of weekly contact hours rmation on SWS (weekly	n technology, cryogeni , language — if other than Gen	cs, light sources, sp	ectroscopic method			
		Sessment (type, scope, langu Ile for bonus)	uage — if other than German,	examination offered — if no	t every semester, informat	ion on whether		
written	n exami	nation (approx. 120 min	utes)					
Allocat	tion of	olaces						
		f pool of general key sk	ills (ASO): 15 places. P	laces will be allocate	ed by lot.			
		ormation						
Worklo	oad							
Teachi	ing cycl	e						
		Referred to in LPO I (examination regulations for teaching-degree programmes)						
 Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)				
 Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	nmmes)				
	ed to in e appea		ns for teaching-degree progra	immes)				
 Module	e appea			nmmes)				
 Modul e Bachel	e appea lor' deg	ars in	007)	ımmes)				
 Module Bachel Bachel	e appea lor' deg lor' deg	a rs in ree (1 major) Physics (2	007) 010)	ımmes)				
 Modul Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg	a rs in ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Physics (2	007) 010) 009) 012)	ımmes)				
 Module Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg lor' deg	ars in ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Physics (2	007) 010) 009) 012) 008)					
 Module Bachel Bachel Bachel Bachel Bachel	e appea lor' deg lor' deg lor' deg lor' deg lor' deg lor' deg	a rs in ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Physics (2	007) 010) 009) 012) 008)					

Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Nanostructure Technology (2008) Bachelor' degree (1 major) Nanostructure Technology (2007) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 55 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation	
Reprod	lucing	Sensors in Infrared			11-ASI-092-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of	Applied Physics	plied Physics Faculty of Physics and Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
3	nume	rical grade				
Duratio	on	Module level	Other prerequisites	;		
1 semester undergraduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Contents						
range of up to m from bo sical op types of of neur Intendo The stu techno	of infrar nicrowa odies w ptics of of senso rophysi ed learn idents l logies a	ed ranges from the vis ves and radiowaves w ith ambient temperatu this spectral range an ors (bolometer, quantu ological aspects. hing outcomes have specific and adva and detector structures	erimental and technical ible spectrum, where the ith artificial emitters. The ure in the infrared spect d discusses: Peculiariti m well, superlattice) as noted knowledge in the s as well as their applic	ne Sun is dominating nere is distinct and s rum. The lecture pro- es of infrared camera well as the evaluati field of infrared spec- ation areas.	as the natural source ometimes dominatir vides an introduction as and thermal imag on of such sensors o	ce of light, ng emission n to the phy- res, different on the basis
			rs, language — if other than Ger		abla)	
			ly contact hours) and co			•
		le for bonus)	guage — if other than German,	examination offered — if no	ot every semester, information	on on whether
groups project (approz Assess and wil examir	(appro report x. 30 m ment o Il be an nation r	x. 30 minutes per cano (approx. 8 to 10 pages inutes) ffered: When and how	ninutes) or b) oral exam didate, for modules with a, time to complete: 1 to often assessment will l under observance of Sec inglish	h less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	edits approx. 20 mir entation/seminar pre on the method of ass	nutes) or c) esentation sessment
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
 Worklo Teachin	ad ng cycl	e				
Bachelor's	with 1 ma	or Physics (2012)		ırg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 56 / 229

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 57 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	Module title Abbreviation							
Applied	d Super	rconduction			11-ASL-092-m01			
Module	e coord	inator		Module offered by				
Manag	ing Dire	ector of the Institute of	Applied Physics	oplied Physics Faculty of Physics and Astronomy				
ECTS Method of grading		Only after succ. con	npl. of module(s)					
6	nume	rical grade						
Duratio	on	Module level	Other prerequisites	Other prerequisites				
		sessment. The lecture at the beginning of sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment i sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
Conten	ts							
			vity. Application in ene alculation of temperatu			ents. Me-		
Intende	ed lear	ning outcomes						
are abl able to energy Course R + V (r Methoo module is a) writt in grou c) proje prox. 3	The students have a basic understanding of superconductivity as a macroscopic quantum phenomenon. They are able to evaluate the contributions of materials sciences to the development of superconductivity. They are able to discuss questions on superconductivity in a scientific manner and to critically question developments of energy technology. Furthermore, they can deal with practical mathematical questions. Courses (type, number of weekly contact hours, language – if other than German) R + V (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: once a year, winter semester					y. They are elopments of ion on whether amination ninutes) or		
Allocat		· · · · ·						
Additio	onal inf	ormation						
Worklo	ad							
Teachi	ng cycl	е						
Referre	d to in	LPO I (examination regulat	ions for teaching-degree progra	ammes)				
Module	Module appears in							
Bachel	or' deg	ree (1 major) Physics (2	2010)					
Bachelor's	achelor's with 1 major Physics (2012) JMU Würzburg • generated 26-Aug-2024 • exam. page 58 / reg. data record Bachelor (180 ECTS) Physik - 2012				page 58 / 229			

Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 59 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	Module title Abbreviation					
Principles of Image Processing					11-EBV-092-m01	
Module coordinator				Module offered by		
Managing Director of the Institute of Ap		oplied Physics	Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
3	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester undergraduate		undergraduate	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts					
transfo tic imag tracking	rm. His ge reco g). Thre	togram equalisation (e.g	. image brightening)	and pixel connectivi	ation. Two-dimensional Fourier ty (e.g. noise reduction). Automa- ttion. Applications (e.g. motion	
and the	eory of	signal processing for ima	ges and have corresp	oonding knowledge (ssing. They know the principles of image generation. They are ab-	
					mage processing with commerci- imaging measuring methods.	
Course	S (type, r	umber of weekly contact hours, l	anguage — if other than Ger	rman)		
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)	
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
groups	(appro report	x. 30 minutes per candid (approx. 8 to 10 pages, t	ate, for modules with	n less than 4 ECTS cr	date each or oral examination in edits approx. 20 minutes) or c) entation/seminar presentation	
and wil	l be an				on the method of assessment 3 ASPO (general academic and	
		ssessment: German, Eng	lish			
Allocat	ion of p	olaces				
Additio	Additional information					
<u></u>						
Worklo	ad					
Teachi	ng cycl	9				

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 60 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 61 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Bachelor's with 1 major Physics (2012)

Module	Module title Abbreviation					
Princip	les of E	nergy Technologies			11-ENT-092-m01	
Module	e coord	inator		Module offered by		
Managing Director of the Institute of Ap		oplied Physics	Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
۱ semester ۽		graduate	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts					
as rene ting ma studen verters Electric	wable aterials ts. Ene . Nucle ity. Bio	resources of energy. We a , selective layers, highly a rgy conservation via ther	also discuss aspects activated carbons). Th mal insulation. Therm ectricity. Wind turbing	of optimising materi he course is especia hodynamic energy ef es. Photovoltaics. So	port and energy storage as well fals (e.g. nanostructured insula- lly suitable for teaching degree ficiency. Fossil fired energy con- plar thermal: Heat. Solar thermal:	
			ferent methods of en	ergy technology, esp	pecially energy conversion, trans-	
					and are able to compare them.	
-		umber of weekly contact hours, l				
R + V (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)	
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
groups project (approz Assess and wil examin	a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.					
Allocat	<u> </u>	ssessment: German, Eng blaces				
Additio	nal inf	ormation				
Worklo	Workload					
Teachi	ng cycl	e				

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Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Functional Materials (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 63 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Introduction to Plasmaphysics					11-EPP-092-m01
Module	e coord	inator		Module offered by	I
	ing Dire	ector of the Institute of	f Theoretical Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con	npl_of_module(s)	
6	1	rical grade			
Duratio		Module level	Other prerequisites	6	
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts	<u>.</u>			
Transp thin the	ort equ e solar	ations for energetic pa wind, Particle accelera	articles, Properties of m	agnetic turbulence, I nd via interaction wi	elds, Magnetohydrodynamics, Propagation of solar particles wi- th plasma turbulence, Particle ac diation.
Intend	ed lear	ning outcomes			
					of transport phenomena in plas- knowledge to Astrophysics.
Course	S (type, r	number of weekly contact hou	rs, language — if other than Ge	rman)	
V + R (r	no infor	mation on SWS (week	ly contact hours) and co	ourse language avail	lable)
		Sessment (type, scope, lan le for bonus)	guage — if other than German,	examination offered — if no	ot every semester, information on whether
groups project (appro: Assess and wil examin	(appro report x. 30 m ment o Il be an nation r	ox. 30 minutes per can (approx. 8 to 10 pages inutes) ffered: When and how	didate, for modules wit s, time to complete: 1 to often assessment will under observance of Se	h less than 4 ECTS co 9 4 weeks) or d) preso be offered depends	idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	ion of	places			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
 Poforra	d to in	IPOL (overrighting source)	tions for teaching-degree progra	ammac)	
		LEVE (examination regula	tions for teaching-degree progra	ammes)	
Bachelor's	with 1 ma	jor Physics (2012)	IMU Würzbı	urg • generated 26-Aug-2024	• exam. page 64 / 229
		, , ,		ord Bachelor (180 ECTS) Phys	

Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 65 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation	
Semico	onduct	or Lasers - Principles	and Current Research		11-HLF-092-m01	
Module coordinator				Module offered by		
Manag	ing Dir	ector of the Institute o	f Applied Physics	Faculty of Physics a	and Astronomy	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester		ter graduate Certain prerequisites must be met to qualify for ad sessment. The lecturer will inform students about at the beginning of the course. Registration for the sidered a declaration of will to seek admission to a dents have obtained the qualification for admissio the course of the semester, the lecturer will put the sessment into effect. Students who meet all prerec- ted to assessment in the current or in the subsequi sessment at a later date, students will have to obt		ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- te subsequent semester. For as-		
Conter			admission to assess		semiconductor lasers, and cur-	
riers ar des, la ductor cade la Intend The stu	nd phot ser res lasers. asers, t ed lear udents	tons. Other topics of t onators, mode selecti . The lecture closes wi erahertz lasers or high ning outcomes have advanced knowl	he lecture are optical pro on, dynamic properties a th current topics of laser n-performance lasers.	ocesses in semiconc as well as technolog research such as qu semiconductor-lase	ed rate equations for charge car- luctors, layer and ridge wavegui- y for the generation of semicon- uantum dot lasers, quantum cas- er physics. They can apply their	
		· · ·	urs, language — if other than Ger		opment of components.	
	_		kly contact hours) and co		able)	
Metho	d of as		•		ot every semester, information on whether	
groups project (appro Assess and wi examir	(appro report x. 30 m ment o Il be ar nation r	ox. 30 minutes per car (approx. 8 to 10 page linutes) offered: When and hov	ndidate, for modules with s, time to complete: 1 to v often assessment will h under observance of Sec	n less than 4 ECTS ci 4 weeks) or d) prese pe offered depends	idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and	
Allocat	ion of	places				
Additio	onal inf	ormation				
 Worklo	ad					

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.		
	reg. data record Bachelor (180 ECTS) Physik - 2012		

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Referred to In LPO I (examination regulations for teaching-degree programmes)				
Module appears in				
Bachelor' degree (1 major) Physics (2010)				
Bachelor' degree (1 major) Physics (2012)				
Bachelor' degree (1 major) Nanostructure Technology (2010)				
Bachelor' degree (1 major) Nanostructure Technology (2012)				
Master's degree (1 major) Mathematics (2012)				
Master's degree (1 major) Physics (2010)				
Master's degree (1 major) Physics (2011)				
Master's degree (1 major) Nanostructure Technology (2011)				
Master's degree (1 major) Nanostructure Technology (2010)				
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)				
Master's degree (1 major) FOKUS Physics (2010)				
Master's degree (1 major) FOKUS Physics (2011)				
Master's degree (1 major) Computational Mathematics (2012)				
Master's degree (1 major) Functional Materials (2012)				

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 67 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation		
Principles of Classification of Patterns			11-KVM-092-m01			
Module coordinator			Module offered by			
Managing Director of the Institute of App		Applied Physics	ed Physics Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)		
3	nume	rical grade				
Duratio	n	Module level	Other prerequisites	i		
1 semester undergraduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts					
terns. T More a	[.] hese p nd mor	atterns are often class e automatic procedure	oustic records, spectra, ified and analysed by o is are adopted to take o fiers such as "minimum	bservers, e.g. by a d on these tasks and cl	octor when analysin assify patterns. The	g an ECG.
Intende	ed leari	ning outcomes				
classify these n	ving pat nethod	tterns in measuring da s to practical problems		itomatise these proc		
	Courses (type, number of weekly contact hours, language – if other than German) V + R (no information on SWS (weekly contact hours) and course language available)					
			guage — if other than German,			on on whother
		le for bonus)	guage — II other than German,		t every semester, mormati	on on whether
a) written examination (90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.						
Language of assessment: German, English						
Allocation of places						
Additional information						
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Bachelor's	with 1 maj	or Physics (2012)		ırg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 68 / 229

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 69 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	1

Module title Ab				Abbreviation			
Organi	Organic Semiconductor 11-OHL-092-m01						
Module coordinator				Module offered by			
Managing Director of the Institute of Ap		Applied Physics	Faculty of Physics a	nd Astronomy			
ECTS	Methe	od of grading	Only after succ. cor	Only after succ. compl. of module(s)			
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 semester graduate		50% of exercises. C sion to assessment ve details at the beg be considered a det students have obta over the course of the assessment into eff mitted to assessment assessment at a lat	Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admis- sion to assessment. The lecturer will inform students about the respecti- ve details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be ad- mitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.				
Conten	ts						
Physica cations	•	iples of organic semic	onductors, molecular a	nd polymer electroni	cs and sensor techn	ology, appli-	
Intende	ed lear	ning outcomes					
The stu	Idents	have advanced knowle	edge of organic semicor	nductors.			
Course	S (type, r	number of weekly contact hou	rs, language — if other than Ge	rman)			
V + Ü (r	no info	rmation on SWS (week	ly contact hours) and co	ourse language avail	able)		
		sessment (type, scope, lan le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informati	ion on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)							
Allocation of places							
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Technology of Functional Materials (2010)							
Bachelor's	with 1 ma	jor Physics (2012)		urg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 70 / 229	
						A	

Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2012)

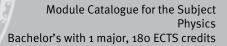
Module title			Abbreviation		
Thermodynamics and Economics			11-TDOE-141-m01		
Module coordinator				Module offered by	
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy and Astrophysics			nd Astronomy		
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)	
3	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	graduate			
Conten	ts				
Part I de folding of the s ropy pro mic gro Part 2 a econom ve labo and cos cial ten Part 3 in use, an Intende The stu in the w connec mies. TI NOTE: t	Energy and economic growth, entropy production, emission reduction. Part I describes the role of energy conversion in the development of the universe, the evolution of life and the un- folding of civilisation. The entropy production density of non-equilibrium thermodynamics shows the relevance of the second law of thermodynamics for ecological damage and resource consumption. Energy conversion, ent- ropy production and natural resources define the technological and ecological boundaries of industrial econo- mic growth. Part 2 analyses how the factors capital, work, energy and creativity produce the goods and services of a national economy and determine economic growth. The productive power of cheap energy by far exceeds that of expensi- ve labour. Within the current system of taxes and social security contributions, this discrepancy between power and costs of production factors leads to job cuts, waste of resources, impoverishment of nations and growing so- cial tensions. The course discusses how factor income taxation can counteract this development. Part 3 includes seminar presentations, comprises the techniques of rational energy use and non-fossil energy use, and introduces the optimisation programme deeco (Dynamic Energy, Emission and Cost Optimization). Intended learning outcomes The students understand that energy conversion and entropy production are going to play an important role in the world's economic and social development. As an extension of economic theory, the students know the connections between thermodynamics and economy as well as the productive physical basis of modern econo- mies. They are able to apply the acquired knowledge to particular problems. NOTE: this is the module that was run by Prof. Dr. R. Kümmel, who has now retired. As the module was tailored to his own theory of economy, it has yet to be decided whether we will continue to offer this module.				
Courses (type, number of weekly contact hours, language — if other than German)					
		ion on SWS (weekly cont			
		s essment (type, scope, languag le for bonus)	ge — if other than German, o	examination offered — if no	t every semester, information on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)					
Allocation of places					
Additional information					
Worklo	Workload				
Teachir	ng cycl	9			
Referred to in LPO I (examination regulations for teaching-degree programmes)					

Bachelor's with 1 major Physics (2012)	JMU Würzburg ● generated 26-Aug-2024 ● exam.	page 72 / 229
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Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 73 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

	e title				Abbreviation	
Astronomical Methods				11-ASM-131-m01		
Module coordinator			Module offered by			
	ing Dir	ector of the Institute of	f Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)		
6		rical grade				
Duratio	on	Module level	Other prerequisites	i		
1 seme	ster	graduate	sessment. The lectu at the beginning of sidered a declaration dents have obtained the course of the se sessment into effec ted to assessment i	requisites must be met to qualify for admission to as- The lecturer will inform students about the respective det aning of the course. Registration for the course will be con eclaration of will to seek admission to assessment. If stu obtained the qualification for admission to assessment of the semester, the lecturer will put their registration for noto effect. Students who meet all prerequisites will be ad assment in the current or in the subsequent semester. For t a later date, students will have to obtain the qualification		ctive details ill be con- nt. If stu- ssment over ation for as- rill be admit- ster. For as-
Conten	its	<u> </u>	•			
			y across the electromag and gamma-ray telesco		action and reduction	n of observa-
Intend	ed lear	ning outcomes				
dio, op	otical, X		servational astronomy nergies). Knowledge of j ervations.			
	-		rs, language — if other than Ge			
,		· · · · · · · · · · · · · · · · · · ·	ly contact hours) and co		•	
		sessment (type, scope, lan ole for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
	ps (apj	prox. 30 minutes per c	minutes) or b) oral exam andidate) or c) project r			
weeks) Assess and wi examir	ment o Il be an nation r	offered: When and how	presentation (approx. 36 often assessment will l under observance of Se English	o minutes) be offered depends (sessment
weeks) Assess and wi examir	ment o Il be an nation r age of a	offered: When and how mounced in due form regulations) 2009. Issessment: German, B	often assessment will under observance of Se	o minutes) be offered depends (sessment
weeks) Assess and wi examir Langua	ment o Il be an nation r age of a	offered: When and how mounced in due form regulations) 2009. Issessment: German, B	often assessment will under observance of Se	o minutes) be offered depends (sessment
weeks) Assess and wil examin Langua Allocat	ment of Il be an nation r age of a ion of	offered: When and how mounced in due form regulations) 2009. Issessment: German, B	often assessment will under observance of Se	o minutes) be offered depends (sessment
weeks) Assess and wil examin Langua Allocat	ment of Il be an nation r age of a ion of	offered: When and how mounced in due form regulations) 2009. assessment: German, I places	often assessment will under observance of Se	o minutes) be offered depends (sessment
weeks) Assess and wil examin Langua Allocat Additic	ment o Il be an nation r age of a :ion of	offered: When and how mounced in due form regulations) 2009. assessment: German, I places	often assessment will under observance of Se	o minutes) be offered depends (sessment
weeks) Assess and wil examin Langua Allocat Additic Worklo	ment o Il be an nation r age of a cion of p onal inf	offered: When and how inounced in due form regulations) 2009. issessment: German, B places	often assessment will under observance of Se	o minutes) be offered depends (sessment
weeks) Assess and wil examin Langua Allocat Additio	ment o Il be an nation r age of a cion of p onal inf	offered: When and how inounced in due form regulations) 2009. issessment: German, B places	often assessment will under observance of Se	o minutes) be offered depends (sessment
weeks) Assess and wil examin Langua Allocat Additio Worklo Teachin 	ment o Il be an nation r age of a ion of p onal inf pad	offered: When and how mounced in due form regulations) 2009. Issessment: German, B places	often assessment will under observance of Sec	o minutes) be offered depends o ction 32 Subsection		sessment
weeks) Assess and wil examin Langua Allocat Additio Worklo Teachin 	ment o Il be an nation r age of a ion of p onal inf pad	offered: When and how mounced in due form regulations) 2009. Issessment: German, B places	often assessment will under observance of Se	o minutes) be offered depends o ction 32 Subsection		sessment
weeks) Assess and wil examin Langua Allocat Additio Worklo Teachin Referre	ment o Il be an nation r age of a ion of p onal inf pad	offered: When and how mounced in due form regulations) 2009. Issessment: German, B places formation	often assessment will under observance of Sec	o minutes) be offered depends o ction 32 Subsection		sessment



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 75 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Thorm	Module title				Abbreviation	
Thermodynamics and Economics				11-TDO-092-m01		
Module coordinator				Module offered by		
	ging Dir strophy	ector of the Institute of sics	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
6	nume	erical grade		•		
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective at the beginning of the course. Registration for the course will be sidered a declaration of will to seek admission to assessment. If dents have obtained the qualification for admission to assessme the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites will be ted to assessment in the current or in the subsequent semester. If sessment at a later date, students will have to obtain the qualific		ctive details vill be con- ent. If stu- essment over ation for as- vill be admit- ester. For as-	
Conter	nts		admission to asses			
fine th	e techn	mage and resource con nological and ecological	sumption. Energy conv l boundaries of industr	ial economic growth	luction and natural ı . Part 2 analyses hov	resources de w the factors
fine the capital nomic system tors lea discus compri	e techn l, work, growth n of taxe ads to j ses how ises the	mage and resource con	sumption. Energy conv l boundaries of industr produce the goods and of cheap energy by far contributions, this discr urces, impoverishment on can counteract this d l energy use and non-fo	rersion, entropy proc ial economic growth services of a nationa exceeds that of exp epancy between pow of nations and growi evelopment. Part 3 i ossil energy use, and	luction and natural n . Part 2 analyses how al economy and dete ensive labour. Withi wer and costs of pro ing social tensions. ncludes seminar pre	resources de w the factors ermine eco- n the current duction fac- The course esentations,
fine the capital nomic system tors lea discus compri gramm	e techn l, work, growth n of taxe ads to j ses how ises the ne deec	mage and resource con hological and ecological energy and creativity p i. The productive power es and social security c hob cuts, waste of resour w factor income taxatio e techniques of rational	sumption. Energy conv l boundaries of industr produce the goods and of cheap energy by far contributions, this discr urces, impoverishment on can counteract this d l energy use and non-fo	rersion, entropy proc ial economic growth services of a nationa exceeds that of exp epancy between pow of nations and growi evelopment. Part 3 i ossil energy use, and	luction and natural n . Part 2 analyses how al economy and dete ensive labour. Withi wer and costs of pro ing social tensions. ncludes seminar pre	resources de w the factors ermine eco- n the current duction fac- The course esentations,
fine the capital nomic system tors lea discus compri gramm Intend The stu in the v connec mies. 1 NOTE:	e techn l, work, growth n of tax ads to j ses hou ises the ne deec ed lear udents world's ctions b They ar this is	mage and resource con hological and ecological energy and creativity p i. The productive power es and social security c job cuts, waste of resour w factor income taxatio e techniques of rational to (Dynamic Energy, Em	sumption. Energy conv l boundaries of industri produce the goods and of cheap energy by far contributions, this discr urces, impoverishment on can counteract this d l energy use and non-fo ission and Cost Optimi y conversion and entrop levelopment. As an exter ics and economy as we uired knowledge to par n by Prof. Dr. R. Kümme	rersion, entropy prod ial economic growth services of a national exceeds that of expe epancy between pow of nations and growi evelopment. Part 3 i possil energy use, and zation).	luction and natural n . Part 2 analyses how al economy and deter ensive labour. Within wer and costs of pro- ing social tensions. The ncludes seminar pre- introduces the option ing to play an import cheory, the students obysical basis of mo- ed. As the module w	resources de w the factors ermine eco- n the current duction fac- The course esentations, misation pro tant role know the odern econo-
fine the capital nomic system tors lea discus compri gramm Intend The stu in the connec mies. T NOTE: his ow	e techn l, work, growth n of tax ads to j ses hou ises the ne deec ed lear udents world's ctions to They are this is n theor	mage and resource con hological and ecological energy and creativity p i. The productive power es and social security c job cuts, waste of resour w factor income taxatio e techniques of rational to (Dynamic Energy, Em ming outcomes understand that energy economic and social d between thermodynami e able to apply the acqu the module that was ru	sumption. Energy conv l boundaries of industri produce the goods and of cheap energy by far contributions, this discr arces, impoverishment on can counteract this d l energy use and non-fo ission and Cost Optimi y conversion and entrop levelopment. As an exter ics and economy as we uired knowledge to par n by Prof. Dr. R. Kümme it to be decided whethe	rersion, entropy proc ial economic growth services of a national exceeds that of expre- epancy between pow of nations and growi evelopment. Part 3 i ossil energy use, and zation).	luction and natural n . Part 2 analyses how al economy and deter ensive labour. Within wer and costs of pro- ing social tensions. The ncludes seminar pre- introduces the option ing to play an import cheory, the students obysical basis of mo- ed. As the module w	resources de w the factors ermine eco- n the current duction fac- The course esentations, misation pro- tant role know the odern econo-
fine the capital nomic system tors lea discus compri gramm Intend The stu in the v connec mies. T NOTE: his ow Course R + V (1	e techn l, work, growth n of tax ads to j ses hou ises the ne deec ed lear udents world's ctions b They aru this is n theor es (type, no info	mage and resource con hological and ecological energy and creativity p b. The productive power es and social security c job cuts, waste of resour w factor income taxatio e techniques of rational to (Dynamic Energy, Em ming outcomes understand that energy economic and social d between thermodynami e able to apply the acquit the module that was run y of economy, it has ye number of weekly contact hour rmation on SWS (weekly	sumption. Energy conv l boundaries of industri produce the goods and of cheap energy by far contributions, this discr arces, impoverishment on can counteract this d l energy use and non-fo ission and Cost Optimi y conversion and entrop levelopment. As an exter ics and economy as we uired knowledge to par n by Prof. Dr. R. Kümme to be decided whethe rs, language — if other than Gen by contact hours) and co	rersion, entropy proc ial economic growth services of a national exceeds that of expre- epancy between pow of nations and growi evelopment. Part 3 i ossil energy use, and zation). by production are go ension of economic t ll as the productive p ticular problems. el, who has now retirer or we will continue to rman)	luction and natural n . Part 2 analyses how al economy and deter ensive labour. Withi wer and costs of pro- ing social tensions. The ncludes seminar pre- introduces the option ing to play an impor- cheory, the students obysical basis of mo- ed. As the module w offer this module. able)	resources de w the factors ermine eco- n the current duction fac- The course esentations, misation pro- tant role know the odern econo- vas tailored t
fine the capital nomic system tors lea discus compri gramm Intend The stu in the v connec mies. T NOTE: his ow Course R + V (I Metho	e techn l, work, growth n of tax ads to j ses hou ises the ne deec ed lear udents world's ctions k They ard this is n theor es (type, no info	mage and resource con hological and ecological energy and creativity p b. The productive power es and social security c job cuts, waste of resour w factor income taxatio e techniques of rational to (Dynamic Energy, Em ning outcomes understand that energy economic and social d between thermodynami e able to apply the acquit the module that was run y of economy, it has ye	sumption. Energy conv l boundaries of industri produce the goods and of cheap energy by far contributions, this discr arces, impoverishment on can counteract this d l energy use and non-fo ission and Cost Optimi y conversion and entrop levelopment. As an exter ics and economy as we uired knowledge to par n by Prof. Dr. R. Kümme to be decided whethe rs, language — if other than Gen by contact hours) and co	rersion, entropy proc ial economic growth services of a national exceeds that of expre- epancy between pow of nations and growi evelopment. Part 3 i ossil energy use, and zation). by production are go ension of economic t ll as the productive p ticular problems. el, who has now retirer or we will continue to rman)	luction and natural n . Part 2 analyses how al economy and deter ensive labour. Withi wer and costs of pro- ing social tensions. The ncludes seminar pre- introduces the option ing to play an impor- cheory, the students obysical basis of mo- ed. As the module w offer this module. able)	resources de w the factors ermine eco- n the current duction fac- The course esentations, misation pro- tant role know the odern econo- vas tailored t
fine the capital nomic system tors lea discus compri gramm Intend The stu in the v connec mies. T NOTE: his ow Course R + V (i Metho module i a) writt groups project (appro Assess and wi examin	e techn l, work, growth n of tax ads to j ses hov ises the e deec ed lear udents world's ctions b They are this is f n theor es (type, no info d of ass is creditat ten exa s (approt t report x. 30 m sment c ill be ar nation i	mage and resource con hological and ecological energy and creativity p i. The productive power es and social security c job cuts, waste of resour w factor income taxatio e techniques of rational to (Dynamic Energy, Em ming outcomes understand that energy economic and social d between thermodynami e able to apply the acquit the module that was run y of economy, it has yee number of weekly contact hour rmation on SWS (weekling sessment (type, scope, lang	Isumption. Energy conv l boundaries of industri produce the goods and of cheap energy by far contributions, this discr arces, impoverishment in can counteract this d l energy use and non-fo ission and Cost Optimi y conversion and entrop levelopment. As an exter ics and economy as we uired knowledge to par n by Prof. Dr. R. Kümme it to be decided whethe rs, language – if other than Ger y contact hours) and co guage – if other than German, ininutes) or b) oral exam- didate, for modules with t, time to complete: 1 to often assessment will l under observance of Sec	rersion, entropy prod ial economic growth services of a national exceeds that of expe epancy between pow of nations and growi evelopment. Part 3 i possil energy use, and zation). by production are go ension of economic t ll as the productive p ticular problems. el, who has now retir rr we will continue to rman) purse language avail examination offered — if no h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	luction and natural n . Part 2 analyses how al economy and deter ensive labour. Withi wer and costs of pro- ing social tensions. The ncludes seminar pre- introduces the option ing to play an impore theory, the students obysical basis of mo- ed. As the module wo offer this module. able) of every semester, information idate each or oral ex- redits approx. 20 mi- entation/seminar pre- on the method of as	resources de w the factors ermine eco- n the current duction fac- The course esentations, misation pro- tant role know the odern econo- vas tailored t tion on whether camination ir nutes) or c) resentation sessment

Allocation of places

Additional information

--

Workload

--

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

--

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 77 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation		
Principles of two- and threedimensional Röntgen imag			ng	11-ZDR-111-m01	_	
Module coordinator				Module offered by		
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	and Astronomy	
ECTS Method of grading Only after succ.		Only after succ.	compl. of module(s)			
6	nume	rical grade				
Duratio	on	Module level	odule level Other prerequisites			
sessment. The l at the beginning sidered a declar dents have obta the course of th sessment into e ted to assessme		sessment. The le at the beginning sidered a declara dents have obtai the course of the sessment into ef ted to assessment	sites must be met to que ecturer will inform stude of the course. Registra- ation of will to seek adr ined the qualification for e semester, the lecturer fect. Students who mee nt in the current or in the ter date, students will h sessment anew.	ents about the respe tion for the course w nission to assessme or admission to asse will put their registra et all prerequisites w ne subsequent seme	ctive details vill be con- ent. If stu- essment over ation for as- vill be admit- ester. For as-	
Conter	nts					
project traction characc Intende The stu technice Course V + R (r Metho module is a) writt groups project (appro. Assess and wi	tion, Fo n, visua terisati ed learn udents l ques us to infor d of ass s creditab ten exal t (approt t report x. 30 m sment o ll be an	urier reconstruction, ite ilisation,). Application on, metrology, biology, ning outcomes (now the principles of ing X-rays and method (number of weekly contact hour mation on SWS (weekl (type, scope, lang le for bonus) mination (approx. 90 m x. 30 minutes per cance (approx. 8 to 10 pages inutes) (ffered: When and how	erative methods). Im ons of X-ray imaging). Radiation prote generating X-rays ar s of image processi s, language – if other than y contact hours) and guage – if other than Germ ninutes) or b) oral ex lidate, for modules y , time to complete:	Mathematics of reconstr hage processing (image in the industrial sector fection and biological ra- and of their interactions with as well as application an, examination offered — if mission (amination of one cand with less than 4 ECTS co 1 to 4 weeks) or d) pres- will be offered depends Section 32 Subsection	data pre-processing (component testing diation effect (dose, with matter. They kno on areas of these me lable) ot every semester, informat idate each or oral ex redits approx. 20 mi entation/seminar pr on the method of as	g, feature ex- g, material). ow imaging thods. tion on whether camination in nutes) or c) resentation sessment
	tion of p					
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
 Referre	ed to in	LPOI (examination regulati	ons for teaching-degree pr	rogrammes)		
Bachelor's	with 1 ma	or Physics (2012)		irzburg • generated 26-Aug-2024 a record Bachelor (180 ECTS) Phy:		page 78 / 229

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2012) Master's degree (1 major) FOKUS Physics (2012) Master's degree (1 major) FOKUS Physics (2006)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 79 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title Abbreviation				Abbreviation
Current Topics in Experimental Physics				11-BXE5-112-m01
Module coordinator		Module offered by		
chairperson c	of examination committee		Faculty of Physics a	ind Astronomy
ECTS Meth	od of grading	Only after succ. com	npl. of module(s)	
5 nume	erical grade			
Duration	Module level	Other prerequisites		
1 semester	undergraduate	Approval by examin	ation committee req	uired.
Contents				
Current topics or study abro		. Accredited academi	c achievements, e.g	. in case of change of university
Intended lear	ning outcomes			
sics of the Ba understand tl	chelor's programme. They	y have knowledge of a uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Method of as module is credital		ge — if other than German, e	examination offered — if no	ot every semester, information on whether
in groups (ap weeks) or d) j		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocation of		. –		
Additional in	formation			
Workload				
Teaching cyc	le			
		·		
Referred to in	LPOI (examination regulation	s for teaching-degree progra	mmes)	
Module appe	ars in			
-	gree (1 major) Physics (20			
Bachelor' deg	gree (1 major) Physics (20	12)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 80 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation
Current Topics in Experimental Physics				11-BXE6-112-m01
Module coordinator		Module offered by		
chairperson o	f examination committee		Faculty of Physics a	ind Astronomy
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)	
6 nume	rical grade			
Duration	Module level	Other prerequisites		
1 semester	undergraduate	Approval by examin	ation committee req	uired.
Contents				
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or
Intended lear	ning outcomes			
sics of the Ba understand th	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether
in groups (ap weeks) or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocation of	places			
Additional inf	ormation			
Workload				
Teaching cycl	le			
Referred to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module appea	ars in			
-	ree (1 major) Physics (20			
Bachelor' deg	ree (1 major) Physics (20:	12)		

Module title Abbreviation				Abbreviation	
Current Topics in Experimental Physics				11-BXE8-112-m01	
Module coordinator		Module offered by			
chairperson o	of examination committee		Faculty of Physics a	ind Astronomy	
ECTS Meth	od of grading	Only after succ. com	npl. of module(s)		
8 nume	erical grade				
Duration	Module level	Other prerequisites			
1 semester	undergraduate	Approval by examin	ation committee req	uired.	
Contents					
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or	
Intended lear	ning outcomes				
sics of the Ba understand t	chelor's programme. They	y have knowledge of a uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to	
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
Method of as module is credita		ge — if other than German, e	examination offered — if no	ot every semester, information on whether	
in groups (ap weeks) or d)		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4	
Allocation of	places				
Additional in	formation				
Workload					
Teaching cyc	Teaching cycle				
		·			
Referred to in	LPOI (examination regulation	s for teaching-degree progra	mmes)		
Module appe	ars in				
	gree (1 major) Physics (20				
Bachelor' deg	gree (1 major) Physics (20	12)			

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 82 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Curren	t Topic	s in Theoretical Physics			11-BXT5-112-m01
Module	e coord	inator		Module offered by	
chairpe	erson o	f examination committee	1	Faculty of Physics a	nd Astronomy
ECTS	Meth	od of grading	Only after succ. compl. of module(s)		
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a	•	in Theoretical Physics. C	redited academic ac	hievements, e.g. in c	ase of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project reservation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat					
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Module	title				Abbreviation
Current	Topics	s in Theoretical Physics		11-BXT6-112-m01	
Module	coord	inator		Module offered by	
chairper	rson of	fexamination committee		Faculty of Physics a	ind Astronomy
ECTS	Metho	od of grading	Only after succ. compl. of module(s)		
6	nume	rical grade			
Duration	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Content	S				
Current study at	•	of Theoretical Physics. A	ccredited academic a	achievements, e.g. ir	n case of change of university or
Intende	d learr	ning outcomes			
sics of t Physics	he Bao and h	chelor's programme. They	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Courses	i (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + R (no	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		e essment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
in group weeks) (os (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 10	lidate each or oral examination o pages, time to complete: 1 to 4
Allocati	on of p	olaces			
Additior	nal info	ormation			
Workloa	ad				
Teachin	g cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	appea	in			
	-	ree (1 major) Physics (20:			
Bachelo	or' deg	ree (1 major) Physics (202	12)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 84 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Current	t Topic	s in Theoretical Physics			11-BXT8-112-m01
Module	e coord	inator		Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	Only after succ. compl. of module(s)	
8	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a		of Theoretical Physics. A	Accredited academic a	achievements, e.g. ir	n case of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	t every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat			0		
			-		
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Module title				Abbreviation			
Image	and Sig	gnal Processing in Phy	sics		11-BSV-122-m01		
Module	e coord	inator		Module offered by			
Manag	ing Dire	ector of the Institute of	Applied Physics	pplied Physics Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
6	nume	rical grade					
Duration Module level		Other prerequisites					
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.				
Conten	ts						
and im convolu getic ol transfo Intende The stu- les of in ferent r Course V + R (r Methoo module is a) writt (approx d) pres Assess	Contents Periodic and aperiodic signals; principles of discreet and exact Fourier transformation; principles of digital signal and image processing; discretisation of signals/sampling theorem (Shannon); homogeneous and linear filters, convolution product; tapering functions and interpolation of images; the Parsival theorem, correlation and energetic observation; statistical signals, image noise, moments, stationary signals; tomography: Hankel and Radom transformation. Intended learning outcomes Intended learning outcomes The students have advanced knowledge of digital image and signal processing. They know the physical principles of image processing and are familiar with different methods of signal processing. They are able to explain different methods and to implement them, especially in the field of tomography. Courses (type, number of weekly contact hours, language – if other than German) V + R (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) a) written examination (go minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and section and examine and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general ac				near filters, on and ener- el and Radon sical princip- to explain dif- ion on whether on in groups o 4 weeks) or sessment		
Allocat							
Additio	nal inf	ormation					
Workload							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
L							
Bachelor's	with 1 ma	jor Physics (2012)		rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 86 / 229	

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 87 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation		
Image	and Sig	nal Processing in Phy	sics		11-BSV-131-m01	
Module	e coord	inator		Module offered by		
Managi	ing Dire	ector of the Institute of	Applied Physics	plied Physics Faculty of Physics and Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semesters.			
Conten	ts					
and im convolu	age pro ution p oservat	ocessing; discretisation roduct; tapering function ion; statistical signals	iples of discreet and ex of signals/sampling th ons and interpolation o , image noise, moments	heorem (Shannon); ł f images; the Parsiva	nomogeneous and lin al theorem, correlation	near filters, on and ener-
Intende	ed leari	ning outcomes				
les of ir	nage p	rocessing and are fam	dge of digital image an iliar with different meth em, especially in the fie	ods of signal proces		
Course	S (type, n	umber of weekly contact hour	s, language — if other than Ger	man)		
V + R (n	io infor	mation on SWS (weekl	y contact hours) and co	ourse language avail	able)	
		essment (type, scope, lang le for bonus)	guage — if other than German, o	examination offered — if no	t every semester, informati	on on whether
in grou weeks) Assess and wil examin	ps (app or d) p ment o l be an ation r	prox. 30 minutes per ca resentation/seminar p ffered: When and how	ninutes) or b) oral exam andidate) or c) project re resentation (approx. 30 often assessment will b Inder observance of Sec nglish	eport (approx. 8 to 10 o minutes) oe offered depends o	o pages, time to com on the method of ass	plete: 1 to 4 sessment
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	e appea	nrs in				
Bachelor's	with 1 maj	or Physics (2012)		rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 88 / 229

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 89 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	



Solid State Physics and Nanostructures

(ECTS credits)

Modules for advanced Bachelor's students offered by the Faculty with regard to preparation for Bachelor's thesis and specialisation in Master's programme.

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 90 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	title				Abbreviation
Semico	nducto	or Physics and Devices			11-SPD-102-m01
Module	coord	inator		Module offered by	
		ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. com	· · ·	,
6		rical grade			
Duratio	n	Module level	Other prerequisites		
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for			
Conten	ts		admission to assess	sment anew.	
		Semiconductor Physics. Ir	ntroduction to key the	eories on semicondu	uctors. Components from the are-
		ics and photonics.			
Intende	ed lear	ning outcomes			
and phononic band structures of important semiconductors and the resulting electronic, optical and thermal properties. They know the principles of charge transport and are able to apply Poisson, Boltzmann and continuity equations to the solution of questions. They have gained insights into the methods of semiconductor production and are familiar with the methods of planar technology and current developments in this sector, they have a basic understanding of component production. They understand the structure and function of the main components of electronics (diodes, transistor, FET, thyristor, diac, triac), microwave applications (tunnel, impatt, baritt and Gunn diode) and optoelectronics (photo diode, solar cell, light-emitting diode, semiconductor injection laser). They know the realisation possibilities of low-dimensional charge carrier systems on the basis of semiconductors and their technological importance. They are familiar with current developments in the field of compon-				ods of semiconductor producti- nents in this sector, they have a and function of the main compo- plications (tunnel, impatt, baritt de, semiconductor injection la- ystems on the basis of semicon-	
Courses	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
		mation on SWS (weekly o			able)
		Sessment (type, scope, langua Ile for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
written examination (approx. 90 minutes) or oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or pro- ject report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					
Allocati	ion of p	olaces			
Additio	nal inf	ormation			

Workload

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012) Master's degree (1 major) Functional Materials (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 92 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

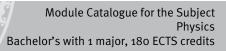
Module title					Abbreviation			
Applied	d Super	rconduction			11-ASL-092-m01			
Module	e coord	inator		Module offered by				
Manag	ing Dire	ector of the Institute of	Applied Physics	plied Physics Faculty of Physics and Astronomy				
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)				
6	nume	rical grade						
Duratio	on	Module level	Other prerequisites	i				
1 semester graduate		sessment. The lecture at the beginning of sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment i sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.					
Conten	ts							
			vity. Application in ene alculation of temperatu			ents. Me-		
Intende	ed lear	ning outcomes						
are abl able to energy Course R + V (r Methoe module is a) writt in grou	The students have a basic understanding of superconductivity as a macroscopic quantum phenomenon. They are able to evaluate the contributions of materials sciences to the development of superconductivity. They are able to discuss questions on superconductivity in a scientific manner and to critically question developments of energy technology. Furthermore, they can deal with practical mathematical questions. Courses (type, number of weekly contact hours, language – if other than German) R + V (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (ap-				y. They are elopments of ion on whether amination ninutes) or			
		ffered: once a year, wi						
Allocat	-	ssessment: German, E blaces						
Additio	nal inf	ormation						
Worklo	ad							
Teaching cycle								
Referred to in LPO I (examination regulations for teaching-degree programmes)								
Module	e appea	ins in						
Bachel	or' deg	ree (1 major) Physics (2	2010)					
Bachelor's	with 1 maj	or Physics (2012)		ırg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 93 / 229		

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Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam. p	
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title Abbreviation						
Solid State Physics 2 11-FK2-092-m01						
Module coordinator Module offered			Module offered by			
Managing Director of the Institute of Applied Physics Faculty of Physics and Astronomy						
ECTS I	Metho	d of grading	Only after succ. con	npl. of module(s)		
8 r	numeri	ical grade				
Duration	n l	Module level	Other prerequisites			
1 semest			tive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-			
Contents	S					
cal mode	el. Diel		ons in periodic potenti ferroelectrics. Semicon onal]			
Intended	d learn	ingoutcomes				
The stud	lents h		nced knowledge in the Solid-State Physics.	field of Solid-State F	Physics. They are the	oretically ab-
-			s, language — if other than Ger	rman)		
R + V (no information on SWS (weekly contact hours) and course language available)						
	Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)				ion on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English				nutes) or c) esentation sessment		
Allocatio						
Addition	nal info	rmation				
Workloa	ıd					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor's wi	vith 1 majo	or Physics (2012)		rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 95 / 229



Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 96 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

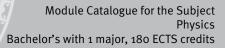
Module title Abbreviation						
Solid State Spectroscopy 11-FKS-092-m01						
Module coordinator				Module offered by		
Managing Director of the Institute of Applied Ph		Applied Physics	ied Physics Faculty of Physics and Astronomy			
ECTS Method of grading Only after succ. compl. of module(s)						
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites	i		
1 semes	ster	graduate			tive details Il be con- nt. If stu- ssment over ition for as- ill be admit- ster. For as-	
Conten	ts					
-		any-particle picture of X-ray spectroscopies.	electrons in solids. Ligh	nt-matter interaction.	Optical spectrosco	oy. Electron
Intende	ed leari	ning outcomes				
types o	f spect		nced knowledge in the s of application. They u			
Course	S (type, n	umber of weekly contact hour	rs, language — if other than Ge	rman)		
R + V (no information on SWS (weekly contact hours) and course language available)						
		essment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informat	on on whether
groups project (approx Assessi and wil examin	a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English				nutes) or c) esentation sessment	
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ng cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	appea	nrs in				
Bachelor's v	with 1 maj	or Physics (2012)		irg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 97 / 229

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 98 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation	
Transp	ort Phe	nomena in Solids			11-FKT-092-m01	
Module	Module coordinator Module offered by					
Managi	Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy and Astrophysics					
ECTS		od of grading	Only after succ. con	pl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	sessment. The lecture at the beginning of sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	isites must be met to qualify for admission to as- ecturer will inform students about the respective details g of the course. Registration for the course will be con- ration of will to seek admission to assessment. If stu- ained the qualification for admission to assessment over e semester, the lecturer will put their registration for as- effect. Students who meet all prerequisites will be admit- ent in the current or in the subsequent semester. For as- ater date, students will have to obtain the qualification fo		ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-
Conten	ts					
Transpo	ort phe	nomena in solids.				
Intende	ed lear	ning outcomes				
The stu	dents	nave specific and adv	anced knowledge in the	field of transport ph	enomena in solids.	
Course	S (type, r	umber of weekly contact hou	ırs, language — if other than Ge	rman)		
R + V (n	no infor	mation on SWS (week	ly contact hours) and co	ourse language avail	able)	
		essment (type, scope, lar le for bonus)	nguage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
groups project (approx Assess and wil examin	(appro report x. 30 m ment o Il be an ation r	x. 30 minutes per can (approx. 8 to 10 page inutes) ffered: When and how	minutes) or b) oral exam didate, for modules with s, time to complete: 1 to v often assessment will l under observance of Sec English	n less than 4 ECTS cr 4 weeks) or d) prese pe offered depends o	edits approx. 20 mir entation/seminar pro on the method of as:	nutes) or c) esentation sessment
Allocat	ion of _l	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	annos	ors in				
			(2010)			
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012)						
	iachelor's with 1 major Physics (2012) IMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) Physik - 2012					

Julius-Maximilians-UNIVERSITÄT WÜRZBURG



Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 100 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Modul	e title				Abbreviation
Semico	onduct	or Lasers - Principles	and Current Research		11-HLF-092-m01
Module coordinator			Module offered by	ered by	
Manag	ing Dir	ector of the Institute o	f Applied Physics	Faculty of Physics a	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 semestergraduateCertain prerequisites must be met to qualify for admission to sessment. The lecturer will inform students about the respect at the beginning of the course. Registration for the course will sidered a declaration of will to seek admission to assessment dents have obtained the qualification for admission to assess the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites will ted to assessment in the current or in the subsequent semest sessment at a later date, students will have to obtain the quality for admission to assess		ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- te subsequent semester. For as-			
Conter			admission to assess		semiconductor lasers, and cur-
riers ar des, la ductor cade la Intend The stu	nd phot ser res lasers. asers, t ed lear udents	tons. Other topics of t onators, mode selecti . The lecture closes wi erahertz lasers or high ning outcomes have advanced knowl	he lecture are optical pro on, dynamic properties a th current topics of laser n-performance lasers.	ocesses in semiconc as well as technolog research such as qu semiconductor-lase	ed rate equations for charge car- luctors, layer and ridge wavegui- y for the generation of semicon- uantum dot lasers, quantum cas- er physics. They can apply their
		· · ·	urs, language — if other than Ger		opment of components.
	_		kly contact hours) and co		able)
Metho	d of as		•		ot every semester, information on whether
groups project (appro Assess and wi examir	(appro report x. 30 m ment o Il be ar nation r	ox. 30 minutes per car (approx. 8 to 10 page linutes) offered: When and hov	ndidate, for modules with s, time to complete: 1 to v often assessment will h under observance of Sec	n less than 4 ECTS ci 4 weeks) or d) prese pe offered depends	idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	ion of	places			
Additio	onal inf	ormation			
 Worklo	ad				

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.
	reg. data record Bachelor (180 ECTS) Physik - 2012

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Referred to In LPO I (examination regulations for teaching-degree programmes)
Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)
Master's degree (1 major) Functional Materials (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 102 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title			Abbreviation				
Semiconductor Physics 11-HLP-092-m01							
Module coordinator				Module offered by			
Managing Director of the Institute of Ap		Applied Physics	Faculty of Physics a	nd Astronomy			
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)			
6	nume	rical grade		-			
Duratio	on	Module level	Other prerequisites	Other prerequisites			
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.				
Conten	ts						
ons and sation of Intende	Advanced examination of crystal bonding and the electronic band structure of semiconductors. Optical excitati- ons and their coupling effects. Electron-phonon coupling. Temperature-dependent transport properties. Quanti- sation effects of semiconductors with reduced dimensions. (Semi-)magnetic semiconductors. Intended learning outcomes The students have specific and advanced knowledge in the field of Semiconductor Physics. They know the physi-					ties. Quanti-	
materia	als.		I have gained an overvi		characteristics of se	miconductor	
			s, language — if other than Ge				
			y contact hours) and co				
		essment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if nc	t every semester, informat	ion on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocation of places							
Additional information							
Workload							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Bachelor's	with 1 ma	or Physics (2012)		rrg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 103 / 229	

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 104 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title			Abbreviation			
Semiconductor Nanostructures			11-HNS-092-m01			
Module coordinator				Module offered by		
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semestergraduateCertain prerequisites must be met to qualify for admission sessment. The lecturer will inform students about the respect at the beginning of the course. Registration for the course v sidered a declaration of will to seek admission to assessmed dents have obtained the qualification for admission to assessment into effect. Students who meet all prerequisites v ted to assessment in the current or in the subsequent seme sessment at a later date, students will have to obtain the q admission to assessment anew.		nts about the respective details ion for the course will be con- nission to assessment. If stu- r admission to assessment over will put their registration for as- t all prerequisites will be admit- e subsequent semester. For as-				
Conten	ts					
or mach ging the tures o with a f of nove for qua	Semiconductor nanostructures are frequently referred to as "artificial materials". In contrast to atoms, molecules or macroscopic crystals, their electronic, optical and magnetic properties can be systematically tailored by changing their size. The lecture addresses technological challenges in the preparation of semiconductor nanostructures of varying dimensions (2D, 1D, oD). It provides the basic theoretical concepts to describe their properties, with a focus on optical properties and light-matter coupling. Moreover, it discusses the challenges and concepts of novel optoelectronic and quantum photonic devices based on such nanostructures, including building blocks for quantum communication and quantum computing architectures.					
Intende	ed lear	ning outcomes				
knowle	dge of		ds to fabricate such s	tructures, and of the	tor nanostructures. They have eir applications to novel photonic arch.	
Course	Courses (type, number of weekly contact hours, language — if other than German)					
R + V (r	R + V (no information on SWS (weekly contact hours) and course language available)					
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English						
Allocation of places						
Additional information						
Worklo	Workload					

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.		
	reg. data record Bachelor (180 ECTS) Physik - 2012		

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Referred to in LPO I (examination regulations for teaching-degree programmes)			
Module appears in			
Bachelor' degree (1 major) Physics (2010)			
Bachelor' degree (1 major) Physics (2012)			
Bachelor' degree (1 major) Nanostructure Technology (2010)			
Bachelor' degree (1 major) Nanostructure Technology (2012)			
Master's degree (1 major) Mathematics (2012)			
Master's degree (1 major) Mathematics (2010)			
Master's degree (1 major) Physics (2010)			
Master's degree (1 major) Physics (2011)			
Master's degree (1 major) Technology of Functional Materials (2010)			
Master's degree (1 major) Nanostructure Technology (2011)			
Master's degree (1 major) Nanostructure Technology (2010)			
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)			
Master's degree (1 major) FOKUS Physics (2010)			
Master's degree (1 major) FOKUS Physics (2011)			
Master's degree (1 major) Computational Mathematics (2012)			
Master's degree (1 major) Functional Materials (2012)			

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 106 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title			Abbreviation			
Magnetism				11-MAG-092-m01		
Module coordinator			Module offered by			
Managing Director of the Institute of Ap		Applied Physics	Faculty of Physics a	ind Astronomy		
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)		
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites	i		
1 semester graduate		sessment. The lecture at the beginning of sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment i sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts					
			nteraction, ferromagne gnetism, experimental			
Intende	ed lear	ning outcomes				
experin ches ar on prot	The students know basic terms, concepts and phenomena of magnetism and measuring methods for magnetic experiments; they are skilled in simple model building and in the formulation of mathematical-physical approaches and are able to apply them to tasks in the stated areas; they have competencies in independently working on problems of these areas; they are able to evaluate the accuracy of observations and analyses.					
			s, language — if other than Ge		abla)	
			y contact hours) and co			• • • •
		le for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English						
Allocation of places						
Additional information						
Workload						
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Bachelor's	with 1 ma	or Physics (2012)		urg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 107 / 229

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 108 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Magnetism and Spin Transport 11-MST-092-m01 Module coordinator Module offered by Faculty of Physics and Astronomy ECTS Method of grading Only after succ. compl. of module(s) CTS Method of grading Only after succ. compl. of module(s) Duration Module level Other prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prequisites will be admit- ted to assessment a later date, students will have to obtain the qualification for admission to assessment anew. Contents The module spans two semesters. During the winter semester, the students become acquainted with the princip- les of magnetism (ranging from atoms to solids), properties of magnetic material (individual usage) and methods to characterise in due consideration of giant magnetoresistance and time magnetoresistance and its applica- tion in magnetic memory. As a last point, we discuss new phenomena from the field of spin dynamics and cur- rent-induced spin phenomena. Interded learning outcomes The students know the basic terms, concepts and phenomena of magnetism and measuring methods for magnet an overview of modem findings in this area (GMR, TMR). They are skilled in simple model building and in the for- mulation of matematical-physical approa	Module title					Abbreviation		
Managing Director of the institute of Applied Physics Faculty of Physics and Astronomy ECTS Method of grading Only after succ. compl. of module(s) 6 numerical grade - Duration Module level Other prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be consisidered a declaration of will to seek admission to assessment over the course of the seek admission to assessment over the course of the seek admission to assessment over the course of the seek admission to assessment over the course of the seek admission to assessment over the course of the seemster, the lecturer will put their registration for admission to assessment anew. Contents The module spans two semesters. During the winter semester, the students become acquainted with the principles of magnetic magnetic properties. During the summer semester, the students learn about spin transport methic attile systems in due consideration of giant magnetoresistance and tunnel magnetoresistance and this application in transport methic and the students learn about spin phenomena. Intended learning outcomes The students know the basic terms, concepts and phenomena of magnetism and measuring methods for magnetic experiments; they are familiar with spin transport applications of information technologies and have galar on overview of modern findings in this area (GMR, TMR). They are skilled in simple endote building and in the formulation of mathematical-physical approaches and are able to apply them to tasks in the stated areas. Courses (type, num	Magnetism and Spin Transport					11-MST-092-m01		
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Additional information	groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.							
 Workload	Additio	Additional information						
Workload								
	Workload							

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.
	reg. data record Bachelor (180 ECTS) Physik - 2012

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) Physics (2010)

Master's degree (1 major) Nanostructure Technology (2010)

Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)

Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 110 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation	
Nanoanalytics	5			11-NAN-092-m01	
Module coord	inator		Module offered by		
Managing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	nd Astronomy	
ECTS Metho	od of grading	Only after succ. com	npl. of module(s)		
6 nume	rical grade				
Duration	Module level	Other prerequisites			
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for			
Contents	<u> </u>	admission to assess			
level up to an of X-ray metho py. Scanning to croscope Se ray absorption Intended lear The students vel. They know pic methods f search metho Courses (type, r R + V (no infor Method of ass module is creditab	Principles of analytic procedures in the field of nanostructure physics, imaging techniques from a microscopic level up to an atomic level, examination of chemical composition, spectroscopy of electronic properties, usage of X-ray methods Physics and material systems on the nanoscale Scanning probes: Atomic force microsco- py. Scanning tunneling microscopy Electron probes: Scanning electron microscope. Transmission electron mi- croscope Secondary ions - mass spectrometry - X-ray methods: Synchrotron spectroscopy. Photoemission. X- ray absorption Intended learning outcomes The students have basic knowledge of modern research methods for different nanostructures up to an atomic le- vel. They know microscoping procedures that are used in practice in labs and the industry as well as spectrosco- pic methods for the determination of electronic properties. They are able to evaluate the efficiency of different re- search methods. Courses (type, number of weekly contact hours, language – if other than German) R + V (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether				
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English Allocation of places Additional information Workload					

Teaching cycle

Defermed to in LDO L

Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Functional Materials (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 112 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	titla				Abbreviation		
Low-Dimensional Structures							
LOW-DI	mensio				11-NDS-092-m01		
Module coordinator			Module offered by				
Managi	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics a	and Astronomy		
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)			
4		rical grade		· · · · · · · · · · · · · · · · · · ·			
Duratio	<u> </u>	Module level	Other prerequisites				
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for					
Cont			admission to assess	sment anew.			
nal stru epitaxy	mensio Ictures. '.	nal structures: Crystal la Comparison between th					
Intende	ed learr	ning outcomes					
know methods of producing and analysing such structures. They know the bandstructures of the most important semiconductors as well as the fabrication and characteristics of semiconductor heterostructures and MOS-diodes. They are familiar with the subband structure of semiconductor heterostructures and MOS-diodes and can evaluate the importance of many-particle effects. They are able to solve problems related to potentials in one dimension by applying Poisson's equation. They know the k*p perturbation theory and can deduce the 2D subband structure from the bulk band structure. They have knowledge of the meaning of modulation doping and are familiar with the 2D hydrogen atom. They understand how an external magnetic field acts on the properties of a free electron gas in 2D. They have basic knowledge of the meaning of gauging, Landau-quantisation, filling factor, and are able to solve implicit problems via numerical methods. They are familiar with elementary excitations in two-dimensional systems.							
		umber of weekly contact hours,			- 1- 1 -)		
Method	d of ass	mation on SWS (weekly e essment (type, scope, langua le for bonus)	-			ion on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocation of places							
Additio	nal info	ormation					
Bachelor's	with 1 maj	or Physics (2012)		rg • generated 26-Aug-2024		page 113 / 229	
			reg. data reco	ord Bachelor (180 ECTS) Phys	ik - 2012		

Workload

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 114 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation		
Quantu	m Tran	sport in Semiconducto	or Nanostructures		11-QTH-102-m01		
Module coordinator				Module offered by			
Managing Director of the Institute of Applied Physics			Applied Physics	Faculty of Physics and Astronomy			
ECTS		od of grading	Only after succ. con	•			
6		rical grade					
Duratio	· · · · · ·	Module level	Other prerequisites				
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for				
Conten	ts						
topics o phenon transpo	of: balli nena b ort pher	dresses the fundamen stic and diffuse transp etween electrons, Coul nomena, topological in	ort, electron interferen omb blockade, thermo	ce effects, quantisat electric properties, c	ion of conductivity,	nteraction	
		ning outcomes					
		nave mastered the basi cations of respective co		nostructures in theor	y and practice. They	know functi-	
Courses	S (type, n	umber of weekly contact hour	s, language — if other than Ger	rman)			
V + R (n	o infor	mation on SWS (weekly	y contact hours) and co	ourse language avail	able)		
		essment (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether	
groups project (approx Assessi and wil examin	(appro report (, 30 m ment o l be an ation re	nination (approx. 90 m x. 30 minutes per cand (approx. 8 to 10 pages, inutes) ffered: When and how nounced in due form u egulations) 2009. ssessment: German, El	idate, for modules with time to complete: 1 to often assessment will I nder observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese pe offered depends o	edits approx. 20 min entation/seminar pro on the method of as	nutes) or c) esentation sessment	
Allocati	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Referre	d to in	LPO I (examination regulation	ons for teaching-degree progra	immes)			
Bachelor's	with 1 maj	or Physics (2012)		rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys	• exam.	page 115 / 229	

Module appears in

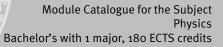
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Master's degree (1 major) Functional Materials (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 116 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	1

Module	title						
Nano-O	ptics				11-NOP-092-m01		
Module coordinator				Module offered by			
Managi	ng Dire	ector of the Institute of A	Applied Physics	plied Physics Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
4	nume	rical grade					
Duratio	n	Module level	Other prerequisites	;			
1 semester graduate		graduate	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.				
Content	ts						
		nciples. Focussing of li ters. Light emission in r				y. Single	
Intende	d learn	ning outcomes					
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		umber of weekly contact hours			- -		
		mation on SWS (weekly					
module is	creditab	e essment (type, scope, langu le for bonus)					
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Allocati	ion of p	olaces	-				
Additio	nal inf	ormation					
Worklo	Workload						
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Bachelor' degree (1 major) Physics (2010)							
	•	or Physics (2012)	JMU Würzbu	urg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 117 / 229	

Julius-Maximilians-UNIVERSITÄT WÜRZBURG



Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

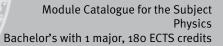
Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 118 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module coordinator Module offered by Managing Director of the institute of Theoretical Physics and Astrophysics Faculty of Physics and Astronomy ECTS Method of grading Only after succ. compl. of module(s) Semester Semester Other prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course, Registration for the course will be con- sidered a declaration of will to seek admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admis- sessment into effect. Students who meet all prerequisites will be admis- sessment into effect. Students who neet all prerequisites will be admis- sessment into effect. Students who meet all prerequisites will be admis- sessment into effect. Students who meet all prerequisites will be admis- sessment into effect. Students who obtain the qualification for admission to assessment anew. Contents Contents "Quantum mechanics II" constitutes the central theoretical course of the international Master's program in Physics. It builds upon basics which are acquired in the lecture "Quantum mechanics I" of the Bachelor's de- gree. While the specific emphasis can be adjusted individually, the core topics that are supposed to be covered should include: . Second quantisation: Fermions and bosons . . Band structures of particles in a crystal . Acatating theory: Potential Stattering, partial wave expansion . Relativistic quantum mechanics: Klein-Gordon	Module title					Abbreviation	
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laster's degree (1 major) Mathematical Physics (2012)
aster's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
aster's degree (1 major) FOKUS Physics (2010)
aster's degree (1 major) FOKUS Physics (2011)
aster's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 120 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation		
Quantum Ph	enomena in electronic c	orrelated Materials		11-QPM-092-m01		
Module coor	dinator		Module offered by	<u> </u>		
	rector of the Institute of	Applied Physics	Faculty of Physics a	and Astronomy		
	hod of grading	Only after succ. con		,		
Duration Module level Other prerequisites						
1 semester	graduate	sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment i	ertain prerequisites must be met to qualify for admission to as- essment. The lecturer will inform students about the respective details the beginning of the course. Registration for the course will be con- dered a declaration of will to seek admission to assessment. If stu- ents have obtained the qualification for admission to assessment over e course of the semester, the lecturer will put their registration for as- essment into effect. Students who meet all prerequisites will be admit- d to assessment in the current or in the subsequent semester. For as- essment at a later date, students will have to obtain the qualification for			
Contents	•					
	ects and phenomena in related systems	current solid-state rese	earch. Correlations. F	Free electron gas and	Fermi liquid.	
Intended lea	rning outcomes					
quantum effe	s have specific, advance ects in strongly correlate iption of such systems a	ed systems. They are ab	le to understand the			
Courses (type	, number of weekly contact hour	s, language — if other than Ge	rman)			
R + V (no info	ormation on SWS (week)	y contact hours) and co	ourse language avail	able)		
Method of as module is credita	ssessment (type, scope, lang able for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informatio	on on whether	
groups (appr project repor (approx. 30 r Assessment and will be a examination Language of	offered: When and how nnounced in due form u regulations) 2009. assessment: German, E	lidate, for modules with , time to complete: 1 to often assessment will l nder observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends	redits approx. 20 mini entation/seminar pres	utes) or c) sentation essment	
Allocation of	fplaces					
Additional in	formation					
Workload						
 Teaching cyo						
Referred to i	n LPO I (examination regulati	ons for teaching-degree progra	ummes)			
 Module appe	ears in					



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 122 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Bachelor's with 1 major Physics (2012)

Module	e title				Abbreviation
Many F	Body Qi	antum Theory			11-QVTP-092-m01
Modul	e coord	inator		Module offered by	
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy and Astrophysics					
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
8 numerical grade Duration Module level Other prerequisites					
Conten	te			sment anew.	
1 Singl 2 Revie 3 Diagr 4 Diagr 5 Land 6 Supe	ew of se rammat rammat au theo ercondu	le Green's function cond quantization ic method using many pa ic method for finite T ry of Fermi liquids		ons at temperature T	=0
Intend	ed lear	ning outcomes			
		nave mastered the princi ed methods to current pr			ticle systems. They are able to ap- 5.
Course	S (type, r	umber of weekly contact hours,	language — if other than Gei	rman)	
R + V (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		essment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
groups project (approz Assess	i (appro t report x. 30 m sment o Il be an	x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form und egulations) 2009.	late, for modules with ime to complete: 1 to ten assessment will h der observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
		ssessment: German, Eng			
Langua		-			
Langua	age of a	-			
Langua Allocat 	age of a t ion of p	-			

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Workload

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

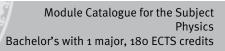
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Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 124 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation	
Relativ	istic Ef	fects in Mesoscopic S	ystems		11-RMS-092-m01	
Module	e coord	inator		Module offered by		
	ing Dire	ector of the Institute of	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	Г ^і ́	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade		-		
Duratio	on .	Module level	Other prerequisites	i		
1 semestergraduateCertain prerequisites must be met to qualify for admi sessment. The lecturer will inform students about the at the beginning of the course. Registration for the co sidered a declaration of will to seek admission to ass dents have obtained the qualification for admission t the course of the semester, the lecturer will put their sessment into effect. Students who meet all prerequi ted to assessment in the current or in the subsequen sessment at a later date, students will have to obtain admission to assessment anew.		nts about the respe ion for the course w hission to assessme or admission to asse will put their registr et all prerequisites w e subsequent seme	ctive details rill be con- ent. If stu- essment over ation for as- rill be admit- ster. For as-			
Conten	Its	-				
		fects in mesoscopic sy cors Majorana fermio	stems Spin-orbit cou ns	oling Dirac equatio	n Quantum Hall e	ffect Topo-
Intend	ed lear	ning outcomes				
			thematical methods for physics. They are able	•		•
		· · · · ·	rs, language — if other than Ge	•••		
R + V (r	10 infoi	rmation on SWS (week	ly contact hours) and co	ourse language avail	able)	
		Sessment (type, scope, lan ole for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informa	tion on whether
groups project (approz Assess and wil examir Langua	(appro report x. 30 m ment o Il be an nation r age of a	ox. 30 minutes per can (approx. 8 to 10 pages inutes) ffered: When and how nounced in due form t egulations) 2009. sssessment: German, E	ninutes) or b) oral exam didate, for modules wit s, time to complete: 1 to often assessment will under observance of Se	h less than 4 ECTS cr 4 weeks) or d) prese be offered depends	edits approx. 20 mi entation/seminar pr on the method of as	nutes) or c) esentation sessment
Allocat	ion of _l	places				
Additio	onal inf	ormation				
Worklo	ad					
Teachi		ρ				
	is cycl	~				
	ed to in	LPOI (examination regulat	ions for teaching-degree progra	ammes)		
 Module	e appea	ars in				
Bachelor's	with 1 ma	jor Physics (2012)	IMU Würzhı	Irg • generated 26-Aug-2024	• exam.	page 125 / 229
		, ,		ord Bachelor (180 ECTS) Phys		F-32 - 57 229



Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 126 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title Abbreviation							
Theore	tical S	olid State Physics			11-TFK-092-m01		
Module	e coord	inator		Module offered by			
Manag and As			of Theoretical Physics	Faculty of Physics a	and Astronomy		
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)			
8	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 semester graduate		graduate	sessment. The lecture at the beginning of sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for			
Conten	Its	I.					
		heoretical Solid-Sta tism. Superconducti	te Physics. Fermi liquid th vity.	eory. Electron-electr	on interaction. Variatio	onal me-	
		ning outcomes					
theory an adv Course	and to anced S (type, r	understand the conr topic of solid-state th number of weekly contact h	retical methods and are a nections to experimental i neory and have discussed ours, language — if other than Ge	results. The individu I this topic in a semi rman)	al students have elabo nar presentation.		
R + V (r	no infoi	mation on SWS (wee	ekly contact hours) and co	ourse language avail	able)		
		sessment (type, scope, l ole for bonus)	anguage — if other than German,	examination offered — if no	ot every semester, information	on whether	
groups project (approj Assess and wi examir	(appro report x. 30 m ment o Il be an nation r	ox. 30 minutes per ca (approx. 8 to 10 pag inutes) Iffered: When and ho	o minutes) or b) oral exam andidate, for modules with ges, time to complete: 1 to ow often assessment will n under observance of Sec , English	h less than 4 ECTS cr 4 weeks) or d) prese be offered depends	redits approx. 20 minu entation/seminar prese on the method of asses	tes) or c) entation ssment	
Allocat	ion of	places					
Additio	onal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
HOTOFF	ea to in	LPO I (examination regu	lations for toaching dograp progra	mmes)			
		jor Physics (2012)		Irg • generated 26-Aug-2024	• exam	0age 127 / 229	

Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
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Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 128 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Bachelor's with 1 major Physics (2012)

Module	e title				Abbreviation
Theory	Theory of Superconduction 11-TSL-092-m01				
Module coordinator Module offered by					<u> </u>
Managing Director of the Institute of Theoretical Physics and Astrophysics			neoretical Physics	Faculty of Physics and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semestergraduateCertain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective at the beginning of the course. Registration for the course will be sidered a declaration of will to seek admission to assessment. If dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites will be ted to assessment in the current or in the subsequent semester. I sessment at a later date, students will have to obtain the qualific			ints about the respective details ion for the course will be con- nission to assessment. If stu- or admission to assessment over will put their registration for as- et all prerequisites will be admit- e subsequent semester. For as-		
Conten	ts		admission to assess	sment anew.	
Introduction to the phenomenom of superconductivity. Microscopic theory of superconductivity (BCS theory). Phenomenological theory of superconductivity (Ginzburg-Landau theory). Mesoscopic aspects of superconductivity (Andreev scattering, Bobolioubov-de Gennes equation, SQUIDS). Quantum computing with superconductive elements. Intended learning outcomes The students have basic knowledge of the theoretical models for the description of superconductivity. They know the properties and application areas of these models and are able to apply calculation methods to simple pro-					
blems.	S (type r	number of weekly contact hours, l	anguage — if other than Ger	man)	
		mation on SWS (weekly o			able)
Metho	d of ass		· · · · · · · · · · · · · · · · · · ·		ot every semester, information on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					
Allocat	ion of J	olaces			
Additional information					
Worklo	ad				
Teaching cycle					

JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) Physik - 2012

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Referred to in LPO I (examination regulations for teaching-degree programmes)

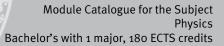
Module appears in

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Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 130 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Modul	e title				Abbreviation	
Renormalization Group Methods in Field Theory				11-RMFT-102-m01		
Module coordinator			Module offered by	l		
Managing Director of the Institute of Theoretical Physics and Astrophysics			Faculty of Physics and Astronomy			
ECTS	<u> </u>	od of grading	Only after succ. cor	npl. of module(s)		
6 numerical grade						
Duratio	on	Module level	Other prerequisites	6		
1 semester graduate Certain prerequisites must be met to qualify for admission to sessment. The lecturer will inform students about the respect at the beginning of the course. Registration for the course will sidered a declaration of will to seek admission to assessment dents have obtained the qualification for admission to assess the course of the semester, the lecturer will put their registrat sessment into effect. Students who meet all prerequisites will ted to assessment in the current or in the subsequent semest sessment at a later date, students will have to obtain the qual admission to assessment anew.		ctive details ill be con- nt. If stu- ssment over ation for as- rill be admit- ster. For as-				
Conter	nts					
		ion group methods for aviour of cryogenic ter	non-linear partial differ mperatures.	ential equations, fie	ld theoretical contex	ts and non-
Intend	ed lear	ning outcomes				
		gain an overview of no alisation group metho	on-linearities in partial d d.	lifferential equations	and their solution c	on the basis
Course	S (type, 1	number of weekly contact hou	ırs, language — if other than Ge	rman)		
V + R (1	no infoi	rmation on SWS (week	dy contact hours) and co	ourse language avail	able)	
		sessment (type, scope, lar ble for bonus)	nguage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
groups project (appro Assess and wi examir Langua	(appro treport x. 30 m ment o ll be an nation r age of a	ox. 30 minutes per can (approx. 8 to 10 page inutes) offered: When and how mounced in due form regulations) 2009. assessment: German, I	minutes) or b) oral exam didate, for modules wit s, time to complete: 1 to often assessment will under observance of Se English	h less than 4 ECTS cr 9 4 weeks) or d) prese be offered depends o	edits approx. 20 min entation/seminar pro on the method of as	nutes) or c) esentation sessment
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regula	tions for teaching-degree progra	ammes)		
Modul	e appea	ars in				
	achelor's with 1 major Physics (2012) JMU Würzburg • generated 26-Aug-2024 • exam. page 131 / 229 reg. data record Bachelor (180 ECTS) Physik - 2012					



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 132 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title Abbreviation						
Spintronics 11-SPI-102-m01						
Module coordinator				Module offered by		
Managing Director of the Institute of Ap		Applied Physics	plied Physics Faculty of Physics and Astronomy			
ECTS Method of grading		Only after succ. con	npl. of module(s)			
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts					
magnet spin dy	oresist namics	tance and tunnel magn s and current-induced s	es of spin transport, wi etoresistance. As a las spin phenomena.			
		ning outcomes				
mation	techno		es of spin transport mo d an overview of curren			
Course	S (type, n	number of weekly contact hour	s, language — if other than Ge	rman)		
V + R (n	o infor	mation on SWS (weekl	y contact hours) and co	ourse language availa	able)	
		sessment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					nutes) or c) esentation sessment	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
						·
Bachelor's	with 1 maj	jor Physics (2012)		rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 133 / 229

Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) FOKUS Physics (2006)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 134 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation
Introduction to Electron Microscopy					11-IEM-111-m01
Module coordinator				Module offered by	
Managing Director of the Institute of App		oplied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
4	nume	rical grade			
Duratio	·	Module level	Other prerequisites		
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for admission to assessment anew.			
Conten	ts		<u>.</u>		
on tech formati image 7. Cher	nnique) ion, ima formati nical ar	. 4. Transmission electro aging of microstructure). on, image simulation). 6.	n microscopy (the ins 5. Can we see atoms . Scanning electron m microscope (energy-c	trument, contrast m ? High-resolution ele hicroscopy (the instru lispersive X-ray micr	parison with the X-ray diffracti- echanisms, principles of image ctron microscopy (principle of ument, contrast mechanisms). oanalysis, electron energy loss techniques.
Intended learning outcomes					
They kr	now mi	croscoping procedures th	at are used in praction	ce in labs and the ind	croscopy up to an atomic level. dustry as well as electron-micros- different research methods.
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					
Allocation of places					
Additional information					
Worklo	Workload				

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Referred to in LPO I (examination regulations for teaching-degree programmes)	
Module appears in	
Bachelor' degree (1 major) Physics (2010)	
Bachelor' degree (1 major) Physics (2012)	
Bachelor' degree (1 major) Nanostructure Technology (2010)	
Bachelor' degree (1 major) Nanostructure Technology (2012)	
Master's degree (1 major) Physics (2010)	
Master's degree (1 major) Physics (2011)	
Master's degree (1 major) Nanostructure Technology (2011)	
Master's degree (1 major) Nanostructure Technology (2010)	
Master's degree (1 major) FOKUS Physics (2010)	
Master's degree (1 major) FOKUS Physics (2011)	
Master's degree (1 major) Functional Materials (2012)	
Master's degree (1 major) FOKUS Physics (2006)	

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 136 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title Abbreviation					
Current Topics in Experimental Physics 11-BXE5-112-mo1					
Module coordinator Module			Module offered by		
chairperson c	of examination committee		Faculty of Physics a	ind Astronomy	
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)		
5 nume	erical grade				
Duration	Module level	Other prerequisites			
1 semester	undergraduate	Approval by examin	ation committee req	uired.	
Contents					
Current topics or study abro		. Accredited academi	c achievements, e.g	. in case of change of university	
Intended lear	ning outcomes				
sics of the Ba understand tl	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to	
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
in groups (ap weeks) or d) j		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4	
Allocation of		-			
Additional in	formation				
Workload					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appe	ars in				
	gree (1 major) Physics (20				
Bachelor' deg	gree (1 major) Physics (20	12)			

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 137 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title	Abbreviation					
Current Topics in Experimental Physics 11-BXE6-112-m01						
Module coordinator Modu			Module offered by			
chairperson o	f examination committee		Faculty of Physics a	ind Astronomy		
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)			
6 nume	rical grade					
Duration	Module level	Other prerequisites				
1 semester	undergraduate	Approval by examin	ation committee req	uired.		
Contents						
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or		
Intended lear	ning outcomes					
sics of the Ba understand th	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to		
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)			
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
in groups (ap weeks) or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4		
Allocation of	places					
Additional inf	ormation					
Workload						
Teaching cycl	le					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appea	ars in					
-	ree (1 major) Physics (20					
Bachelor' deg	ree (1 major) Physics (20	12)				

Module title	Abbreviation					
Current Topics in Experimental Physics 11-BXE8-112-m01						
Module coordinator Modul			Module offered by			
chairperson c	f examination committee		Faculty of Physics a	ind Astronomy		
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)			
8 nume	rical grade					
Duration	Module level	Other prerequisites				
1 semester	undergraduate	Approval by examin	ation committee req	uired.		
Contents						
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or		
Intended lear	ning outcomes					
sics of the Ba understand th	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to		
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)			
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
in groups (ap weeks) or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4		
Allocation of	places					
Additional inf	ormation					
Workload						
Teaching cyc	le					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appe	ars in					
-	ree (1 major) Physics (20					
Bachelor' deg	ree (1 major) Physics (20	12)				

Module	e title				Abbreviation
Curren	t Topic	s in Theoretical Physics			11-BXT5-112-m01
Module coordinator		Module offered by	<u>,</u>		
chairpe	erson o	f examination committee	1	Faculty of Physics a	nd Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a		in Theoretical Physics. C	redited academic ac	hievements, e.g. in c	ase of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Ger	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ıle for bonus)	ge — if other than German,	examination offered — if no	t every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project reservation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat					
			-		
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Module t	itle			Abbreviation		
Current Topics in Theoretical Physics11-BXT6-112-m01						
Module coordinator		Module offered by				
chairpers	son of examination committee		Faculty of Physics a	ind Astronomy		
ECTS N	Nethod of grading	Only after succ. con	npl. of module(s)			
6 r	umerical grade					
Duration	Module level	Other prerequisites				
1 semest	er undergraduate					
Contents						
Current to study ab		Accredited academic a	achievements, e.g. iı	n case of change of university or		
Intended	learning outcomes					
sics of th Physics a	e Bachelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-		
Courses	type, number of weekly contact hours,	language — if other than Gei	man)			
V + R (no	information on SWS (weekly	contact hours) and co	ourse language avail	able)		
	of assessment (type, scope, langua reditable for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether		
in groups weeks) o		didate) or c) project resentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4		
Allocatio	n of places					
Addition	al information					
Workload	1					
Teaching	cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module a	ppears in					
	' degree (1 major) Physics (20					
Bachelor	' degree (1 major) Physics (20	12)				

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) Physik - 2012	page 141 / 229
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Module	e title				Abbreviation
Current	t Topic	s in Theoretical Physics			11-BXT8-112-m01
Module coordinator		Module offered by			
chairpe	erson o	f examination committee	1	Faculty of Physics a	and Astronomy
ECTS	Methe	od of grading	Only after succ. con	npl. of module(s)	
8	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a	•	of Theoretical Physics. A	Accredited academic a	achievements, e.g. ir	n case of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V + R (r	no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	t every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project reservation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat					
			-		
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Module	title				Abbreviation	
Physics of Advanced Materials 11-PMM-132-mo1						
Module	e coord	inator		Module offered by		
Managi	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)		
6		rical grade		• • • •		
Duratio		Module level	Other prerequisites			
1 seme		graduate				
Conten		gladuate				
				la l'antid amontale an		
and sup	percon	rties of various materia ductors; thin films, het imensional layer mater	erostructures and supe			
Intende	ed lear	ning outcomes				
The stu	dents l	know the properties an	d characterising metho	ods of some modern	materials.	
Course	S (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
		mation on SWS (weekl			able)	
Method	l of ass	sessment (type, scope, lang le for bonus)	· · · ·	<u> </u>		ion on whether
Assess and wil examin	ment o l be an ation r	resentation/seminar p ffered: When and how nounced in due form u egulations) 2009. ssessment: German, E	often assessment will nder observance of Se	be offered depends o		
Allocat	ion of p	olaces				
Additional information						
Workload						
Teachir	ng cycl	e				
		-				
Poforro	d to in	LPO I (examination regulati	and for tooching dogree progr			
Keleffe			ons for teaching-degree progra	ammes)		
Module	annes	ors in				
			2010)			
Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012)						
Bachelor' degree (1 major) Nanostructure Technology (2010)						
Bachelor' degree (1 major) Nanostructure Technology (2012)						
Master's degree (1 major) Physics (2010)						
Master	's degr	ee (1 major) Physics (20	011)			
	-	ee (1 major) Nanostruc				
	-	ee (1 major) Nanostruct	•, · ·			
	-	ee (1 major) FOKUS Phy				
Master	s degr	ee (1 major) FOKUS Phy	'SICS (2011)			
Bachelor's	with 1 maj	jor Physics (2012)		irg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 143 / 229



Astro Physics and Particle Physics

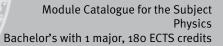
(ECTS credits)

Modules for advanced Bachelor's students offered by the Faculty with regard to preparation for Bachelor's thesis and specialisation in Master's programme.

Bachelor's with 1 major Physics (2012)	elor's with 1 major Physics (2012) JMU Würzburg • generated 26-Aug-2024 • exam.	
	reg. data record Bachelor (180 ECTS) Physik - 2012	

	e title			Abbreviation		
Astrop	hysics				11-A4-072-m01	
Modul	e coord	inator		Module offered by		
	ging Dire	ector of the Institute of sics	Theoretical Physics	Faculty of Physics and Astronomy		
ECTS	T	od of grading	Only after succ. con	ompl. of module(s)		
6		rical grade				
Duratio	on	Module level	Other prerequisites	;		
1 seme	ester	undergraduate	Admission prerequisite to assessment: successful completion of approx 50% of exercises. Certain prerequisites must be met to qualify for admis sion to assessment. The lecturer will inform students about the respecti- ve details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be ad- mitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification			fy for admis- the respecti- course will essment. If sessment gistration for will be ad- mester. For
Conter			for admission to as	sessment anew.		
nucleo Intend The stu physic	ed lear udents al obse ney kno	sis, cosmic microwave ning outcomes are familiar with the m rvations and evaluatio	, Friedmann World Mod background radiation, odern world view of Ast ns. They are able to use universe, e.g. of stars a	structure formation, rophysics. They kno e these methods to p	inflation w methods and tools blan and analyse owr	for astro- 1 observati-
		number of weekly contact hou	rs, language — if other than Ge	rman)		
			ly contact hours) and co		able)	
		S essment (type, scope, lang ole for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informati	on on whether
written	n exami	nation (approx. 120 mi	nutes)			
Allocat	tion of _l	places				
Only a	s part o	f pool of general key s	kills (ASQ): 15 places. P	laces will be allocate	ed by lot.	
	onal inf	ormation				
Additio						
 Worklo	bad					
	oad					
 Worklo	oad ng cycl	e				
 Worklo		e				
 Worklo Teachi 	ng cycl		ions for teaching-degree progra	ammes)		
 Worklo Teachi Referro	ng cycl ed to in	LPOI (examination regulat	ions for teaching-degree progra	ammes)		
 Worklo Teachi Referro Modul	ng cycl ed to in e appea	LPO I (examination regulat		ammes)		
 Worklo Teachi Referro Modul Bachel	ng cycl ed to in e appea lor' deg	LPOI (examination regulat	2007)	ammes) Jrg • generated 26-Aug-2024		

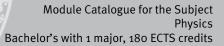




Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2009) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 146 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Cosmo	logy				11-AKM-092-m01
Module	e coord	inator		Module offered by	1
	ing Dire	ector of the Institute of	of Theoretical Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. cor	npl. of module(s)	
6	1	rical grade			
Duratio		Module level	Other prerequisites	;	
1 seme	ster	graduate	sessment. The lectu at the beginning of sidered a declaration dents have obtaine the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for	
Conten	ts				
matter,	, primo	rdial nucleosynthesis		kground, structure fo	e early universe, inflation, dark ormation, supercluster, galaxies
Intende	ed lear	ning outcomes			
	late the	em to observations. T			ethods of cosmology and are ab- ch topics and are able to work on
Course	S (type, r	number of weekly contact ho	ours, language — if other than Ge	rman)	
R + V (r	no infor	rmation on SWS (wee	kly contact hours) and co	ourse language avail	able)
		sessment (type, scope, la ble for bonus)	anguage — if other than German,	examination offered — if no	ot every semester, information on whether
groups project (approx Assess and wil examin	(appro report x. 30 m ment o Il be an ation r	ox. 30 minutes per ca (approx. 8 to 10 page inutes) iffered: When and ho	ndidate, for modules wit es, time to complete: 1 to w often assessment will under observance of Se	h less than 4 ECTS ci 4 weeks) or d) prese be offered depends	idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	ion of _l	places			
Additio	onal inf	ormation			
	-				
Worklo	ad				
Teachi	ng cycl	e			
 Referre	ed to in	LPO I (examination regul	ations for teaching-degree progra	ammes)	
	with 1 ma	jor Physics (2012)	IMIL Würzbı	irg • generated 26-Aug-2024	• exam. page 147 / 229



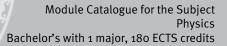
Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 148 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Plasma - Astrophysics 11-APL-092-m01 Mondule coordinator Module offered by Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy and Astrophysics ECTS Method of grading Only after succ. compl. of module(s) 6 numerical grade Duration Module level Other prerequisites must be met to qualify for admission to assessment. If sums the detts about the respective detail at the beginning of the course. Registration for the course will be admission to assessment. If sums a sessment in the current or in the subsequents respective detail at the beginning of the course. Registration for admission to assessment or the course of the same server, the lecturer will put their registration for at during regulation admission to assessment in the current or in the subsequent sensetser. The lecturer will put their registration for as essessment in the current or in the subsequent sensetser. The subcents who meet all prerequisites will be admited to assessment in the current or in the subsequent sensetser. The subcents will have to obtain the qualification a damission to assessment anew. Contents Plasma Astrophysics: Dynamics of charged particles in electric and magnetic fields. Transport equations for eigstic particles in space, they know corresponding measuring methods and can compare and evaluate theory electron of solar particles within the solar wind. Particle acceleration of will basma turbulence. Particle acceleration and transport equation and can compare and evaluate theory of modules with less than 4 ECTS credits approx. 2 on minutes of a modules (etcleabed bearma). R v (to	Module	e title				Abbreviation
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astrophysics ECTS Method of grading Only after succ. compl. of module(s) Onnumerical grade Duration Module level Other prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective detai at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment into effect. Students who meet all prerequisites will be admission to assessment into effect. Students who meet all prerequisites will be admission to assessment into effect. Students who meet all prerequisites will be admission to assessment into effect. Students who meet all prerequisites will be admission to assessment as essment into effect. Students who meet all prerequisites will be admission to assessment assessment anew. Plasma Astrophysics: Dynamics of charged particles in electric and magnetic fields. Transport equations for eight particles. Properties of magnetic turbulence. Propagation of solar particles within the solar wind. Particle acceleration via shock waves and via interaction with plasma turbulence. Particle acceleration and transport i galaxies and other cosmic objects. Intended learning outcomes The students have basic knowledge of Plasma Astrophysics. They have mastered the theoretical description o motion and acceleration of charged particles in space, they know corresponding measuring methods and can compare and evaluate theory and experiments. Courses (type, number of weeky contact hours, language – if other than Geman, examin	Plasma	a-Astro	physics			11-APL-092-m01
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Module appears in

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Actor	e title				Abbreviation	
ASTION	omical	Methods			11-ASM-131-m01	
Module	e coord	inator		Module offered by		
	ing Dire	ector of the Institute of	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)		
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Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011)

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation
Introdu	uction (to Space Physics			11-ASP-092-m01
Module	e coord	linator		Module offered by	
Manag and As			of Theoretical Physics	Faculty of Physics a	and Astronomy
ECTS	<u>г і і</u>	od of grading	Only after succ. co	mpl. of module(s)	
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	with 1 ma	ijor Physics (2012)	IMILW/ürzh	urg • generated 26-Aug-2024	• exam. page 153 / 2

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	title				Abbreviation	
Atmosp	here a	nd Space Physics			11-AWP-092-m01	
Module	coord	inator		Module offered by	<u> </u>	
Managi and Ast		ector of the Institute of sics	Theoretical Physics	Faculty of Physics a	ind Astronomy	
		od of grading	Only after succ. cor	compl. of module(s)		
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	with a ma	jor Physics (2012)	IA11 \\////	urg • generated 26-Aug-2024	• exam	Dage 155 / 200
Jachelor 5 V	and I lind	Jon 1 Hysics (2012)		ord Bachelor (180 ECTS) Phys		page 155 / 229

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Aerospace Computer Science (2009) Bachelor' degree (1 major) Aerospace Computer Science (2011) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011)

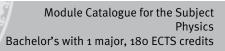
Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 156 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Introdu	iction t	o Plasmaphysics			11-EPP-092-m01
Module	e coord	linator		Module offered by	<u> </u>
		ector of the Institute o	f Theoretical Physics	Faculty of Physics a	and Astronomy
and As			,	, , , , , , , , , , , , , , , , , , , ,	,
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites	5	
1 semester graduate		sessment. The lectu at the beginning of sidered a declaration dents have obtaine the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for		
Conten	ts				
Transp thin the	ort equ e solar	ations for energetic p wind, Particle acceler	articles, Properties of m	agnetic turbulence, I nd via interaction wi	elds, Magnetohydrodynamics, Propagation of solar particles w th plasma turbulence, Particles diation.
Intend	ed lear	ning outcomes			
					of transport phenomena in pla knowledge to Astrophysics.
Course	S (type, 1	number of weekly contact hou	ırs, language — if other than Ge	rman)	
V + R (r	no infoi	rmation on SWS (week	kly contact hours) and co	ourse language avail	able)
		sessment (type, scope, lar ble for bonus)	nguage — if other than German,	examination offered — if no	ot every semester, information on whethe
groups project (appro: Assess and wil examin	(appro report x. 30 m ment o Il be an nation r	ox. 30 minutes per can (approx. 8 to 10 page linutes) offered: When and how	didate, for modules wit s, time to complete: 1 to v often assessment will under observance of Se	h less than 4 ECTS co 9 4 weeks) or d) preso be offered depends	idate each or oral examination redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	-				
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regula	tions for teaching-degree progra	ammes)	
			1		· · ·
sachelor's	with 1 ma	ijor Physics (2012)	IMU Würzbu	urg • generated 26-Aug-2024	• exam. page 157 / 2

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 158 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation		
Group [·]	Theory				11-GRT-092-m01		
Module	e coord	inator		Module offered by			
Manag	Managing Director of the Institute of Theoretical Phy and Astrophysics			Faculty of Physics a	nd Astronomy		
ECTS		od of grading	Only after succ. con	npl. of module(s)			
6	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for				
Conten	ts	<u>.</u>					
Group	theory.	Finite groups. Lie grou	ps. Lie algebra. Depicti	on. Tensors. Classifi	cation theorem. App	lications.	
Intendo	ed lear	ning outcomes					
group t	heory a		up theory, especially of sing the acquired meth oblems.				
Course	S (type, r	number of weekly contact hour	rs, language — if other than Ge	rman)			
R + V (r	no infor	mation on SWS (week	y contact hours) and co	ourse language avail	able)		
		Sessment (type, scope, lan le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informat	ion on whether	
groups project (approx Assess and wil examin	(appro report x. 30 m ment o Il be an ation r	ox. 30 minutes per cano (approx. 8 to 10 pages inutes) ffered: When and how	ninutes) or b) oral exam didate, for modules with t, time to complete: 1 to often assessment will l under observance of Sec nglish	n less than 4 ECTS cr 4 weeks) or d) prese pe offered depends o	edits approx. 20 min entation/seminar pr on the method of as	nutes) or c) esentation sessment	
Allocat	<u> </u>	· · ·	<u> </u>				
Additio	onal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
	d to in	LPO I (examination regulat	ions for teaching-degree progra	mmes)			
 Module							
	Aodule appears in Inchelor's with 1 major Physics (2012) JMU Würzburg • generated 26-Aug-2024 • exam. page 159 / 229						



Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Mathematical Physics (2009)
Bachelor' degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Mathematical Physics (2012)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 160 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

at the beginning of the course. Registration for the course will be course of the semester, the lecturer will put their registration for sessesment. If su, dents have obtained the qualification for admission to assessment, the course of the semester, the lecturer will put their registration for sessment in the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualification in the subsequent semester. For sessment at a later date, students will have to obtain the qualification in the subsequent semester. For sessment at a later date, students will have to obtain the qualification in the subsequent semester. For sessment at a later date, students will have to obtain the qualification in the subsequent semester. For sessment at a later date, students will have to obtain the qualification in the subsequent semester. For sessment and subsection is conservation laws (fluid dynamics, finite difference method, Riemann solve. Lattice-Boltzmann). Hyperbolic conservation laws (fluid dynamics, finite difference method, Riemann solve. ENO). Methods of high-performance computing. Message-passing interface (MPI). GPGPU programming (Op CL). Intendel learning outcomes The students are able to solve typical problems and equations of Astrophysics and other subdisciplines of I sics with the help of numerical simulations. They are especially capable of choosing adequate strategies to proach such problems and of validating the results. Courses (type, number of weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whe weekly or other submations of a candidate each or oral examination in groups. 3 por minutes) or b) oral examination offered – if not every semester, information any examination (approx. 30 minutes p		e title				Abbreviation	
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy ECTS Method of grading Only after succ. compl. of module(s) 6 numerical grade Duration Module level Other prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective de at the beginning of the course. Registration for the course will be co sidered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment. If students have obtained the qualification for admission to assessment. If students have obtained the qualification for admission to assessment. If students have obtained the qualification for admission to assessment. If students have obtained the qualification for admission to assessment. If students will have to obtain the qualificati admission to assessment at a later date, students will have to obtain the qualificati admission to assessment at a later date, students will have to obtain the qualificati admission to assessment as a later date, students will have to obtain the qualificati admission to assessment as a later date, students will have to obtain the qualificati admission to assessment students about the respective date. Students whethods (particle-in-cell methods). Valsow methods (particle-in-cell methods). Valsow methods (particle-in-cell methods). Nasow methods (particle-in-cell methods). Nasow methods (particle-in-cell methods). Particle-mesh methods (particle-in-cell methods). Methods of high-performance computing. Message-passing interface (MPI). GPGPU programming (Op CL). Intended learning outcomes The students are able to solve typical problems and equations of Astrophysics and other subd	Computational Astrophysics					11-NMA-111-m01	
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy ECTS Method of grading Only after succ. compl. of module(s) 6 numerical grade Duration Module level Other prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective de at the beginning of the course. Registration for the course will be co sidered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment. If students have obtained the qualification for admission to assessment. If students have obtained the qualification for admission to assessment into effect. Students who meet all preequisites will be act te do assessment in the fetc. Students who meet all preequisites will be act te do assessment at a later date, students will have to obtain the qualificati admission to assessment an admission to assessment at later date, students will have to obtain the qualificati admission to assessment and extremester. For sessment and extremester, see able to assessment and extremester. For sessment and extremester and by momial codes). Particle-mesh methods (particle-in-cell methods). Vlasow methods (e. Lattice-Boltzmann). Hyperbolic conservation laws (fluid dynamics, finite difference method, Riemann solve ENO). Methods of high-performance computing. Message-passing interface (MPI). GPGPU programming (Op CL). Intended learning outcomes The students are able to solve typical problems and equations of Astrophysics and other subdisciplines of I sics with he help of numerical simulations. They are especially capable of choosing adequate strategies to proact such problems and of validating the results. <	Module coordinator			Module offered by			
6 numerical grade Duration Module level Other prerequisites 1 semester graduate Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective de at the beginning of the course. Registration for the course will be course will be course will be course of the semester, the lecturer will put their registration for sessessment. If students have obtained the qualification for admission to assessment. If students have obtained the qualification for admission to assessment in the free. Students who meet all prerequisites will be ac ted to assessment in the free. Students who meet all prerequisites will be ac ted to assessment at a later date, students will have to obtain the qualification for admission to assessment and polynomial codes). Particle-mesh methods (particle-in-cell methods). Vlasow methods (particle-Boltzmann). Hyperbolic conservation laws (fluid dynamics, finite difference method, Riemann solve ENO). Methods of high-performance computing. Message-passing interface (MPI), GPGPU programming (Op CL). Intended learning outcomes The students are able to solve typical problems and equations of Astrophysics and other subdisciplines of is is with the help of numerical simulations. They are especially capable of choosing adequate strategies to proach such problems and of validating the results. Courses (type, number of weeky contact hours, language – if other than Geman, examination of one candidate each or oral examination in groups (approx, 30 minutes) per candidate) or 0) project report (approx, 8 to 10 pages, time to complete: sueeks) or 0) project report (approx, 8 to 10 pages, time to complete: sueeks) or 0) project report (approx, 8 to 10 pages, time to complete: sueeks)				Theoretical Physics	Faculty of Physics a	and Astronomy	
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sessment. The lecturer will inform students about the respective de at the beginning of the course. Registration for the course will be co sidered a declaration of will to seek admission to assessment. If stu dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment in the effect. Students who meet all prerequisites will be ad ted to assessment in the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualificati admission to assessment an exu. Contents Various methods used in astrophysical simulations with special emphasis on their applications. N-body alg tithms (tree- and polynomial codes). Particle-mesh methods (particle-in-cell methods). Vlasow methods (e. Lattice-Botzmann). Hyperbolic conservation laws (fluid dynamics, finite difference method, Riemann solve ENO). Methods of high-performance computing. Message-passing interface (MPI). GPGPU programming (Op CL). Intended learning outcomes The students are able to solve typical problems and equations of Astrophysics and other subdisciplines of I sics with the help of numerical simulations. They are especially capable of choosing adequate strategies to proach such problems and of validating the results. Courses (type, number of weekly contact hours, language – if other than Geman) V + R (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than Geman, examination of one candidate each or oral examination in groups (approx. 30 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: si weeks) or d) presentation/seminar presentation (approx. 9 minutes) Assessment offered. When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 3	Duratio	n	Module level	Other prerequisites			
Contents Various methods used in astrophysical simulations with special emphasis on their applications. N-body alg rithms (tree- and polynomial codes). Particle-mesh methods (particle-in-cell methods). Vlasow methods (e., Lattice-Boltzmann). Hyperbolic conservation laws (fluid dynamics, finite difference method, Riemann solve (ENO). Methods of high-performance computing. Message-passing interface (MPI). GPGPU programming (OF CL). Intended learning outcomes Intended learning outcomes The students are able to solve typical problems and equations of Astrophysics and other subdisciplines of I sics with the help of numerical simulations. They are especially capable of choosing adequate strategies to proach such problems and of validating the results. Courses (type, number of weekly contact hours, language – if other than German) V + R (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on who module is creditable for bonus) a) written examination (approx. 120 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 11 more, scope, language of assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic a examination regulations) 2009. Language of assessment. German, English Allocation of places	1 semester graduate		sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for				
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The students are able to solve typical problems and equations of Astrophysics and other subdisciplines of 1 sics with the help of numerical simulations. They are especially capable of choosing adequate strategies to proach such problems and of validating the results. Courses (type, number of weekly contact hours, language – if other than German) V + R (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whe module is creditable for bonus) a) written examination (approx. 120 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 1 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic a examination of places	Lattice- ENO). M CL).	Boltzm Aethod	nann). Hyperbolic conse Is of high-performance o	rvation laws (fluid dyn	amics, finite differen	nce method, Riema	nn solver,
V + R (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on who module is creditable for bonus) a) written examination (approx. 120 minutes) or b) oral examination of one candidate each or oral examinat in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessmen and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic a examination regulations) 2009. Language of assessment: German, English Allocation of places Morkload Teaching cycle	sics wit	th the h	nelp of numerical simula	ations. They are espec			
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on who module is creditable for bonus) a) written examination (approx. 120 minutes) or b) oral examination of one candidate each or oral examinati in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 3 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessmen and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic a examination regulations) 2009. Language of assessment: German, English Allocation of places Morkload Teaching cycle 	Course	S (type, r	number of weekly contact hours	, language — if other than Ge	rman)		
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in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 1 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic a examination regulations) 2009. Language of assessment: German, English Allocation of places Additional information Workload 				uage — if other than German,	examination offered — if no	ot every semester, informa	ation on whether
Additional information Workload Teaching cycle	in grou weeks) Assess and wil examin Langua	ps (app or d) p ment o l be an ation r ge of a	prox. 30 minutes per cal presentation/seminar pr offered: When and how of mounced in due form un regulations) 2009. Issessment: German, Er	ndidate) or c) project r resentation (approx. 30 often assessment will nder observance of Sec	eport (approx. 8 to 1 5 minutes) be offered depends (o pages, time to co on the method of as	mplete: 1 to 4 ssessment
Workload Teaching cycle	Allocat	ion of _l	places				
Teaching cycle	 Additio	nal inf	ormation				
Teaching cycle	Worklo	ad					
 Bachelor's with 1 major Physics (2012) JMU Würzburg • generated 26-Aug-2024 • exam. page 16	Teachir	ng cycl	e				
Bachelor's with 1 major Physics (2012) JMU Würzburg • generated 26-Aug-2024 • exam. page 16:							
Bachelor's with 1 major Physics (2012) JMU Würzburg • generated 26-Aug-2024 • exam. page 16							
reg. data record Bachelor (180 ECTS) Physik - 2012	achelor's	with 1 ma	jor Physics (2012)				page 161 / 229

Module appears in

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Mathematical Physics (2012)

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Physics (2011)

Master's degree (1 major) Mathematical Physics (2012)

Master's degree (1 major) FOKUS Physics (2011)

Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 162 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Bachelor's with 1 major Physics (2012)

Module title				Abbreviation			
Supersymmet	try I and II			11-SUS-092-m01			
Module coordinator			Module offered by				
Managing Dire and Astrophys	ector of the Institute of Th sics	neoretical Physics	Faculty of Physics a	and Astronomy			
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)				
	rical grade						
Duration	Module level	Other prerequisites					
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for					
Contents		admission to assess	sment anew.				
Supersymmet ticles. Phenor Intended lear The students tric models. T	nenology of LEP, Tevatron ning outcomes have knowledge of the m	athematical and phy ry's formalism and rec	l. Higgs sector. The s metric neutrino mas sical principles of su	ymmetry. spectrum of supersymmetric par- s models. Violation of R-parity. upersymmetry and supersymme- ons to other models as well as its			
Courses (type, r	number of weekly contact hours,	language — if other than Ger	rman)				
V + R (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)			
Method of ass module is creditat		ge — if other than German,	examination offered — if no	ot every semester, information on whether			
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocation of	places						
Additional information							
Workload							
Teaching cycl	Teaching cycle						

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Module appears in

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 164 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation		
Renormalization Theory					11-RNT-092-m01		
Module coordinator				Module offered by			
Managi and Ast		ector of the Institute of Th sics	eoretical Physics	Faculty of Physics a	ind Astronomy		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
6	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for					
Conten	ts		admission to assess				
behavio levance ons. St berg-M and cor	our for e for ph ochast a differ mparise	dynamics beyond the eq ase diagrams in cryogen ic non-linear partial diffe	uilibrium. Classical-c ic temperatures. Insta rential equations. Co etries, e.g. in the stoc	ritical and quantum- ability of statistical a nstruction of generat	erential equations with scaling critical phenomena and their re- and dynamic mean-field soluti- ting functionals. Halperin-Hohen- ation (KPZ equation). Introduction		
			of renormalisation gr	oup methods for no	n-linear partial differential equa-		
					are able to apply them to specific		
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
R + V (n	no infor	mation on SWS (weekly o	contact hours) and co	ourse language availa	able)		
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether		
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
	Allocation of places						
Additio	nal inf	ormation					
Worklo	ad						

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

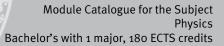
Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 166 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Relativ	istical	Quantumfield Theory			11-RQFT-092-m01
Module	e coord	linator		Module offered by	
Manag and As		ector of the Institute of sics	f Theoretical Physics	Faculty of Physics a	ind Astronomy
ECTS		od of grading	Only after succ. con	npl. of module(s)	
8	1	rical grade		•	
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate	sessment. The lectu at the beginning of sidered a declaration dents have obtained the course of the se sessment into effec ted to assessment i	rer will inform stude the course. Registrat on of will to seek adm d the qualification fo mester, the lecturer t. Students who mee n the current or in th date, students will h	alify for admission to as- nts about the respective details ion for the course will be con- nission to assessment. If stu- or admission to assessment ove will put their registration for as- et all prerequisites will be admit e subsequent semester. For as- ave to obtain the qualification for
Conten	ts		,		
	Feynm	nan rules. Quantum ele			and interaction. Perturbation on. Radiative corrections and r
Intend	ed lear	ning outcomes			
standir Course R + V (r	ng of ra s (type, i no info	Idiative corrections an number of weekly contact hou rmation on SWS (week	d renormalisation. rs, language — if other than Ge ly contact hours) and co	man) Durse language avail	-
		sessment (type, scope, lan ble for bonus)	guage — if other than German,	examination offered — if no	ot every semester, information on whether
a) writt groups project (approz Assess and wil examin	en exa (appro report x. 30 m ment o Il be ar nation i	mination (approx. 90 r ox. 30 minutes per can (approx. 8 to 10 pages iinutes) offered: When and how	didate, for modules with s, time to complete: 1 to often assessment will under observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	date each or oral examination i redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and
Allocat	-				
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			

Module appears in

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 168 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation	
Theory	of Rela	ativity			11-RTT-092-m01	
Module	e coord	linator		Module offered by	l	
	ing Dir	ector of the Institute of	of Theoretical Physics			
ECTS	<u> </u>	od of grading	Only after succ. con	Inly after succ. compl. of module(s)		
6	1	erical grade		•		
Duratio		Module level	Other prerequisites			
1 seme	ster	graduate	sessment. The lectu at the beginning of sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	rer will inform stude the course. Registrat on of will to seek adm d the qualification for mester, the lecturer t. Students who mee n the current or in th date, students will h	alify for admission to as- ents about the respective details tion for the course will be con- nission to assessment. If stu- or admission to assessment ove will put their registration for as- et all prerequisites will be admit the subsequent semester. For as- nave to obtain the qualification for	
Conten	its	1				
ments	of diffe	erential geometry; ele		nple of a relativistic §	mmary of special relativity; ele- gauge theory; field equations of Ilation	
-		ning outcomes		-		
mather able to Course	matical apply s (type, 1	l understanding of the the acquired knowlec number of weekly contact ho		elativity on the basis physics and cosmolo rman)		
		sessment (type, scope, la ole for bonus)	nguage — if other than German,	examination offered — if no	ot every semester, information on whether	
groups project (appro: Assess and wil examin	(appro report x. 30 m ment o Il be ar nation r	ox. 30 minutes per can (approx. 8 to 10 page hinutes) offered: When and how	ndidate, for modules with es, time to complete: 1 to w often assessment will under observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	idate each or oral examination i redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment 3 ASPO (general academic and	
Allocat	ion of	places				
Additio	onal inf	formation				
Worklo	ad					
 Teachi	ng cycl	le				
Referre	ed to in	LPOI (examination regula	ations for teaching-degree progra	ammes)		
		ajor Physics (2012)				
	with 1 mg			irg • generated 26-Aug-2024	• exam. page 169 / 22	



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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Bachelor's with 1 major Physics (2012)

Theoretical Elementary Particle Physics 11-TEP-092-m01 Module coordinator Module offered by Managing Director of the Institute of Theoretical Physics and Astronomy Faculty of Physics and Astronomy ECTS Method of grading Only after succ. compl. of module(s) 8 numerical grade Duration Module level Other prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective d at the beginning of the course. Registration for the course will be a sessment. The lecturer will inform students about the respective d at the beginning of the course. Registration for the course will be a sessment into effect. Students who meet all prerequisites will be a ted to assessment and exclusion to assessment the course of the semester, the lecturer will put their registration for sessment and admission to assessment and admission to assessment and admission to assessment and sessement and admission to assessment and admission to assessment and admission to assessment and sessesment and admission to assessment and the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualification for admission to assessment and the course of the semester and admission to assessment and sessessment and astronomed. Fundamental forces and particles. Groups and symmetries. Quark model. Principles of quantum field theoret subsequent semester. For sessment and alter date, students will have to obtain the qualification for admission to assessment and admission to assessment and with the mathematical methods of the standard model. F	
Managing Director of the Institute of Theoretical Physics Faculty of Physics and Astronomy ECTS Method of grading Only after succ. compl. of module(s) 8 numerical grade Duration Module level Other prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective d at the beginning of the course. Registration for the course will be c sidered a declaration of will to seek admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be at ted to assessment into effect. Students will have to obtain the qualification for admission to assessment and anission to assessment and anission to assessment and anission to assessment at a later date, students will have to obtain the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be a ted to assessment at a later date, students will have to obtain the qualification for admission to assessment and anission to assessment anew. Contents Fundamental forces and particles. Groups and symmetries. Quark model. Principles of quantum field theore Gauge theories. Spontaneous symmetry breaking. Electroweak standard model. Quantum chrome dynamic tensions of the standard model. Intende Learning outcomes The students are familiar with the mathematical methods of Elementary Particle Physics. They understand structure of the standard model based on symmetry principles and experimental observations. They know lation methods for the processing of simple problems and processes of Elem	
and Astrophysics Only after succ. compl. of module(s) ECTS Method of grading Only after succ. compl. of module(s) 8 numerical grade Duration Module level Other prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective dat the beginning of the course. Registration for the course will be a time beginning of the course. Registration for admission to assessment. If s dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be a ted to assessment in the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualification for admission to assessment and admission to assessment and assessment and a later date, students will have to obtain the qualification for admission to assessment and admission to assessment and admission to assessment and assessment and the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualification for admission to assessment and a ter date, students will have to obtain the qualification for admission to assessment and a later date. Fundamental forces and particles. Groups and symmetries. Quark model. Principles of quantum field theo Gauge theories. Spontaneous symmetry breaking. Electroweak standard model. Quantum chrome dynami tensions of the standard model. Intended learning outcomes The students are familiar with the mathematical methods of Elementary Particle Physics. They understand structure of the standard model based on symmetry principles and experimental observat	
8 numerical grade Duration Module level Other prerequisites 1 semester graduate Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective d at the beginning of the course. Registration for the course will be or sidered a declaration of will to seek admission to assessment. If s dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be at ted to assessment in the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualification for admission to assessment admission to assessment at a later date, students will have to obtain the qualification for sessment and the sessment and the sessment and the subsequent semester. For sessment at a later date, students will have to obtain the qualification for the subsequent semester. For sessment at a later date, students will have to obtain the qualification for the subsequent semester. For sessment at a later date, students will have to obtain the qualification for the subsequent semester. For sessment at a later date, students will have to obtain the qualification for the standard model. Fundamental forces and particles. Groups and symmetries. Quark model. Principles of quantum field theor Gauge theories. Spontaneous symmetry breaking. Electroweak standard model. Quantum chrome dynamit tensions of the standard model. Intended learning outcomes Intended learning outcomes The students are familiar with the mathematical methods of Elementary Particle Physics. They understand structure of the standard model bas	
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1 semester graduate Certain prequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective d at the beginning of the course. Registration for the course will be a sidered a declaration of will to seek admission to assessment. If s dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be a ted to assessment in the current or in the subsequent semester. For sessment at a later date, students will have to obtain the qualificat admission to assessment admission to assessment anew. Contents Fundamental forces and particles. Groups and symmetries. Quark model. Principles of quantum field theor Gauge theories. Spontaneous symmetry breaking. Electroweak standard model. Quantum chrome dynamitensions of the standard model. Intended learning outcomes The students are familiar with the mathematical methods of Elementary Particle Physics. They understand structure of the standard model based on symmetry principles and experimental observations. They know lation methods for the processing of simple problems and processes of Elementary Particle Physics. Furth re, they know the tests and limits of the standard model and the basics of extended theories. Courses (type, number of weekly contact hours, language — if other than German)	
sessment. The lecturer will inform students about the respective d at the beginning of the course. Registration for the course will be d sidered a declaration of will to seek admission to assessment. If s dents have obtained the qualification for admission to assessment 	
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Fundamental forces and particles. Groups and symmetries. Quark model. Principles of quantum field theo Gauge theories. Spontaneous symmetry breaking. Electroweak standard model. Quantum chrome dynami tensions of the standard model. Intended learning outcomes The students are familiar with the mathematical methods of Elementary Particle Physics. They understand structure of the standard model based on symmetry principles and experimental observations. They know lation methods for the processing of simple problems and processes of Elementary Particle Physics. Furth re, they know the tests and limits of the standard model and the basics of extended theories. Courses (type, number of weekly contact hours, language – if other than German)	
Courses (type, number of weekly contact hours, language — if other than German)	l the calcu-
K + V (no momation on SWS (weekly contact nous) and course language available)	
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on w module is creditable for bonus)	vhether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examina groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presenta (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessm and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic examination regulations) 2009. Language of assessment: German, English	or c) ation ent
Allocation of places	
Additional information	
Workload	
Teaching cycle	

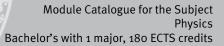
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Module appears in

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

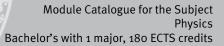
Module title Abbreviation								
Experin	nental	Particle Physics			11-TPE-092-m01			
Module	coord	inator		Module offered by				
Managi	ng Dire	ector of the Institute of	Applied Physics	plied Physics Faculty of Physics and Astronomy				
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)				
4	nume	rical grade						
Duratio	n	Module level	Other prerequisites	i i				
1 semestergraduateCertain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective deta at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment or the course of the semester, the lecturer will put their registration for a sessment into effect. Students who meet all prerequisites will be admited to assessment at a later date, students will have to obtain the qualification admission to assessment anew.					tive details Il be con- nt. If stu- ssment over tion for as- ill be admit- ster. For as-			
Conten	ts							
supersy	/mmeti as oth	y and other physics be er parameters of the st	ers at the LHC and at the eyond the standard mod andard model. Introduc	del. Determination o	f the top quark mass	and W mass		
Intende	ed learı	ning outcomes						
questio lysis an	ons of P Id are a	article Physics, which ble to put results into	nciples of modern part are examined by using context and to assess t	these detectors. The heir systematic unce	y know modern met			
			s, language — if other than Ger					
			y contact hours) and co					
		s essment (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether		
groups project (approx Assess and wil examin	a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English							
Allocat	ion of p	olaces						
Additio	nal inf	ormation						
Worklo	ad							
Teachir	ng cycl	9						
Referre	d to in	LPO I (examination regulati	ons for teaching-degree progra	ammes)				
		_						
Bachelor's	with 1 maj	or Physics (2012)		rrg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 173 / 229		



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) Computational Mathematics (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 174 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

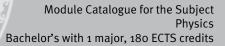
Module title Abbreviation							
Particle	e Physi	cs (Standard Model)			11-TPS-092-m01		
Module	coord	inator		Module offered by			
		ectors of the Institute o f Theoretical Physics a		d Faculty of Physics and Astronomy			
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)			
8	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semestergraduateCertain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment admission to assessment anew.						ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-	
Conten	Contents						
		o the theory of electrow el and determination o		ontaneous symmetry	y breaking. Experime	ents on the	
Intende	ed leari	ning outcomes					
perimer	nts tha	know the theoretical fu t have established and sults in the framework o	confirmed the standar	d model. They are al	ole to interpret expe		
Courses	5 (type, n	umber of weekly contact hour	s, language — if other than Ger	man)			
R + V (n	o infor	mation on SWS (weekl	y contact hours) and co	urse language availa	able)		
		essment (type, scope, lang le for bonus)	uage — if other than German, o	examination offered — if no	t every semester, informati	on on whether	
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English						nutes) or c) esentation sessment	
Allocati	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachin	ng cycl	e					
Referre	d to in	LPO I (examination regulati	ons for teaching-degree progra	mmes)			
Bachelor's v	with 1 maj	or Physics (2012)		rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 175 / 229	



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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Modul	e title				Abbreviation
Theore	tical As	strophysics			11-AST-092-m01
Modul	e coord	inator		Module offered by	1
Manag and As		ector of the Institute of T sics	heoretical Physics	Faculty of Physics a	and Astronomy
ECTS	ECTS Method of grading Only after succ. compl. of module(s)				
6 numerical grade					
Duratio	on	Module level	Other prerequisites	;	
1 seme	ster	graduate			
Conter	ts		•		
Theore	tical As	trophysics, models for t	he description of com	plex observation res	sults, numeric simulations.
		ning outcomes		_	,
	-		the methods of Theo	pretical Astrophysics	. They are able to design complex
		and to test the models w			
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
	-	mation on SWS (weekly			able)
-					ot every semester, information on whether
		le for bonus)	,		,
written	exami	nation (approx. 120 minu	utes)		
Allocat	ion of	olaces			
Additio	onal inf	ormation			
Worklo	ad				
Teachi					
Teacin	ing cyci	e			
				`	
	ea to in	LPO I (examination regulation	is for teaching-degree progra	ammes)	
		•			
Modul					
	-	ree (1 major) Physics (20			
	-	ree (1 major) Physics (20 ree (1 major) Mathematio			
	-	ree (1 major) Mathematic			
	-	ee (1 major) Physics (201	•		
	0	ee (1 major) Physics (201	,		
	-	ee (1 major) Mathematic			
	-	ee (1 major) FOKUS Phys	•		
Master	's degr	ee (1 major) FOKUS Phys	ics (2011)		
Master	's degr	ee (1 major) FOKUS Phys	ics (2006)		

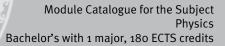
Module	e title				Abbreviation	
Strong	Interac	tion in Accelerator Expe	riments		11-WWB-102-m01	
Module	e coord	inator		Module offered by	<u> </u>	
Manag	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics a	and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	· · · · · · · · · · · · · · · · · · ·	
3	nume	rical grade		-		
Duratio	on	Module level	Other prerequisites			
1 semestergraduateCertain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective of at the beginning of the course. Registration for the course will be or sidered a declaration of will to seek admission to assessment. If set dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be ted to assessment in the current or in the subsequent semester. F sessment at a later date, students will have to obtain the qualification admission to assessment anew.					ctive details vill be con- ent. If stu- essment over ation for as- vill be admit- ester. For as-	
Conten	ts					
Asymp	tomatic QCD Jet	r freedom/confinement. t simulation. Hadron pro	•	-	-	•
Intend	ed learı	ning outcomes				
	nts. Th	know the basic organisa ey have knowledge of m				
Course	S (type, n	umber of weekly contact hours,	language — if other than Ger	rman)		
V + R (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		essment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, informa	tion on whether
groups project (approz Assess and wil examin	(appro report x. 30 m ment o Il be an action r	nination (approx. 90 min x. 30 minutes per candio (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form un- egulations) 2009. ssessment: German, Eng	date, for modules with ime to complete: 1 to ften assessment will h der observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	redits approx. 20 mi entation/seminar pr on the method of as	nutes) or c) resentation rsessment
Allocat	ion of p	olaces				
			-			
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	ammes)		
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bachelor's	with 1 maj	or Physics (2012)		rrg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 178 / 229



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2006)

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	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation		
Practical Course Astrophysics				11-APP-111-m01			
Module coordinator			Module offered by				
Managing Director of the Institute of Theoretical Physics and Astrophysics		Faculty of Physics and Astronomy					
			Only after succ. con	compl. of module(s)			
6	(not)	successfully completed					
Duration Module level C		Other prerequisites					
1 seme	ster	graduate	sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment in sessment at a later	rtain prerequisites must be met to qualify for admission to as- ssment. The lecturer will inform students about the respective detail the beginning of the course. Registration for the course will be con- dered a declaration of will to seek admission to assessment. If stu- nts have obtained the qualification for admission to assessment over e course of the semester, the lecturer will put their registration for as ssment into effect. Students who meet all prerequisites will be admi d to assessment in the current or in the subsequent semester. For as ssment at a later date, students will have to obtain the qualification mission to assessment anew.			
Conten	ts						
Astroph tions.	nysical	experiments in the field	s of detectors, telesco	opes, methodology, a	analysis and astronc	omic observa-	
Intende	ed lear	ning outcomes					
and wit ons and Course	th basi d meas s (type, r	ta and present the result c techniques of detecting surements and to presen number of weekly contact hours, tion on SWS (weekly con	g electromagnetic rad t the results. language — if other than Gen	iation. They are able	to plan and evaluat		
		Sessment (type, scope, languale for bonus)	age — if other than German,	examination offered — if no	t every semester, informat	ion on whether	
(exam) test the nutes). Assess and wil	is pas e candi ment o Il be an	performing and evaluatin sed. Experiments that we date's understanding of ffered: When and how o nounced in due form un egulations) 2009.	ere not successfully co the physics-related co ften assessment will l	ompleted can be rep ontents and results o be offered depends o	eated once. Or b) di of the experiment (ap on the method of as	scussion to oprox. 20 mi-	
	ion of	places					
Allocat							
Allocat		ormation					
Allocat Additio 	onal inf	ormation					
Allocat	onal inf	ormation					
Allocat Additio Worklo 	onal inf ad						
Allocat Additio	onal inf ad						
Allocat Additio Worklo Teachin 	nal inf ad ng cycl		ns for teaching-degree progra	ımmes)			
Allocat Additio Worklo Teachin 	nal inf ad ng cycl	e	ns for teaching-degree progra	ımmes)			

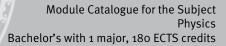


Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2006)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 181 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation	
Genera	l Theo	ry of Relativity			11-ART-112-m01	
Module	e coord	inator		Module offered by	<u> </u>	
Managi and As		ector of the Institute of sics	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. con	npl. of module(s)		
4		rical grade		•		
Duratio	on	Module level	Other prerequisites	;		
1 seme	ester	graduate	sessment. The lecture at the beginning of sidered a declaration dents have obtaine the course of the se sessment into effect ted to assessment i	es must be met to quarer will inform stude the course. Registrat on of will to seek adm d the qualification for emester, the lecturer t. Students who mee n the current or in th date, students will h sment anew.	nts about the respe- tion for the course we hission to assessme or admission to asse will put their registra et all prerequisites we e subsequent seme	ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-
Conten	its	1	1			
ments	of diffe	rential geometry; elect	eory of relativity; differe rodynamics as an exan roduction to cosmology	nple of a relativistic §	gauge theory; field e	
		ning outcomes				
mather able to	matical apply	understanding of the the acquired knowledg	asic physical and mathe formulation of general i ge to problems of Astrop	relativity on the basis physics and cosmolo	s of differential form	
	-		rs, language — if other than Ge		11.	
			ly contact hours) and co			
		Sessment (type, scope, lang ble for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
groups project (approx Assess and wil	(appro report x. 30 m ment o Il be an	ox. 30 minutes per cano (approx. 8 to 10 pages inutes) iffered: When and how	ninutes) or b) oral exam didate, for modules wit s, time to complete: 1 to often assessment will under observance of Se	h less than 4 ECTS cr 4 weeks) or d) prese be offered depends	redits approx. 20 min entation/seminar pro on the method of as:	nutes) or c) esentation sessment
Allocat	ion of _l	places				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
 Referre	ed to in	LPO I (examination regulat	ions for teaching-degree progra	ammes)		
Bachelor's	with 1 ma	jor Physics (2012)		ırg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 182 / 229

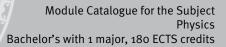


Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2006)

Bachelor's with 1 major Physics (2012)	JMU Würzburg ● generated 26-Aug-2024 ● exam.	page 183 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

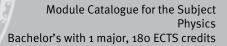
Module	e title				Abbreviation	
Specia	l Theor	y of Relativity			11-SRT-112-m01	
Module	e coord	inator		Module offered by	l	
	ing Dire	ector of the Institute of	Theoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)		
4	1	rical grade		•		
Duratio	on .	Module level	Other prerequisites			
1 seme	ster	graduate	sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the set sessment into effect ted to assessment i	rerequisites must be met to qualify for admission to as- t. The lecturer will inform students about the respective details ginning of the course. Registration for the course will be con- declaration of will to seek admission to assessment. If stu- ve obtained the qualification for admission to assessment ove se of the semester, the lecturer will put their registration for as- t into effect. Students who meet all prerequisites will be admit sessment in the current or in the subsequent semester. For as- t at a later date, students will have to obtain the qualification for		ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-
Conten	its					
		principles; differential of motion; relativistic	forms; special relativit free particle	y; Minkowski space;	; Lorentz transforma	tion, Hamilto-
Intend	ed lear	ning outcomes				
familia ge to p	r with r roblem	nodern mathematical f s of special relativity.d	ysical concepts and ma ormulation of special re en. s, language — if other than Ger	elativity. They are ab		
	-		y contact hours) and co		able)	
Metho	d of ass		guage — if other than German,			ion on whether
groups project (approz Assess and wi	(appro report x. 30 m ment o Il be an	x. 30 minutes per cand (approx. 8 to 10 pages inutes) ffered: When and how	ninutes) or b) oral exam lidate, for modules with , time to complete: 1 to often assessment will l nder observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	edits approx. 20 min entation/seminar pro on the method of as:	nutes) or c) esentation sessment
Allocat						
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
	1	LDOL				
	ed to in	LPO I (examination regulati	ons for teaching-degree progra	ummes)		
Referre			ons for teaching-degree progra	immes)		



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2006)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 185 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation	
Particle	e Radia	tion Detectors			11-DTS-111-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)		
4	nume	rical grade				
Duratio	on	Module level	Other prerequisites	i		
1 semestergraduateCertain prerequisites must be met to qualify for admission to as sessment. The lecturer will inform students about the respective at the beginning of the course. Registration for the course will be sidered a declaration of will to seek admission to assessment. It dents have obtained the qualification for admission to assess m the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites will be ted to assessment in the current or in the subsequent semester. sessment at a later date, students will have to obtain the qualifi admission to assessment anew.		ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-				
Conten	ts					
			rticles and matter. Parti particle identification.			
Intende	ed lear	ning outcomes				
and ap	plicatio		ciples and the basic str f detectors, they can ex of detector systems.			
			rs, language — if other than Ge			
			ly contact hours) and co			
		s essment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informati	on on whether
groups project (approx Assess and wil examin	(appro report x. 30 m ment o Il be an nation r	x. 30 minutes per cano (approx. 8 to 10 pages inutes) ffered: When and how	ninutes) or b) oral exam didate, for modules with , time to complete: 1 to often assessment will under observance of Sen nglish	h less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	edits approx. 20 mir entation/seminar pre on the method of ass	nutes) or c) esentation sessment
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Keterre	a to in	LTUI (examination regulation	ons for teaching-degree progra	ammes)		
 Module	3 30000	are in				
Mouule	e ahhag	uə III				
Bachelor's	with 1 ma	or Physics (2012)		rrg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 186 / 229



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2006)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 187 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation
Current Topic	s in Experimental Physics	5		11-BXE5-112-m01
Module coord	linator		Module offered by	
chairperson o	chairperson of examination committee Faculty of Physics and Astronomy		nd Astronomy	
ECTS Meth	od of grading	Only after succ. com	npl. of module(s)	
5 nume	erical grade			
Duration	Module level	Other prerequisites		
1 semester	undergraduate	Approval by examin	ation committee req	uired.
Contents				
Current topic or study abro		. Accredited academi	c achievements, e.g.	. in case of change of university
Intended lear	ning outcomes			
sics of the Ba understand t	chelor's programme. They	y have knowledge of a uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ne of Experimental Physics and s knowledge. They are able to
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	man)	
V + R (no info	rmation on SWS (weekly o	contact hours) and co	urse language avail	able)
Method of as module is credita		ge — if other than German, e	examination offered — if no	t every semester, information on whether
in groups (ap weeks) or d)		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 10	lidate each or oral examination o pages, time to complete: 1 to 4
Allocation of	places			
Additional in	formation			
Workload				
Teaching cyc	le			
Referred to in	LPOI (examination regulation	s for teaching-degree progra	mmes)	
Module appe	ars in			
	gree (1 major) Physics (20			
Bachelor' deg	gree (1 major) Physics (20	12)		

Module title				Abbreviation
Current Topic	s in Experimental Physics	5		11-BXE6-112-m01
Module coord	linator		Module offered by	
chairperson o	f examination committee		Faculty of Physics a	ind Astronomy
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)	
6 nume	rical grade			
Duration	Module level	Other prerequisites		
1 semester	undergraduate	Approval by examin	ation committee req	uired.
Contents				
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or
Intended lear	ning outcomes			
sics of the Ba understand th	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether
in groups (ap weeks) or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocation of	places			
Additional inf	ormation			
Workload				
Teaching cycl	le			
Referred to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module appea	ars in			
-	ree (1 major) Physics (20			
Bachelor' deg	ree (1 major) Physics (20:	12)		

Module title				Abbreviation
Current Topic	s in Experimental Physics	5		11-BXE8-112-m01
Module coord	linator		Module offered by	
chairperson o	f examination committee		Faculty of Physics a	ind Astronomy
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)	
8 nume	rical grade			
Duration	Module level	Other prerequisites		
1 semester	undergraduate	Approval by examin	ation committee req	uired.
Contents				
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or
Intended lear	ning outcomes			
sics of the Ba understand th	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether
in groups (ap weeks) or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocation of	places			
Additional inf	ormation			
Workload				
Teaching cycl	le			
Referred to in	LPOI (examination regulation	s for teaching-degree progra	mmes)	
Module appea	ars in			
-	ree (1 major) Physics (20			
Bachelor' deg	ree (1 major) Physics (20	12)		

Module	e title				Abbreviation
Curren	t Topic	s in Theoretical Physics			11-BXT5-112-m01
Module	e coord	inator		Module offered by	
chairpe	chairperson of examination committee Faculty of Physics and Astronomy		and Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	ts				
Current study a	•	in Theoretical Physics. C	redited academic ac	hievements, e.g. in c	ase of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Bao 5 and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Ger	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	t every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat	ion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	е			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 191 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Current	t Topic	s in Theoretical Physics			11-BXT6-112-m01
Module	Module coordinator			Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	ind Astronomy
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Current study a	•	of Theoretical Physics. A	Accredited academic a	achievements, e.g. ir	n case of change of university or
Intende	ed lear	ning outcomes			
sics of Physics	the Bao and h	chelor's programme. They	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V + R (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachiı	ng cycl	е			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module	appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 192 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Current	t Topic	s in Theoretical Physics			11-BXT8-112-m01
Module coordinator				Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
8	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a	•	of Theoretical Physics. A	Accredited academic a	achievements, e.g. ir	n case of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	t every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat			0		
			-		
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Module title				Abbreviation	
Particle Radiation Detectors					11-DTS-131-m01
Module co	oordir	nator		Module offered by	
Managing	g Direo	ctor of the Institute of Ap	plied Physics	Faculty of Physics a	nd Astronomy
ECTS M	lethoo	d of grading	Only after succ. com	pl. of module(s)	
4 ni	umeri	cal grade			
Duration	!	Module level	Other prerequisites		
1 semester graduate		sessment. The lectu at the beginning of t sidered a declaratio dents have obtained the course of the set sessment into effect	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semesters.		
Contents					
					ce and time measurement, deter- e detectors in examples.
Intended	learni	ing outcomes			
and applie	catior		etectors, they can ex		tectors. They know the functions ent of physical values and have
Courses (ty	type, nu	mber of weekly contact hours, la	anguage — if other than Ger	man)	
V + Ü (no i	inforn	nation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Method of module is cre			ge — if other than German, e	examination offered — if no	t every semester, information on whether
in groups weeks) or Assessme and will b examinati	(appr r d) pro ent off e ann ion reg	ox. 30 minutes per canc esentation/seminar pres fered: When and how off	lidate) or c) project re sentation (approx. 3c en assessment will b ler observance of Sec	eport (approx. 8 to 10 o minutes) oe offered depends o	date each or oral examination p pages, time to complete: 1 to 4 on the method of assessment 3 ASPO (general academic and
Allocation	n of pl	aces			
Additiona	al info	rmation			
Workload	l				
Teaching	cycle				
Referred t	to in L	POI (examination regulations	s for teaching-degree progra	mmes)	
Module a	ppear	's in			
		ee (1 major) Physics (201	.0)		
	-	ee (1 major) Physics (201			

Bachelor's with 1 major Physics (2012)



Complex Systems, Quantum control and Biophysics

(ECTS credits)

Modules for advanced Bachelor's students offered by the Faculty with regard to preparation for Bachelor's thesis and specialisation in Master's programme.

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 195 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation		
Biophy	sical N	leasurement Technolo	ogy in Medical Science	2	11-BMT-092-m01		
Module	e coord	inator		Module offered by			
Manag	ing Dire	ector of the Institute o	f Applied Physics		Faculty of Physics and Astronomy		
ECTS	CTS Method of grading Only after succ.		Only after succ. co	ompl. of module(s)			
6	nume	rical grade					
Duration Module level Other prerequisites							
1 semester graduate Certain prerequis sessment. The le at the beginning sidered a declara dents have obtai the course of the sessment into ef ted to assessmen sessment at a lat		sessment. The lec at the beginning o sidered a declarat dents have obtain the course of the sessment into effe ted to assessment	prerequisites must be met to qualify for admission to as- the lecturer will inform students about the respective details reginning of the course. Registration for the course will be con- a declaration of will to seek admission to assessment. If stu- ve obtained the qualification for admission to assessment over se of the semester, the lecturer will put their registration for as- ti into effect. Students who meet all prerequisites will be admit- sessment in the current or in the subsequent semester. For as- ti at a later date, students will have to obtain the qualification for				
Conten	nts	L	ł				
topics sound	are con	ventional X-ray techni R-tomography. The lec	ciples of imaging tech ique, computer tomog ture additionally addre	raphy, imaging techni	ques of nuclear medi	cine, ultra-	
Intend	ed lear	ning outcomes					
images	5.		neration and are able		chniques and interpro	et simple	
			(ly contact hours) and		lable)		
		sessment (type, scope, lar le for bonus)	nguage — if other than Germa	n, examination offered — if n	ot every semester, information	on on whether	
groups project (approz Assess and wil examir	(appro t report x. 30 m ment o Il be an nation r	x. 30 minutes per can (approx. 8 to 10 page inutes) ffered: When and how	minutes) or b) oral exa didate, for modules w s, time to complete: 1 v often assessment wil under observance of S English	ith less than 4 ECTS c to 4 weeks) or d) pres Il be offered depends	redits approx. 20 min entation/seminar pre on the method of ass	utes) or c) esentation essment	
Allocat	tion of p	olaces					
Additio	onal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regula	tions for teaching-degree prov	grammes)			
				3.4			
		jor Physics (2012)	-	burg • generated 26-Aug-2024			

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011) Master's degree (1 major) FOKUS Physics (2011)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 197 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Bachelor's with 1 major Physics (2012)

	e title				Abbreviation
Laboratory and Measurement Technology in Biophysics			ogy in Biophysics		11-LMB-092-m01
Modul	e coord	inator		Module offered by	
Managing Director of the Institute of Applied Physics		pplied Physics	Faculty of Physics a	and Astronomy	
ECTS	S Method of grading Only after succ. compl. of module(s)				
6	nume	rical grade			
Duration Module level Other prerequis		Other prerequisites	i		
1 semester graduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for			
Conten	its		admission to asses		
measu methoo Intendo The stu sical p	ring tec ds of st ed learn idents l rocedui	hniques and sensors, m ructure elucidation of bio ning outcomes know the principles of m res for the examination a	ethods of single-part omolecules. olecular and cellular	icle detection, speci	s. The main topics are optical al microscoping techniques and e physical principles of biophy-
measuring techniques and their applications and are able to apply techniques of structure elucidation to simple biomolecules.					
	lecules.	· · · ·		o apply techniques of	
Course	ecules. S (type, r	number of weekly contact hours,	language — if other than Ge	o apply techniques (of structure elucidation to simple
Course R + V (r	ecules. S (type, r no infor	number of weekly contact hours, mation on SWS (weekly	language — if other than Gen contact hours) and cc	o apply techniques (rman) ourse language avail	of structure elucidation to simple able)
Course R + V (r Metho	lecules. s (type, r no infor d of ass	number of weekly contact hours, mation on SWS (weekly	language — if other than Gen contact hours) and cc	o apply techniques (rman) ourse language avail	of structure elucidation to simple
Course R + V (r Metho module is a) writt groups project (appro. Assess and wi examir	ecules. (type, r to infor d of ass s creditab cen exat (appro report x. 30 m ment o ll be an hation r	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 mir x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	of structure elucidation to simple able)
Course R + V (r Method module i: a) writt groups project (appro. Assess and wi examir Langua	ecules. (type, r to infor d of ass s creditab cen exat (appro report x. 30 m ment o ll be an hation r	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 min x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form un- egulations) 2009. ssessment: German, Eng	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	able) able) of every semester, information on whether idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment
Course R + V (r Method module i: a) writt groups project (appro. Assess and wi examir Langua	ecules. (type, r no infor d of ass s creditab cen exall (appro report x. 30 m ment o ll be an nation r age of a	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 min x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form un- egulations) 2009. ssessment: German, Eng	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	able) able) of every semester, information on whether idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment
Course R + V (r Methor module i: a) writt groups project (appro. Assess and wi examir Langua Allocat	ecules. s (type, r no infor d of ass s creditab cen exal (appro report x. 30 m ment o ll be an nation r age of a cion of p	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 min x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form un- egulations) 2009. ssessment: German, Eng	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	able) able) of every semester, information on whether idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment
Course R + V (r Methor module i: a) writt groups project (appro. Assess and wi examir Langua Allocat	ecules. s (type, r no infor d of ass s creditab cen exal (appro report x. 30 m ment o ll be an nation r age of a cion of p	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 min x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form une egulations) 2009. ssessment: German, Eng blaces	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	able) able) of every semester, information on whether idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment
Course R + V (r Methor module i: a) writt groups project (appro. Assess and wi examir Langua Allocat	s (type, r no infor d of ass s creditab cen exal (appro report x. 30 m ment o Il be an nation r age of a cion of p	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 min x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form une egulations) 2009. ssessment: German, Eng blaces	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	able) able) of every semester, information on whether idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment
Course R + V (r Methor module i: a) writt groups project (appro. Assess and wi examir Langua Allocat Additic	s (type, r no infor d of ass s creditab cen exal (appro report x. 30 m ment o Il be an nation r age of a cion of p	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 min x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form une egulations) 2009. ssessment: German, Eng blaces	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	able) able) of every semester, information on whether idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment
Course R + V (r Method module is a) writt groups project (appro. Assess and wi examir Langua Allocat Additic 	s (type, r no infor d of ass s creditab cen exal (appro report x. 30 m ment o Il be an nation r age of a cion of p	number of weekly contact hours, mation on SWS (weekly sessment (type, scope, langua le for bonus) mination (approx. 90 mir x. 30 minutes per candic (approx. 8 to 10 pages, t inutes) ffered: When and how of nounced in due form une egulations) 2009. ssessment: German, Eng blaces	language — if other than Ger contact hours) and co age — if other than German, nutes) or b) oral exam date, for modules with time to complete: 1 to ften assessment will 1 der observance of Sec	o apply techniques o rman) ourse language avail examination offered — if no hination of one candi h less than 4 ECTS cr 4 weeks) or d) prese be offered depends of	able) able) of every semester, information on whether idate each or oral examination in redits approx. 20 minutes) or c) entation/seminar presentation on the method of assessment

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Referred to in LPO I (examination regulations for teaching-degree programmes)

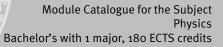
Module appears in

Bachelor' degree (1 major) Physics (2010)
Bachelor' degree (1 major) Physics (2012)
Bachelor' degree (1 major) Nanostructure Technology (2010)
Bachelor' degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
Master's degree (1 major) Physics (2011)
Master's degree (1 major) Nanostructure Technology (2011)
Master's degree (1 major) Nanostructure Technology (2010)
Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010)
Master's degree (1 major) FOKUS Physics (2010)
Master's degree (1 major) FOKUS Physics (2011)
Master's degree (1 major) Functional Materials (2012)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 199 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation	
Nano-Optics					11-NOP-092-m01	
Module	e coord	inator		Module offered by		
Managing Director of the Institute of Ap		pplied Physics	Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
4	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semester graduate		sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for			
Conten	ts		•			
		inciples. Focussing of lig ters. Light emission in r				y. Single
Intende	ed learı	ning outcomes				
		nave specific and advan les and application area				th the theo-
Course	S (type, n	umber of weekly contact hours	, language — if other than Gei	rman)		
R + V (n	io infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		s essment (type, scope, langu le for bonus)	age — if other than German,	examination offered — if no	t every semester, informat	ion on whether
groups project (approx Assess and wil examin	(appro report k. 30 m ment o l be an ation r	mination (approx. 90 mi x. 30 minutes per candi (approx. 8 to 10 pages, inutes) ffered: When and how c nounced in due form ur egulations) 2009. ssessment: German, En	date, for modules with time to complete: 1 to ften assessment will h der observance of Sec	n less than 4 ECTS cr 4 weeks) or d) prese pe offered depends o	edits approx. 20 mir entation/seminar pre on the method of ass	nutes) or c) esentation sessment
Allocat						
Additio	nal inf	ormation				
Worklo	ad					
Teachir	ıg cycl	e				
Referre	d to in	LPO I (examination regulatio	ns for teaching-degree progra	mmes)		
Module		urs in				
		ree (1 major) Physics (20	010)			
	_	or Physics (2012)	JMU Würzbu	rg • generated 26-Aug-2024 ord Bachelor (180 FCTS) Phys		page 200 / 229

Julius-Maximilians-UNIVERSITÄT WÜRZBURG



Bachelor' degree (1 major) Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 201 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation
Physics of Complex Systems					11-PKS-092-m01
Module	e coord	inator		Module offered by	
Managi and Ast	-	ector of the Institute of Th sics	eoretical Physics	Faculty of Physics a	nd Astronomy
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate	sessment. The lectu at the beginning of t sidered a declaratio dents have obtained the course of the se sessment into effect ted to assessment in	rer will inform stude the course. Registrat n of will to seek adm the qualification fo mester, the lecturer t. Students who mee n the current or in th date, students will h	alify for admission to as- nts about the respective details ion for the course will be con- nission to assessment. If stu- r admission to assessment over will put their registration for as- t all prerequisites will be admit- e subsequent semester. For as- ave to obtain the qualification for
Conten	ts				
 2. Intro 3. Entro 4. Phas 5. Unive 6. Spin 	duction opy pro e trans ersality glasse		equilibriumt t		
-		ning outcomes			
The stu methoo	dents l ls of St	nave specific and advanc	tational Physics and	non-linear dynamics	omplex systems. They know the , which are used to describe
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
R + V (n	io infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		s essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					
Allocat					
Additio	nal inf	ormation			
Worklo	ad				

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Mathematical Physics (2012) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 203 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Bachelor's with 1 major Physics (2012)

Module title Abbreviation					
Quanti	um Info	rmation and Quantum C	omputing		11-QIC-092-m01
Modul	e coord	inator		Module offered by	·
	ging Dire strophys	ector of the Institute of T sics	heoretical Physics	Faculty of Physics a	and Astronomy
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 semestergraduateCertain prerequisites must be met to qualify for admission to as sessment. The lecturer will inform students about the respective at the beginning of the course. Registration for the course will b sidered a declaration of will to seek admission to assessment. I dents have obtained the qualification for admission to assess ment into effect. Students who meet all prerequisites will b ted to assessment in the current or in the subsequent semester 			nts about the respective details ion for the course will be con- nission to assessment. If stu- r admission to assessment over will put their registration for as- t all prerequisites will be admit- e subsequent semester. For as-		
Conter	nts		admission to assess	sment anew.	
tron sp states. Intend	oin state ed lear i	es. The third part covers	the description and e	xplanation of decom	ipulation of coherent two-elec- erence of quantum mechanical owledge of quantum calculation.
		to solve simple problem			5 -
Course	es (type, r	umber of weekly contact hours,	language — if other than Ger	rman)	
R + V (I	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		essment (type, scope, langu le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009. Language of assessment: German, English					
Allocation of places					
Additio	onal inf	ormation			
Worklo	oad				
			_		
Teaching cycle					
Teachi	ng cycl	e			

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Referred to in LPO I (examination regulations for teaching-degree programmes)

Module appears in

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Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 205 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation	
Statist	ics, Da	ta Analysis and Comp	uter Physics		11-SDC-092-m01	
Modul	e coord	inator		Module offered by		
Managing Director of the Institute of Applied Physics			f Applied Physics	Faculty of Physics a	ind Astronomy	
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
4		rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester graduate Certa sessi at the sider dents the c sessi ted to sessi ted to			sessment. The lecture at the beginning of the sidered a declaration dents have obtained the course of the se sessment into effect ted to assessment i	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification fo		
Conten	its					
Statisti	ics, dat	a analysis and compu	ter physics.			
Intend	ed lear	ning outcomes				
The stu Physics		have specific and adv	anced knowledge in the	field of statistics, da	ata analysis and Con	nputational
Course	S (type, r	number of weekly contact hou	ırs, language — if other than Gei	rman)		
R + V (r	no infoi	mation on SWS (week	ly contact hours) and co	ourse language avail	able)	
module is	s creditab	le for bonus)	nguage — if other than German,			
groups project (approz Assess and wil examir Langua	(appro treport x. 30 m ment o Il be an nation r age of a	ox. 30 minutes per can (approx. 8 to 10 page inutes) ffered: When and how nounced in due form egulations) 2009. sssessment: German, l	minutes) or b) oral exam didate, for modules with s, time to complete: 1 to v often assessment will h under observance of Sec English	n less than 4 ECTS cr 4 weeks) or d) prese be offered depends o	edits approx. 20 min entation/seminar pr on the method of as	nutes) or c) esentation sessment
Allocat	tion of _l	places				
 Additic	onal inf	ormation				
Worklo	bad					
Teaching cycle						
Referre	ed to in	LPUI (examination regula	tions for teaching-degree progra	immes)		
		•				
 Module	e appea		(2010)			
Bachel	e appea lor' deg	ars in ree (1 major) Physics (ree (1 major) Physics (

Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) FOKUS Physics - Nanostructuring Technology (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) FOKUS Physics (2010)

UNIVERSITÄT

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Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 207 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title Abbreviation						
Current Topic	Current Topics in Experimental Physics 11-BXE5-112-mo1					
Module coord	linator		Module offered by			
chairperson o	of examination committee		Faculty of Physics a	nd Astronomy		
ECTS Meth	od of grading	Only after succ. com	npl. of module(s)			
5 nume	erical grade					
Duration	Module level	Other prerequisites				
1 semester	undergraduate	Approval by examin	ation committee req	uired.		
Contents						
Current topic or study abro		. Accredited academi	c achievements, e.g.	. in case of change of university		
Intended lear	ning outcomes					
sics of the Ba understand t	chelor's programme. They	y have knowledge of a uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ne of Experimental Physics and s knowledge. They are able to		
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	man)			
V + R (no info	rmation on SWS (weekly o	contact hours) and co	urse language avail	able)		
Method of as module is credita		ge — if other than German, e	examination offered — if no	t every semester, information on whether		
in groups (ap weeks) or d)		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 10	lidate each or oral examination o pages, time to complete: 1 to 4		
Allocation of	places					
Additional in	formation					
Workload	Workload					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appe	ars in					
	gree (1 major) Physics (20					
Bachelor' degree (1 major) Physics (2012)						

Module title Abbreviation					
Current Topics in Experimental Physics 11-BXE6-112-mo1					
Module coo	rdinator		Module offered by		
chairperson	of examination committee		Faculty of Physics a	ind Astronomy	
ECTS Met	hod of grading	Only after succ. con	npl. of module(s)		
6 num	erical grade				
Duration	Module level	Other prerequisites			
1 semester	undergraduate	Approval by examin	ation committee req	uired.	
Contents					
Current topi study abroa		. Credited academic a	achievements, e.g. ir	n case of change of university or	
Intended lea	arning outcomes				
sics of the B understand	achelor's programme. The	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to	
Courses (type	, number of weekly contact hours,	anguage — if other than Ger	man)		
V + R (no inf	ormation on SWS (weekly	contact hours) and co	ourse language avail	able)	
Method of a module is credit		ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
in groups (a weeks) or d)		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4	
Allocation o	f places				
Additional i	nformation				
Workload					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module app					
	egree (1 major) Physics (20				
Bachelor' degree (1 major) Physics (2012)					

Module title Abbreviation					
Current Topic	s in Experimental Physics	5		11-BXE8-112-m01	
Module coordinator			Module offered by		
chairperson o	f examination committee		Faculty of Physics a	ind Astronomy	
ECTS Meth	od of grading	Only after succ. con	npl. of module(s)		
8 nume	rical grade				
Duration	Module level	Other prerequisites			
1 semester	undergraduate	Approval by examin	ation committee req	uired.	
Contents					
Current topics study abroad		. Credited academic a	achievements, e.g. ir	n case of change of university or	
Intended lear	ning outcomes				
sics of the Ba understand th	chelor's programme. They	y have knowledge of uation methods nece	a current subdiscipli essary to acquire this	of a module of Experimental Phy- ine of Experimental Physics and s knowledge. They are able to	
Courses (type,	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
Method of as module is credital		ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
in groups (ap weeks) or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4	
Allocation of	places				
Additional inf	ormation				
Workload					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appea	ars in				
-	ree (1 major) Physics (20				
Bachelor' degree (1 major) Physics (2012)					

Module title Abbreviation					
Curren	t Topic	s in Theoretical Physics			11-BXT5-112-m01
Module	e coord	inator		Module offered by	
chairpe	erson o	f examination committee	1	Faculty of Physics a	nd Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examin	ation committee req	uired.
Conten	Its				
Current study a	•	in Theoretical Physics. C	redited academic ac	hievements, e.g. in c	ase of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Gei	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project reservation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat					
Additio	onal inf	ormation			
Worklo	ad				
Teaching cycle					
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Module title Abbreviation					
Current	t Topic	s in Theoretical Physics			11-BXT6-112-m01
Module	e coord	inator		Module offered by	
chairpe	erson o	f examination committee		Faculty of Physics a	ind Astronomy
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Current study a	•	of Theoretical Physics. A	Accredited academic a	achievements, e.g. ir	n case of change of university or
Intende	ed lear	ning outcomes			
sics of Physics	the Bao and h	chelor's programme. They	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V + R (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module	appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 212 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module	e title				Abbreviation
Current Topics in Theoretical Physics			11-BXT8-112-m01		
Module coordinator		Module offered by			
chairpe	erson o	f examination committee		Faculty of Physics a	and Astronomy
ECTS	Meth	od of grading	Only after succ. con		
8	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	Approval by examination committee required.		
Conten	Its				
Current study a		of Theoretical Physics. A	Accredited academic a	achievements, e.g. ir	n case of change of university or
Intend	ed lear	ning outcomes			
sics of Physics	the Ba s and h	chelor's programme. The	y have advanced spe	cialist knowledge of	of a module of Theoretical Phy- a subdiscipline of Theoretical quired methods to current pro-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ile for bonus)	ge — if other than German,	examination offered — if no	t every semester, information on whether
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 1	lidate each or oral examination o pages, time to complete: 1 to 4
Allocat			0		
			-		
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
Bachel	or' deg	ree (1 major) Physics (20	12)		



Thesis

(20 ECTS credits)

The grade awarded for the thesis will count double in the calculation of the overall grade of the Bachelor's degree.

Bachelor's with 1 major Physics (2012)	JMU Würzburg ● generated 26-Aug-2024 ● exam.	page 214 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title				Abbreviation	
Bache	lor Thes	sis Physics			11-BA-P-072-m01
Module coordinator		Module offered by	e offered by		
chairp	erson o	f examination committee		Faculty of Physics	and Astronomy
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts		<u> </u>		
		endent processing of an e aspects.	xperimental or theor	etical task of Physic	s according to known procedures
Intend	ed lear	ning outcomes			
		are able to independently own methods and scienti			task from Physics, especially ac- esis.
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
no cou	rses as	signed			
^{module i} writter	s creditab thesis	le for bonus) (approx. 25 pages) ssessment: German or El			ot every semester, information on whether
Allocat	tion of _l	olaces			
Additio	onal inf	ormation			
Worklo	bad				
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	immes)	
Modul	e appea	ars in			
		ree (1 major) Physics (20	07)		
	-	ree (1 major) Physics (20			
	-	ree (1 major) Physics (20	•		
	-	ree (1 major) Physics (20			
Bachel	lor' deg	ree (1 major) Physics (20	08)		

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 215 / 229
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Subject-specific Key Skills

(16 ECTS credits)

Modules 11-P-MR and 11-HS must be successfully completed.

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Compulsory Courses

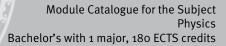
(10 ECTS credits)

Modules 11-P-MR and 11-HS must be successfully completed.

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Module title					Abbreviation
Advan	Advanced Seminar Experimental/Theoretical Physics				11-HS-092-m01
Module coordinator				Module offered by	
Managing Directors of the Institute of Applied Physics and the Institute of Theoretical Physics and Astrophysics				Faculty of Physics a	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
4	nume	erical grade			
Durati	on	Module level	Other prerequisites	i	
1 seme	ester	undergraduate		site to assessment: of seminar presenta	regular attendance and suc- ition.
Conter	nts	•	·		
Curren	t issue	s of Theoretical/Experime	ental Physics.		
Intend	ed lear	ning outcomes	· · · ·		
		have advanced knowledg ntly acquire this knowled		•	Theoretical Physics. They are able tation.
Course	es (type,	number of weekly contact hours, I	anguage — if other than Ge	rman)	
S (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language availabl	e)
		sessment (type, scope, langua ble for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
Assess and wi	sment o Il be ar		ten assessment will l		on the method of assessment 3 ASPO (general academic and
Alloca	tion of	places			
		<u>-</u>			
Additio	onal inf	formation			
Worklo	bad		-		
Teachi	ng cyc	le			
			-		
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ammes)	
		-	• • •		
Modul	e appe	ars in			
		ree (1 major) Physics (20	10)		
	-	ree (1 major) Physics (20			
	-	ree (1 major) Mathematic			
Bache	lor's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2010)		

Module title			Abbreviation			
Mather	natical	Methods of Physics			11-P-MR-092-m01	
Module	coord	inator		Module offered by		
Managi and Ast		ector of the Institute of T sics	Theoretical Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
6	(not) s	successfully completed				
Duration Module level Other prerequisites						
2 seme	ster	undergraduate				
Contents						
duction on of ba	i to and asic kn	nathematics and basic I preparation of the mo- owledge, functions of s stribution, Fourier trans	dules of Theoretical Pł everal real variables, o	nysics and Classical (or Experimental Phys	sics. Repetiti-
Intende	ed leari	ning outcomes				
require	d in Th	nave knowledge of the p eoretical and Experimen he field of Physics.				
Course	S (type, n	umber of weekly contact hours	, language — if other than Ge	rman)		
hour), c Mather	once a y natisch	e Rechenmethoden 1 (/ year (winter semester) e Rechenmethoden 2 (year (summer semester	Mathematical Method			
		s essment (type, scope, langu le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
1. Topic 1)): e 2. Topic 2)): e Succes	cs cove xercise cs cove exercise sful co	as the following assess red in lectures and exer s or talk (approx. 15 mi red in lectures and exer es or talk (approx. 15 mi mpletion of approx. 50%	cises in part 1 (Mathe nutes, usually chosen cises in part 2 (Mathe nutes, usually chosen) or written examinat matische Rechenme) or written examinat	ion (approx. 60 mini thoden 2 (Mathemat tion (approx. 60 min	utes) tical Methods utes)
	ts mus	2. t register for assessmer odule, students must p				nt 2.
Allocat		•				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referre	d to in	LPO I (examination regulation	ns for teaching-degree progra	ammes)		
§ 53 (1)	1. a) P	hysik Mechanik, Wärme hysik "Grundlagen der I	elehre, Elektrizitätsleh		len Relativitätstheor	rie
Module		·	,			
Bachelor's	with 1 maj	or Physics (2012)		ırg ● generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 219 / 229



Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2012) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 220 / 229
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Physics

Compulsory Electives

(6 ECTS credits)

6 ECTS credits must be achieved in mandatory electives.

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 221 / 229
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Module title					Abbreviation	
Compu	Itationa	al Physics			11-A1-092-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dir	ector of the Institute of	Theoretical Physics	Faculty of Physics and Astronomy		
and AstrophysicsECTSMethod of gradingOnly after succ.		Only after succ. cor	nnl of module(s)			
6		rical grade				
Duratio		Module level	Other prerequisites	;		
1 semesterundergraduateCertain prerequisites must be met to qualify for admission to sessment. The lecturer will inform students about the respect at the beginning of the course. Registration for the course wi sidered a declaration of will to seek admission to assessment dents have obtained the qualification for admission to assess the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites wited to assessment at a later date, students will have to obtain the qualification.		ctive details ill be con- nt. If stu- ssment over ation for as- rill be admit- ster. For as-				
Conten	nts	<u> </u>	admission to asses			
- rando - many Intende The stu They ha solutio	om walk -particl ed lear udents ave kno on of ph	e processes and reacti ning outcomes have knowledge of two owledge of numerical s ysical problems, e.g. a	major programming la tandard methods and a lgorithms for solving n	are able to apply com umerical problems o	puter-assisted proc	
	_		rs, language — if other than Ge			
			ly contact hours) and c			
		S essment (type, scope, lang ble for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
written Assess and wi	exami sment o Il be an	nation (approx. 120 mi ffered: When and how	nutes) often assessment will Inder observance of Se			
Allocat						
	-		kills (ASQ): 15 places. P	laces will be allocate	ed by lot.	
Additio	onal inf	ormation				
	_					
Workload						
-						
Teachi	ng cycl	e				
			ions for teaching-degree progra	ammes)		
			ions for teaching-degree progra	ammes)		

Module appears in

Bachelor' degree (1 major) Physics (2010) Bachelor' degree (1 major) Physics (2012) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Mathematical Physics (2009) Bachelor' degree (1 major) Mathematical Physics (2012) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 223 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation	
					11-A2-092-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of	Applied Physics	lied Physics Faculty of Physics and Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duration Module level Other prerequisites						
1 semester undergraduate Certain prerequisites must be met to qualify for admission to a sessment. The lecturer will inform students about the respective at the beginning of the course. Registration for the course will be sidered a declaration of will to seek admission to assessment. dents have obtained the qualification for admission to assessment the course of the semester, the lecturer will put their registration sessment into effect. Students who meet all prerequisites will be ted to assessment in the current or in the subsequent semester sessment at a later date, students will have to obtain the quali admission to assessment anew.		ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-				
Conten	ts					
coils ar	nd diod	les) and active compor	and circuits. Analogous Jents (bipolar and field 10S circuits. Microcont	-effect transistors, of	-	•
Intende	ed learı	ning outcomes				
The stu circuit f			practical setup of elect	ronic circuits from th	ne field of analogous	and digital
Course	S (type, n	number of weekly contact hour	s, language — if other than Ge	rman)		
V + Ü (r	no infor	mation on SWS (week	y contact hours) and co	ourse language avail	able)	
		s essment (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
Assess and wil	ment o Il be an		utes) often assessment will l nder observance of Sec	•		
Allocat	ion of p	olaces				
Only as	s part o	f pool of general key sl	kills (ASQ): 15 places. P	laces will be allocate	ed by lot.	
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	e appea	ars in				
Bachel Bachel	or' deg or' deg	ree (1 major) Physics (2 ree (1 major) Physics (2 ree (1 major) Nanostrue ee (1 major) Physics (2)	2012) Sture Technology (2012))		
Bachelor's	with 1 maj	or Physics (2012)		irg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Phys		page 224 / 229
			וכב. עמומ ופנו		2012	1



Master's degree (1 major) Nanostructure Technology (2011) Master's degree (1 major) FOKUS Physics (2011) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 225 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

	e title				Abbreviation						
Laboratory and Measurement Technology				11-A3-072-m01							
Modul	e coord	inator		Module offered by							
		ector of the Institute of A	Applied Physics	Faculty of Physics and Astronomy							
					ind Astronomy						
ECTS	1	od of grading	Only after succ. con	npl. of module(s)							
6		rical grade									
Duration Module level		Other prerequisites									
		Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.									
Conter	nts	<u> </u>		sessment anew.							
Introdu	uction t	o electronic and optical cs, light sources, spectr				y and cryoge-					
		ning outcomes	I								
red val	lue acq es (type, r	, cryogenics and vacuun uisition. number of weekly contact hours rmation on SWS (weekly	, language — if other than Ge	rman)	·	s and measu					
			uage — if other than German,	examination offered — if no	t every semester, informat	V + Ü (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether method is a subscription of the score of the					
written	n exami	nation (approx. 120 min	utes)			module is creditable for bonus)					
written examination (approx. 120 minutes)											
	tion of _l	places									
Allocat			ills (ASQ): 15 places. P	laces will be allocate	ed by lot.						
Allocat Only as	s part o	places f pool of general key ski ormation	ills (ASQ): 15 places. P	laces will be allocate	ed by lot.						
Allocat Only as	s part o	f pool of general key ski	ills (ASQ): 15 places. P	laces will be allocate	ed by lot.						
Allocat Only as Additio	s part o onal inf	f pool of general key ski	ills (ASQ): 15 places. P	laces will be allocate	ed by lot.						
Allocat Only as Additic Worklc	s part o onal inf oad	f pool of general key ski ormation	ills (ASQ): 15 places. P	laces will be allocate	ed by lot.						
Allocat Only as Additic Worklc	s part o onal inf	f pool of general key ski ormation	ills (ASQ): 15 places. P	laces will be allocate	ed by lot.						
Allocat Only as Additio Worklo Teachi	s part o onal inf oad	f pool of general key ski ormation e			ed by lot.						
Allocat Only as Additio Worklo Teachi	s part o onal inf oad	f pool of general key ski ormation			ed by lot.						
Allocat Only as Additio Worklo Teachi Referre	s part o onal inf oad ing cycl ed to in	f pool of general key ski ormation e LPOI (examination regulatio			ed by lot.						
Allocat Only as Additio Worklo Teachi Referre Modulo	s part o onal inf oad ing cycl ed to in e appea	f pool of general key ski formation e LPO I (examination regulatio	ins for teaching-degree progra		ed by lot.						
Allocat Only as Additio Worklo Teachi Referre Bachel	s part o onal inf oad ing cycl ed to in e appea lor' deg	f pool of general key ski ormation e LPOI (examination regulatio	ins for teaching-degree progra		ed by lot.						
Allocat Only as Additio Worklo Teachi Referre Bachel Bachel Bachel	s part o onal inf oad ing cycl ed to in e appea lor' deg lor' deg	f pool of general key ski ormation e LPOI (examination regulatio ars in ree (1 major) Physics (20	ins for teaching-degree progra		ed by lot.						
Allocat Only as Additio Worklo Teachi Referre Bachel Bachel Bachel Bachel Bachel	s part o onal inf oad ing cycl ed to in e appea lor' deg lor' deg lor' deg	f pool of general key ski formation e LPOI (examination regulation ars in ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Physics (20	007) 010) 009) 012)		ed by lot.						
Allocat Only as Additio Worklo Teachi Referre Bachel Bachel Bachel Bachel Bachel Bachel	s part o onal inf oad ing cycl ing cycl ed to in e appea lor' deg lor' deg lor' deg lor' deg	f pool of general key ski ormation e LPO I (examination regulatio ars in ree (1 major) Physics (20 ree (1 major) Physics (20	ns for teaching-degree progra 007) 010) 009) 012) 008)	ammes)	ed by lot.						
Allocat Only as Additio Worklo Teachi Referre Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	s part o onal inf oad ad ang cycl ad to in e appea lor' deg lor' deg lor' deg lor' deg lor' deg	f pool of general key ski formation e LPOI (examination regulation ars in ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Physics (20	ns for teaching-degree progra 007) 010) 009) 012) 008)	ammes)	ed by lot.						

Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) Nanostructure Technology (2008) Bachelor' degree (1 major) Nanostructure Technology (2007) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Functional Materials (2012) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2010)

Bachelor's with 1 major Physics (2012)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 227 / 229
	reg. data record Bachelor (180 ECTS) Physik - 2012	

Module title					Abbreviation	
Key Qualifications for Physicists				11-BFSQ5-112-m01		
Module coordinator				Module offered by		
chairpe	erson o	f examination committee		Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate	Approval by examination	ation committee req	uired.	
Conten	ts					
Subjec	t comp	etencies for physicists.				
Intende	ed lear	ning outcomes				
the Bao	chelor's	programme. They have	knowledge of a currer	nt subdiscipline of P	nents of a module of Physics of hysics and the required under- l know the application areas.	
Course	S (type, r	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V + R (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
in grou weeks)	ps (app or d) p		didate) or c) project re sentation (approx. 30	eport (approx. 8 to 10	lidate each or oral examination o pages, time to complete: 1 to 4	
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Workload						
Teaching cycle						
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module	e appea	in in				
Bachel	Bachelor' degree (1 major) Physics (2012)					

Module title					Abbreviation
Key Qualifications for Physicists					11-BFSQ6-112-m01
Module coordinator				Module offered by	
chairperson of examination committee				Faculty of Physics and Astronomy	
ECTS	CTS Method of grading		Only after succ. compl. of module(s)		
6	nume	rical grade			
Duration		Module level	Other prerequisites		
1 semester		undergraduate	Approval by examination committee required.		
Contents					
Subject competencies for physicists.					
Intended learning outcomes					
The students have subject-specific competencies corresponding to the requirements of a module of Physics of the Bachelor's programme. They have knowledge of a current subdiscipline of Physics and the required under- standing of this topic. They are able to classify the subject-specific contexts and know the application areas.					
Courses (type, number of weekly contact hours, language — if other than German)					
V + R (no information on SWS (weekly contact hours) and course language available)					
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)					
a) written examination (approx. 120 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes) Language of assessment: German or English					
Allocation of places					
Additional information					
Workload					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor' degree (1 major) Physics (2012)					