

Subdivided Module Catalogue for the Subject

Nanostructure Technology

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

Examination regulations version: 2007 Responsible: Faculty of Physics and Astronomy

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Course of Studies - Contents and Objectives

The goal of the studies is it to mediate knowledge on the most important subsections of the Nanostructure Technology and to make the students familiar with the methods of engineering 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 physical and chemical terms and laws as well as on basic engineeringscientific knowledge and the development of the typical scientific thinking and working structures. During the Bachelor thesis the student should work on an thematic and temporally limited experimental or theoretical engineering-scientific task in the field of Nanostructure Technology using well-known procedures and scientific criteria under guidance to a large extent independently.

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:

ASPO2007

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

15-Apr-2008 (2008-7)

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.

The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	pag
Compulsory Courses (132	ECTS credits)			
Nanostructure Technolo	gy (12 ECTS credits)			
11-N1-072-m01	Basics of NanostructureTechnology	6	NUM	27
11-N2-072-m01	Principles of Electronics (with Practical Course)	6	NUM	28
Lab Course Engineering	(18 ECTS credits)			
11-PFB-072-m01	Advanced Practical Course Bachelor	4	B/NB	34
	Advanced Undergraduate Laboratory (Classical Mechanics,			
11-PGA-NN-072-m01	Thermodynamics, Basic Circuitry)	4	B/NB	37
AL DCP NDN 070 mod	Advanced Undergraduate Laboratory (Optics, Basic Semicon-	2	D/ND	
11-PGB-NRN-072-m01	ductor Circuits)	2	B/NB	3
11-PFI-072-m01	Industrial Internship	8	B/NB	3
Mathematics for Engine	ers (26 ECTS credits)			
11-MPI3-062-m01	Mathematics 3 for students of Physics and Engineering	8	NUM	2
10-M-NST1-072-m01	Mathematics 1 for students in Nanostructural Engineering	10	NUM	1
10-M-NST2-072-m01	Mathematics 2 for students in Nanostructural Engineering	8	NUM	1
Chemistry (10 ECTS crea	lits)			
08-CP1-072-m01	General Chemistry for Physics and Engineers	10	NUM	8
Experimental Physics (4	2 ECTS credits)			
	Experimental Physics 1 (Mechanics, Thermodynamics, Waves	-		
11-E1-072-m01	and Oscillations)	8	NUM	1
11-E2-072-m01	Experimental Physics 2 (Electrics and Magnetism)	8	NUM	1
	Experimental Physics 3 (Optics, Quantum Phenomena, Intro-			
11-E3-072-m01	duction Atomic Physics)	8	NUM	2
11-E4-072-m01	Experimental Physics 4 (Introduction to Solid State Physics)	8	NUM	2
11-E5-072-m01	Experimental Physics 5 (Physics of Atoms and Molecules)	6	NUM	2
	Experimental Physics 7 (Solid State Phenomena [Semiconduc-			
11-E7-072-m01	tor, Superconductivity, Magnetism])	4	NUM	2
Theoretical Physics (16	ECTS credits)			
11-T1-072-m01	Theoretical Physics 1 (Theoretical Mechanics)	8	NUM	4
11-T3-072-m01	Theoretical Physics 3 (Theoretical Quantum Mechanics)	8	NUM	4
11-T3F-072-m01	Theoretical Physics 3 FOKUS (Theoretical Quantum Mechanics)	8	NUM	4
Module Comprehensive	Tests (8 ECTS credits)			
	Comprehensive Exam in Theoretical Physics / Nanostructure		N11 1 A 4	_
11-PREN-072-m01	Technology	4	NUM	3
	Comprehensive Exam in Theoretical Physics / Nanostructure		NII 184	<u>.</u>
11-PRN-072-m01	Technology	4	NUM	4
Compulsory Electives (18 I	CTS credits)			
08-NM-AW-072-m01	Nanomatrix Inorganic Materials Chemistry	6	NUM	10
08-NM-NS-072-m01	Nanoparticle Synthesis and Structuring Technologies	6	NUM	1
11-NM-WP-072-m01	Nanomatrix insulation systems and photovoltaics	6	NUM	3
11-NM-HM-072-m01	Nanomatrix semiconductor materials	6	NUM	3
11-NM-HP-072-m01	Nanomatrix Semiconductor Processing	6	NUM	3
11-NM-MB-072-m01	Principles Micro/Nano- and Optoelectronic Devices	6	NUM	3
elor's with 1 major Nanostructure		ø da-	nag	e 4 / 4

03-NM-BW-072-m01 Nanomatrix Biomedical Materials		NUM	6				
Nanomatrix Biocompatible Structuring Technologies	6	NUM	7				
Nanomatrix Biophysical Analyzing Systems and Processes	6	NUM	29				
Thesis (10 ECTS credits)							
11-BA-N-072-mo1 Bachelor Thesis Nanostructure Technology		NUM	17				
Subject-specific Key Skills (14 ECTS credits)							
Theoretical Physics 2 (Theoretical Electrostatics and Electrody-	0	NILIAA	(2)				
namics)	0	NOM	42				
Theoretical Physics 4 (Theoretical Thermodynamics and Stati-	Q	NILIM	4.5				
stics)	0	NOM	45				
Mathematics 4 for Students of Physics and Engineering	8	NUM	26				
Measurements and Data Analysis	2	NUM	36				
Computational Physics	6	NUM	14				
11-A3-072-mo1 Laboratory and Measurement Technology		NUM	15				
	Nanomatrix Biocompatible Structuring Technologies Nanomatrix Biophysical Analyzing Systems and Processes Bachelor Thesis Nanostructure Technology (14 ECTS credits) Theoretical Physics 2 (Theoretical Electrostatics and Electrody- namics) Theoretical Physics 4 (Theoretical Thermodynamics and Stati- stics) Mathematics 4 for Students of Physics and Engineering Measurements and Data Analysis Computational Physics	Nanomatrix Biocompatible Structuring Technologies6Nanomatrix Biophysical Analyzing Systems and Processes6Bachelor Thesis Nanostructure Technology10(14 ECTS credits)10Theoretical Physics 2 (Theoretical Electrostatics and Electrodynamics)8Theoretical Physics 4 (Theoretical Thermodynamics and Statistics)8Mathematics 4 for Students of Physics and Engineering8Measurements and Data Analysis2Computational Physics6	Nanomatrix Biocompatible Structuring Technologies6NUMNanomatrix Biophysical Analyzing Systems and Processes6NUMBachelor Thesis Nanostructure Technology10NUMInterview of the systems and ProcessesBachelor Thesis Nanostructure Technology10NUMInterview of the systems and ProcessesBachelor Thesis Nanostructure Technology10NUMInterview of the systems and ProcessesBachelor Thesis Nanostructure Technology10NUMInterview of the systems and Electrody- namics)8NUMTheoretical Physics 2 (Theoretical Electrostatics and Electrody- namics)8NUMTheoretical Physics 4 (Theoretical Thermodynamics and Stati- stics)8NUMMathematics 4 for Students of Physics and Engineering8NUMMeasurements and Data Analysis2NUMComputational Physics6NUM				

Module	e title				Abbreviation
Nanom	atrix B	iomedical Materials			03-NM-BW-072-m01
Module	e coord	linator		Module offered by	<u> </u>
chairpe	erson o	f examination committee	of the Master's de-	Faculty of Medicine	
gree pr	ogram	me Human-Computer Inte	eraction		
ECTS		od of grading	Only after succ. cor	npl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites	i	
1 seme	ster	undergraduate			
Conten	ts				
nics an	d phot	onics and biophysical ap	plications as well as	the technology focu	reas power engineering, electro- ses materials science, nanostruc- e area of biomedical materials.
Intend	ed lear	ning outcomes	· · · · · · · · · · · · · · · · · · ·		
		e developed an advanced with a particular focus of			ea or technology focus of engi-
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)
V + R (r	no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
		mination (approx. 90 min oral examination in group) oral examination of one candi- rt (approx. 10 pages)
Allocat	ion of	places			
Additio	nal inf	ormation			
Worklo	ad				
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)	
Module	e appe	ars in			
	-	ree (1 major) Nanostructu	•, •		
Bachel	or' deg	ree (1 major) Nanostructu	re Technology (2007	7)	

Modul	e title				Abbreviation
Nanomatrix Biocompatible Structuring Technologies 07-NM-BS-072-m01					
Module coordinator Module offered by					
Dean o	of Studi	es Biologie (Biology)		Faculty of Biology	-
ECTS	1	od of grading	Only after succ. con		
6	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conte	nts				
engine scienc	eering, e e, nanc	electronics and photonic	s, and biophysical ap s and components an	plications and the te	he application directions power echnology fields of materials ent, in particular in the area of
Intend	ed lear	ning outcomes			
		e acquired advanced kno neering work, in particula			tion directions or technology technologies.
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	an)
V + R (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-
		mination (approx. 90 min oral examination in group) oral examination of one candi- rt (approx. 10 pages)
Alloca	tion of	places			
Additi	onal inf	ormation			
Workle	oad				
Referr	ed to in	LPOI (examination regu	ulations for teaching-	degree programmes)	
Modul	e appe	ars in			
Bache	lor' deg	ree (1 major) Nanostruct	ure Technology (2008	3)	
Bache	lor' deg	ree (1 major) Nanostruct	ure Technology (2007)	

Module	title				Abbreviation	
General Chemistry for Physics and Engineers 08-CP1-072-m01					08-CP1-072-m01	
Module coordinator Module offered by						
lecture	r of the	course		Institute of Inorgani	ic Chemistry	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
		iscusses the fundamenta pportunity to learn esser			c chemistry. The lab course gives nents.	
Intende	ed learr	ning outcomes				
to expla cal forn le to ide	ain bas nulas to entify fi	ic models of the structure o describe chemical react undamental problems in	e of matter. They have tions and to interpret chemistry and perfor	e developed the abil them by identifying m experiments to so		
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
compor • 0 • 0 • 0 • 0	nent. 8-IOC-1 8-CP1-1 <u>8-CP1-1</u> 1 of ass	1-072: V (no information o 1-072: V (no information o 3-072: P (no information o	on SWS (weekly conta on SWS (weekly conta on SWS (weekly conta nguage — if other tha	act hours) and cours act hours) and cours act hours) and cours an German, examina	e language available)	
	less st	ated otherwise, successf			e components as specified be- successful completion of all indi-	
 Assessment in module component o8-IOC-1-o72: 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-CP1-1-072: Basics of General an Inorganic Chemistry 5 ECTS, Method of grading: numerical grade written examination (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. 						
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					

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

Module appears in

Bachelor' degree (1 major) Physics (2007) Bachelor' degree (1 major) Physics (2009) Bachelor' degree (1 major) Physics (2008) Bachelor' degree (1 major) Nanostructure Technology (2007) Master's degree (1 major) Physics (2010) No final examination (2010)

Module	title				Abbreviation		
Nanom	Nanomatrix Inorganic Materials Chemistry 08-NM-AW-072-m01						
Module	Module coordinator Module offered by						
Dean of Studies Chemie and Pharmazie (Chemistry and Pharmacy) Chair of Chemical Technology of Material Synthesi							
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						
enginee science	ering, e e, nano	electronics and photonics	and biophysical app	olications and the te	he application directions power chnology fields of materials ent, in particular in the area of in-		
Intende	ed lear	ning outcomes					
		e developed advanced kn eering work, in particula			ation directions or technology stry.		
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	in)		
R + V (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
		essment (type, scope, la on on whether module ca			tion offered — if not every seme-		
		mination (approx. 90 min oral examination in group) oral examination of one candi- rt (approx. 10 pages)		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)			
Module	appea	urs in					
		ree (1 major) Nanostructu ree (1 major) Nanostructu					

Module	e title				Abbreviation	
Nanopa	Nanoparticle Synthesis and Structuring Technologies 08-NM-NS-072-m01					
Module coordinator Module offered by						
Dean of Studies Chemie and Pharmazie (Chemistry and Pharmacy) Chair of Chemical Technology of Material Synthe						
ECTS		od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio		Module level	Other prerequisites	5		
1 seme	ster	undergraduate				
Conten	ts					
enginee science	ering, e e, nano	electronics and photonics	and biophysical app and components an	olications and the te	he application directions power chnology fields of materials ent, in particular in the area of na-	
Intende	ed lear	ning outcomes				
					ation directions or technology d structuring technologies.	
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)	
V + R (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, la ion on whether module ca			ation offered — if not every seme-	
		mination (approx. 90 min oral examination in group) oral examination of one candi- rt (approx. 10 pages)	
Allocat	ion of _l	places				
Additio	nal inf	ormation				
Worklo	ad					
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Module	e appea	ars in				
	-	ree (1 major) Nanostructu ree (1 major) Nanostructu				
Bachel	0. 405			,		

would	e title				Abbreviation	
Mathematics 1 for students in Nanostructural Engineering 10-M-NST1-072-m01						
Modul	e coord	inator		Module offered by	/	
Dean o	of Studi	es Mathematik (Mathem	atics)	Institute of Mathe	matics	
ECTS		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					
		nbers and functions, seq e differential equations.	uences and series, d	ifferential and integ	ral calculus in one variable, vector	
Intend	led lear	ning outcomes				
ple pro able to	oblems o interp	in natural and engineerin ret the results.	ng sciences, in partic	ular in the field of n	ns to apply these methods to sim- anostructure technology, and is	
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germ	ian)	
V + Ü (no info	mation on CNIC (woold)				
		mation on SWS (weekly	contact hours) and co	ourse language ava	ilable)	
	d of as	· ·	anguage — if other th	an German, examin	ilable) ation offered — if not every seme-	
ster, ir	d of ass nformat	sessment (type, scope, la	anguage — if other th	an German, examin		
ster, ir writter	d of ass nformat	sessment (type, scope, la ion on whether module c nation (90 minutes)	anguage — if other th	an German, examin		
ster, ir writter	od of ass nformat n exami	sessment (type, scope, la ion on whether module c nation (90 minutes)	anguage — if other th	an German, examin		
ster, ir writter Alloca	od of ass nformat n exami tion of p	sessment (type, scope, la ion on whether module c nation (90 minutes)	anguage — if other th	an German, examin		
ster, ir writter Alloca	od of ass nformat n exami tion of p	sessment (type, scope, la ion on whether module c nation (90 minutes) places	anguage — if other th	an German, examin		
ster, ir writter Alloca	od of ass nformati n exami tion of p onal inf	sessment (type, scope, la ion on whether module c nation (90 minutes) places	anguage — if other th	an German, examin		
ster, ir writter Alloca Additio	od of ass nformati n exami tion of p onal inf	sessment (type, scope, la ion on whether module c nation (90 minutes) places	anguage — if other th	an German, examin		
ster, ir writter Alloca Additio Worklo	od of ass nformati n exami tion of p onal inf oad	sessment (type, scope, la ion on whether module c nation (90 minutes) places	anguage — if other th an be chosen to earn	an German, examin a bonus)	nation offered — if not every seme-	
ster, ir writter Alloca Additio Worklo	od of ass nformati n exami tion of p onal inf oad	sessment (type, scope, la ion on whether module of nation (90 minutes) places formation	anguage — if other th an be chosen to earn	an German, examin a bonus)	nation offered — if not every seme-	
ster, ir writter Alloca Additio Worklo Referro 	od of ass nformati n exami tion of p onal inf oad ed to in	sessment (type, scope, la ion on whether module of nation (90 minutes) places formation	anguage — if other th an be chosen to earn	an German, examin a bonus)	nation offered — if not every seme-	
ster, ir writter Alloca Additio Worklo Referro Modul	od of ass nformati n exami tion of p onal inf oad ed to in	sessment (type, scope, la ion on whether module of nation (90 minutes) places formation	anguage — if other th an be chosen to earn ulations for teaching-	an German, examin a bonus) degree programmes	nation offered — if not every seme-	

Modul	e title				Abbreviation						
Mathematics 2 for students in Nanostructural Engineering10-M-NST2-072-m01											
Module coordinator Module offered by											
Dean c	of Studi	es Mathematik (Mathema	atics)	Institute of Mathen	natics						
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)							
8	nume	rical grade									
Durati	on	Module level	Other prerequisites								
1 seme	ester	undergraduate									
Conter	nts										
		nd systems of linear equ variables, differential eq			y, differential and integral calcu-						
Intend	ed lear	ning outcomes									
se met	hods to		ural and engineering		tics. He/She learns to apply the- ar in the field of nanostructure						
Course	es (type	, number of weekly conta	act hours, language —	if other than Germa	an)						
V + Ü (no info	mation on SWS (weekly	contact hours) and co	ourse language avai	able)						
		sessment (type, scope, lation on whether module c			ation offered — if not every seme-						
written	exami	nation (90 minutes)									
Allocat	tion of	olaces									
Additio	onal inf	ormation									
Worklo	bad										
Referre	ed to in	LPOI (examination regu	llations for teaching-o	legree programmes)							
Referre	ed to in	LPOI (examination regu	llations for teaching-o	legree programmes)							
			llations for teaching-o	degree programmes)							
 Modul	e appea										

Modul	e title				Abbreviation
Computational Physics					11-A1-072-m01
Modul	e coord	inator		Module offered by	<u> </u>
Managing Director of the Institute of Theoretical Physics and Astrophysics			neoretical Physics	Faculty of Physics a	nd Astronomy
ECTS		od of grading	Only after succ. cor	npl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites	;	
1 seme	ester	undergraduate			
Conter	nts				
		o two of the programming s with computer program		for students of Phys	ics and Engineering, solving phy-
Intend	ed lear	ning outcomes			
The stu	udents		-		f two programming languages, sical problems.
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	in)
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		s essment (type, scope, la ion on whether module c			tion offered — if not every seme-
written	exami	nation (approx. 120 minu	ites)		
Allocat	tion of	places			
Additio	onal inf	ormation			
Worklo	ad				
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)	
Modul	e appea	ars in			
	-	ree (1 major) Physics (20			
	-	ree (1 major) Physics (20	•		
	-	ree (1 major) Physics (20			
	-	ree (1 major) Nanostructu			
	-	ree (1 major) Nanostructu		")	
васпе	or s ae	gree (1 major, 1 minor) Pł	iysics (willior, 2008)		

Module	e title				Abbreviation	
Labora	tory an	d Measurement Technol	ogy		11-A3-072-m01	
Madul	<u> </u>	luntor.		An dula offered by		
Module coordinator				Module offered by		
	Managing Director of the Institute of Applied Physics Faculty of Physics and 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 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			y for admis- ne respecti- course will ssment. If sessment istration for will be ad-	
			assessment at a late for admission to ass		l have to obtain the q	ualification
Conten	nte			bessment anew.		
		o electronic and optical r	noocuring mothods o	f physical matrology	wacuum tachnalagu	and cruogo
		cs, light sources, spectro				and cryoge-
		ning outcomes				
		nave acquired the follow	ing transforable skills	- Electronic and onti	cal maacuring matha	de in nhuei
cal met	trology,	cryogenics and vacuum	-		_	
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	n)	
V + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
Metho	d of ass	essment (type, scope, la	anguage — if other tha	an German, examina		every seme-
		on on whether module c		a Dollus)		
		nation (approx. 120 minu	ites)			
	tion of p					
Only as	s part o	f pool of general key skil	ls (ASQ): 15 places. P	laces will be allocate	ed by lot.	
Additio	onal inf	ormation				
	_					
Worklo	bad					
Referre	ed to in	LPOI (examination regu	lations for teaching	legree programmoc)		
Module	e appea	irs in				
Bachel	lor' deg	ree (1 major) Physics (20	07)			
		ree (1 major) Physics (20				
	-	ree (1 major) Physics (20	•			
	-	ree (1 major) Physics (20				
	-	ree (1 major) Physics (20				
	-	ree (1 major) Nanostructu				
	-	ree (1 major) Nanostructu				
	-	ree (1 major) Nanostructu or Nanostructure Technology	= -) • generated 11-Jan-2023 • exa	um reg da	nage 15 / 15
Bachelor's (2007)	with 1 maj			or (180 ECTS) Nanostrukturte		page 15 / 45

Julius-Maximilians-UNIVERSITÄT WÜRZBURG

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)

Modul	e title				Abbreviation
Bachelor Thesis Nanostructure Technology					11-BA-N-072-m01
Module coordinator Module offered			Module offered by	<u> </u>	
chairpe	erson o	f examination committee	2	Faculty of Physics a	ind Astronomy
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	ester	undergraduate			
Conter	nts				
					ask in the field of nanostructure riting of the Bachelor's thesis.
Intend	ed lear	ning outcomes			
structu	ire tech		ce of a supervisor, es	pecially in accordan	d engineering task from nano- ce with known methods and
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	n)
no cou	rses as	signed			
		sessment (type, scope, la on on whether module c			tion offered — if not every seme-
written	thesis	(approx. 25 pages)			
Allocat	tion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
			,		
Referre	ed to in	LPOI (examination regu	llations for teaching-	degree programmes)	
			0		
Modul	e appea	urs in			
		ree (1 major) Nanostructi	ure Technology (2010)	
	-	ree (1 major) Nanostructi			
		ree (1 major) Nanostructi			
Bachel	or' deg	ree (1 major) Nanostructi	ure Technology (2007)	

Module title					Abbreviation	
Experimental Physics 1 (Mechanics, Thermodynamics, Waves and Oscillati-						
ons)						
Modul	e coord	inator		Module offered by	<u> </u>	
Manag	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics	and Astronomy	
ECTS		od of grading	Only after succ. con	npl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
Physic	al laws	of mechanics, vibrations	and waves, thermod	ynamics		
Intend	ed lear	ning outcomes				
The stu	udents	understand the basic co	ntexts and principles	of mechanics, vibra	ation, waves and thermodynamics	
Course	e s (type	, number of weekly conta	act hours, language –	- if other than Germ	ian)	
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language ava	ilable)	
		s essment (type, scope, la ion on whether module c			ation offered — if not every seme-	
		nation (approx. 120 minu				
	tion of					
Alloca		Jaces				
Additid		ormation				
Auunn						
Worklo						
WOIKI						
		IDOI (overringtion	lations for too him -		-)	
Referre		LPOI (examination regu	utations for teaching-o	legree programme	o)	
Modul	e appea	ars in				
Bachel	or' deg	ree (1 major) Physics (20	07)			
	-	ree (1 major) Physics (20				
Bachel	or' deg	ree (1 major) Physics (20	08)			
Bachel	or' deg	ree (1 major) Nanostruct	ure Technology (2008)		
Bachel	or' deg	ree (1 major) Nanostruct	ure Technology (2007)		
Bachel	Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)					

Modul	Module title Abbreviation					
Experi	mental	Physics 2 (Electrics and	Magnetism)		11-E2-072-m01	
Modul	e coord	inator		Module offered by	<u> </u>	
Manag	ing Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
Physic	al laws	of the science of electrici	ty, magnetism, elect	romagnetic vibratior	is and waves	
Intend	ed lear	ning outcomes				
		understand the basic con I waves.	texts and principles	of science of electric	ity, magnetism, electromagnetic	
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	ın)	
V + Ü (no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
ster, in written	formati exami	ion on whether module ca nation (approx. 120 minu	an be chosen to earn		ition offered — if not every seme-	
Allocat	tion of _l	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Modul	e appea	ars in				
Bachelor' degree (1 major) Physics (2007)						
Bachelor' degree (1 major) Physics (2009)						
Bachelor' degree (1 major) Physics (2008)						
Bachelor' degree (1 major) Nanostructure Technology (2008)						
	Bachelor' degree (1 major) Nanostructure Technology (2007) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)					
васне	or's de	gree (1 major, 1 minor) Pr	iysics (Minor, 2008)			

Modul	e title				Abbreviation			
Experi	Experimental Physics 3 (Optics, Quantum Phenomena, Introduction Atomic 11-E3-072-m01							
Physic	Physics)							
Modul	e coord	inator		Module offered by				
Manag	ging Dire	ector of the Institute of Ap	oplied Physics	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	ester	undergraduate						
Conter	nts	·	• •					
Physic	al laws	of optics, quantum phen	omena, introduction	to Atomic Physics.				
		ning outcomes	· · · ·	,				
			asic contexts and prir	nciples of optics, gu	antum phenomena and Atomic			
Physic			usie contexts and pin	respices of optices, qu	antan prenomena ana Atointe			
		, number of weekly conta	act hours, language –	- if other than Germa	an)			
		rmation on SWS (weekly						
		· · · · ·	· · · · · · · · · · · · · · · · · · ·		ation offered — if not every seme-			
		ion on whether module c						
		nation (approx. 120 minu						
	tion of	• •						
Allocu								
 A d d i t i d		ormation						
Additio		ormation						
Worklo	bad							
	_							
Referre	ed to in	LPOI (examination regu	llations for teaching-o	degree programmes)				
Modul	e appea	ars in						
Bachel	lor' deg	ree (1 major) Mathematic	cs (2008)					
Bachel	lor' deg	ree (1 major) Mathematic	:s (2007)					
	Bachelor' degree (1 major) Physics (2007)							
	Bachelor' degree (1 major) Physics (2009)							
	-	ree (1 major) Physics (20						
	Bachelor' degree (1 major) Nanostructure Technology (2008)							
	-	ree (1 major) Nanostructu						
Bachel	Bachelor' degree (1 major) Computational Mathematics (2009)							
Bachel	Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)							

Module	Module title Abbreviation						
Experin	Experimental Physics 4 (Introduction to Solid State Physics) 11-E4-072-m01						
Module	e coord	inator		Module offered by	·		
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	ind Astronomy		
ECTS	Metho	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					
Conten	ts						
		of solids: Bonding and si lectron gas).	tructure, lattice dynai	mics, thermal prope	rties, principles of electronic pro-		
Intend	ed lear	ning outcomes					
		have knowledge of the ba properties, principles of			nding and structure, lattice dyna-		
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	in)		
V + Ü (I	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		essment (type, scope, la on on whether module ca			tion offered — if not every seme-		
written	exami	nation (approx. 120 minu	tes)				
Allocat	ion of p	olaces					
Additio	onal inf	ormation					
Worklo	ad						
Referre	d to in	LPOI (examination regu	lations for teaching-	degree programmes)			
Module	e appea	urs in					
	Bachelor' degree (1 major) Mathematics (2008)						
	Bachelor' degree (1 major) Mathematics (2007)						
	Bachelor' degree (1 major) Physics (2007)						
	Bachelor' degree (1 major) Physics (2009)						
Bachel	Bachelor' degree (1 major) Nanostructure Technology (2007)						

Modul	Module title Abbreviation						
Experi	Experimental Physics 5 (Physics of Atoms and Molecules) 11-E5-072-m01						
Modul	e coord	inator		Module offered by			
Manag	ging Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy		
ECTS		od of grading	Only after succ. con	pl. of module(s)			
6	nume	rical grade					
Durati	on	Module level	Other prerequisites				
1 seme	ester	undergraduate					
Conter	nts						
Physic	al laws	of Atomic and Molecular	Physics.				
Intend	ed lear	ning outcomes					
Quant	um meo	hanical atom model, one	/multi-electron atom	s, electronic dipole	d Molecular Physics (atoms: transitions, atoms in B field as ations, electronic excitations)		
Course	es (type	, number of weekly conta	ct hours, language –	if other than Germa	an)		
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avai	lable)		
		s essment (type, scope, la ion on whether module ca			ation offered — if not every seme-		
writter	n exami	nation (approx. 120 minu	tes)				
Alloca	tion of	places					
Additi	onal inf	ormation					
Workle	oad						
Referre	ed to in	LPOI (examination regu	lations for teaching-	legree programmes)		
	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	e appea	ars in					
		ree (1 major) Physics (200	(70				
	-	ree (1 major) Physics (20					
	Bachelor' degree (1 major) Nanostructure Technology (2007)						

Module title					Abbreviation	
Experir	nental	Physics 7 (Solid State Pl	luctor, Supercon-	11-E7-072-m01		
ductivi	ty, Mag	(netism])				
Module	e coord	inator		Module offered by	,	
Manag	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics	and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
4	1	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Physica	allaws	of solid-state phenomen	a (semiconductors, s	uperconductivity, m	nagnetism)	
		ning outcomes		aperconductivity, in		
		-	acic contaxts and aris	ciplos of alastropia	transport and electrical proper	
					<pre>transport and electrical proper- erfaces; superconductivity: pheno-</pre>	
					mean field description of magne-	
tic orde			-	U .	, ,	
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germ	an)	
ı) Ü + V	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avai	lable)	
Metho	d of ass	sessment (type, scope, la	anguage — if other th	an German, examina	ation offered — if not every seme-	
		on on whether module c			,	
written	exami	nation (approx. 120 minu	ites)			
Allocat	ion of p	olaces				
Additio	onal inf	ormation	-			
Worklo	be		-			
WOIKIU						
					、	
Referre	a to in	LPOI (examination regu	llations for teaching-o	degree programmes)	
Module						
	-	ree (1 major) Physics (20	-			
		ree (1 major) Physics (20				
	Bachelor' degree (1 major) Physics (2008)					
	-	ree (1 major) Nanostructu				
	-	ree (1 major) Nanostructu)		
Bachel	or's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2008)			

Module					Abbreviation	
Mathe	matics	3 for students of Physic	s and Engineering		11-MPI3-062-m01	
Module	e coord	inator		Module offered by	<u> </u>	
		ector of the Institute of T	heoretical Physics	Faculty of Physics a	and Astronomy	
and As	-		neoreticat i nysies			
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)		
8		rical grade		• • • •		
Duratio	on	Module level	Other prerequisites	;		
1 seme	ster	undergraduate	Admission prerequi	site to assessment:	successful completion of app	•
			-		must be met to qualify for ad	
					orm students about the resp	
					e. Registration for the course	
					ek admission to assessment	
				•	n for admission to assessme	
					turer will put their registration	
					eet all prerequisites will be a	
					n the subsequent semester. I	
					l have to obtain the qualifica	ition
			for admission to as	sessment anew.		
Conten	its					
Ordina	ry and	partial differential equat	ions in Physics.			
Intend	ed lear	ning outcomes				
			l knowledge of dynan	nic equations and so	olution methods for common	and
•		ntial equations.	-			
		, number of weekly cont				
V + Ü (I	no info	rmation on SWS (weekly	contact hours) and co	ourse language avai	lable)	
					ation offered — if not every se	eme-
	-	ion on whether module of		a Dollus)		
		nation (approx. 120 min				
Allocat	ion of _l	Diaces				
Additio	onal inf	ormation				
Worklo	ad					
Referre	ed to in	LPOI (examination reg	ulations for teaching-	degree programmes)		
		•				
Modul						
	-	ree (1 major) Physics (20				
	-	ree (1 major) Physics (20	•			
	-	ree (1 major) Physics (20 ree (1 major) Technology		als (2000)		
	-	ree (1 major) Technology		-		
	-	ree (1 major) Nanostruct				
	-		ure Technology (2010) ure Technology (2012)			
	-	ree (1 major) Nanostruct				
	•.,					1
Bachelor's (2007)	with 1 ma	jor Nanostructure Technology	-	 generated 11-Jan-2023 example or (180 ECTS) Nanostrukturte 		/ 45



Bachelor' degree (1 major) Nanostructure Technology (2007) Bachelor' degree (1 major) Functional Materials (2012) Bachelor' degree (1 major) Technology of Functional Materials (2006)

Module title					Abbreviation	
Mathe	matics	4 for Students of Physics	and Engineering		11-MPI4-062-m01	
Modul	e coord	inator		Module offered by	<u> </u>	
	ing Dire	ector of the Institute of Th sics	neoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)		
8		rical grade		• • • •		
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conter	nts					
Functio	onal an	alysis and complex analy	sis.			
		ning outcomes				
The stu	udents			ert space and the the	eory of functions of a complex va	
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)	
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	lable)	
written	exami	ion on whether module c nation (approx. 120 minu		a bonus)		
Allocat	tion of _l	places				
Additio	onal inf	ormation				
Worklo	ad					
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Modul	e appea	ars in				
Bachel	or' deg	ree (1 major) Physics (20	07)			
Bachelor' degree (1 major) Physics (2009)						
Bachelor' degree (1 major) Physics (2008)						
Bachelor' degree (1 major) Nanostructure Technology (2010)						
	-	ree (1 major) Nanostructu				
Bachel	Bachelor' degree (1 major) Nanostructure Technology (2008)					
Bachelor' degree (1 major) Nanostructure Technology (2007)						

Module title Abbreviation					
Basics	of Nan	ostructureTechnology			11-N1-072-m01
Modul	e coord	inator		Module offered by	
Manag	ing Dir	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con		, , , , , , , , , , , , , , , , , , ,
6		rical grade		1	
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conter	nts				
Princip	les of p	producing, characterising	and applying nanost	ructures.	
		ning outcomes	<u> </u>		
The stu	udents		ndamental propertie	s, technologies, cha	racterising methods and functi-
Course	e s (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)
V + S (I	no info	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
written	-	ion on whether module ca nation (approx. 90 minut places		a bonus)	
Additio	onal inf	ormation			
Worklo	oad				
Referre	ed to in	LPO I (examination regu	lations for teaching-	degree programmes)	
	_				
Modul	e appea	ars in			
Bachel	or' deg	ree (1 major) Physics (20	08)		
Bachelor' degree (1 major) Technology of Functional Materials (2009)					
Bachelor' degree (1 major) Technology of Functional Materials (2010)					
Bachelor' degree (1 major) Nanostructure Technology (2008)					
Bachelor' degree (1 major) Nanostructure Technology (2007)					
	Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)				
Bachelor' degree (1 major) Technology of Functional Materials (2006)					

Module title Abbreviation							
Princip	Principles of Electronics (with Practical Course) 11-N2-072-m01						
Modul	e coord	inator		Module offered by			
Manag	ing Dir	ector of the Institute of A	oplied Physics	Faculty of Physics a	and Astronomy		
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	undergraduate					
Conter	nts						
Princip techno		bassive and active electro	onic components and	their application in	analogous and digital circuit		
Intend	ed lear	ning outcomes					
The stu circuit			ractical setup of elect	ronic circuits from th	ne field of analogous and digital		
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)		
V + P (I	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-		
written	exami	nation (approx. 90 minut	es)				
Allocat	tion of	places					
Additio	onal inf	ormation					
Worklo	ad						
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programmes)			
Modul	Module appears in						
Bachelor' degree (1 major) Nanostructure Technology (2007) No final examination (2010)							
INO FINA	ii exam	ination (2010)					

Module title					Abbreviation	
Nanon	natrix B	iophysical Analyzing Sy	stems and Processes		11-NM-BV-072-m01	
Modul	e coord	linator		Module offered by	Į	
Manag	ging Dir	ector of the Institute of A	pplied Physics	Faculty of Physics a	and Astronomy	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
6	nume	erical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conte	nts					
nics, p	hotonio uring, co	cs and biophysics as we	ll as in the technology	-oriented materials	of energy engineering, electro- sciences, technologies of nano- physical analysis systems and	
Intend	ed lear	ning outcomes				
The st	udents				gy areas of engineering work,	
Course	es (type	, number of weekly cont	act hours, language –	- if other than Germa	an)	
V + R (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, l ion on whether module			ation offered — if not every seme	
		mination (approx. 90 mi oral examination in grou) oral examination of one candi- rt (approx. 10 pages)	
Alloca	tion of	places				
		<u>.</u>				
Additi	onal inf	formation				
Workle	oad					
			_			
Refer	ed to in	LPOI (examination reg		degree programmos		
Modul	0.2000	arcin				
	e appe	ars in gree (1 major) Nanostruct	turo Tochnology (acos))		
	-		•, •			
1101111	Bachelor' degree (1 major) Nanostructure Technology (2007) Master's degree (1 major) Technology of Functional Materials (2010)					
	r's degr					

Module title Abbreviation						
Nanoma	atrix se	emiconductor materials			11-NM-HM-072-m01	
Module	coord	inator		Module offered by		
Managi	ng Dire	ector of the Institute of Ap	plied Physics	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 semes	ster	undergraduate				
Content	ts					
nics, ph	otonic		as in the technology	-oriented materials	of energy engineering, electro- sciences, technologies of nano- niconductor materials.	
Intende	d learn	ning outcomes				
		nave advanced knowledg he field of semiconducto		lication or technolog	gy areas of engineering work,	
Courses	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)	
V + R (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		e ssment (type, scope, la on on whether module ca			tion offered — if not every seme-	
		nination (approx. 90 min ral examination in group) oral examination of one candi- t (approx. 10 pages)	
Allocati	on of p	olaces				
Additio	nal inf	ormation				
Workloa	ad					
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)		
Module	appea	in in				
		ree (1 major) Nanostructu				
	Bachelor' degree (1 major) Nanostructure Technology (2007)					
	-	ee (1 major) Technology c				
Master's	s degre	ee (1 major) Technology c	or Functional Material	5 (2009)		

Module title Abbreviation					Abbreviation	
Nanon	natrix S	emiconductor Processinន្	5		11-NM-HP-072-m01	
Module coordinator Module offered by						
Manag	ging Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	ind Astronomy	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
nics, p	hotonio		as in the technology	-oriented materials	of energy engineering, electro- sciences, technologies of nano- niconductor processes.	
Intend	ed lear	ning outcomes				
		have advanced knowledg he field of semiconducto		lication or technolog	gy areas of engineering work,	
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)	
V + R (no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-	
		mination (approx. 90 min oral examination in group) oral examination of one candi- rt (approx. 10 pages)	
Alloca	tion of _l	olaces				
Additi	onal inf	ormation				
Worklo	oad					
Referre	ed to in	LPO I (examination regu	lations for teaching-o	degree programmes)		
Modul	e appea	ars in				
		ree (1 major) Nanostructu				
	Bachelor' degree (1 major) Nanostructure Technology (2007)					
	-	ee (1 major) Technology c				
Maste	r's degr	ee (1 major) Technology c	of Functional Materia	IS (2009)		

Module title Abbreviation						
Princip	Principles Micro/Nano- and Optoelectronic Devices 11-NM-MB-072-m01					
Module coordinator Module offered by						
Manag	ging Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. con		·	
6	nume	rical grade		•		
Durati	on	Module level	Other prerequisites	i		
1 seme	ester	graduate				
Conter	nts					
nics, p structu	hotonio	s and biophysics as we	ell as in the technology	oriented materials	of energy engineering, electro- sciences, technologies of nano- cro-/nano- and optoelectronic	
Intend	ed lear	ning outcomes				
		have advanced knowle he field of micro-, nano	•		gy areas of engineering work,	
Course	es (type	, number of weekly con	tact hours, language –	- if other than Germa	an)	
V + R (no infoi	mation on SWS (weekly	/ contact hours) and co	ourse language avail	able)	
		sessment (type, scope, ion on whether module			ation offered — if not every seme	
		mination (approx. 90 m oral examination in grou) oral examination of one candi- rt (approx. 10 pages)	
Alloca	tion of	olaces				
Additi	onal inf	ormation				
Worklo	oad					
Referre	ed to in	LPOI (examination reg	gulations for teaching-	degree programmes))	
Modul	e appea	ars in				
Bache	lor' deg	ree (1 major) Nanostruc	ture Technology (2008	3)		
Bache	lor' deg	ree (1 major) Nanostruc	ture Technology (2007	<i>'</i>)		

Modul					Abbreviation
Nanom	natrix ii	nsulation systems and ph	notovoltaics		11-NM-WP-072-m01
Modul	e coord	linator		Module offered by	<u> </u>
Manag	ging Dir	ector of the Institute of A	oplied Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con		•
6	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
nics, p	hotonio uring, co	cs and biophysics as well	as in the technology	-oriented materials	of energy engineering, electro- sciences, technologies of nano- rmal insulation systems and pho
Intend	ed lear	ning outcomes			
		have advanced knowledg the field of thermal insula			gy areas of engineering work,
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	ın)
V + R (1	no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-
		mination (approx. 90 mir oral examination in group) oral examination of one candi- rt (approx. 10 pages)
Alloca	tion of	places			
Additio	onal inf	ormation	_		
Worklo	oad				
Referre	ed to in	LPO I (examination regu	lations for teaching.	degree programmes)	
Modul	e appe	arc in			
		ree (1 major) Nanostructu	ire Technology (2009		
	-				
	Bachelor' degree (1 major) Nanostructure Technology (2007) Master's degree (1 major) Technology of Functional Materials (2010)				
	-	ree (1 major) Technology (()	

Module title					Abbreviation	
Advand	Advanced Practical Course Bachelor 11-PFB-072-m01					
Module	Module coordinator Module offered by					
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	nd Astronomy	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
4	(not) s	successfully completed	11-E1, 11-E2			
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate	11-A3			
Conten	Its					
		luclear, Atomic and Mole ties of solids, surfaces ar		ments on cryogenic t	emperatures and correlated sy-	
Intend	ed learı	ning outcomes				
The stu results	ıdents l . They h	nave knowledge of condu	issuing a scientific p	ublication and of usi	d documenting the experimental ng modern evaluation systems. xperimental methods.	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
hour)					elor Theory): S (1 weekly contact or Practice): P (3 weekly contact	
		s essment (type, scope, la on on whether module ca			tion offered — if not every seme-	
1. Sem the e 2. Lab if a T Studer	inar: ta experim course: estat (e nts mus	ents to be prepared (app	onstrating the studer prox. 30 minutes) nd evaluating the exp s must prepare an ex components 1 and 2	eriments will be con periment log (8 to 10 online (details to be	announced).	
		•	SS DOLIT ASSESSMENT	component 1 and as	sessment component 2.	
	ion of p	Jaces				
Additio	onal info	ormation				
Worklo	ad					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	Bachelor' degree (1 major) Physics (2007)					
	Bachelor' degree (1 major) Physics (2009)					
	-	ree (1 major) Physics (200				
	-	ree (1 major) Nanostructu				
Bachel	Bachelor' degree (1 major) Nanostructure Technology (2007)					

Module title Abbreviation						
Industi	ndustrial Internship 11-PFI-072-m01					
Module	Module coordinator Module offered by					
Manag	ing Dire	ector of the Institute of A	oplied Physics	Faculty of Physics a	ind Astronomy	
ECTS	1	od of grading	Only after succ. con	npl. of module(s)	·	
8	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
		ndustrial methods, work report and an oral prese		l production method	s. Summary of own experiences	
Intend	ed lear	ning outcomes				
					ustrial technologies with relevan- report and an oral presentation.	
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	in)	
P + S (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		essment (type, scope, la on on whether module c			tion offered — if not every seme-	
•	•	oort / fieldwork report / re cal course (20 pages)	eport on practical trai	ning / report on prac	ctical course / project report / re-	
Allocat	ion of j	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Module	e appea	ars in				
	-	ree (1 major) Nanostructu	•, .			
Bachel	Bachelor' degree (1 major) Nanostructure Technology (2007)					

Module					Abbreviation
Measu	rement	s and Data Analysis			11-PFR-072-m01
Module	e coord	inator		Module offered by	<u> </u>
Manag	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics	and Astronomy
ECTS	Methe	od of grading	Only after succ. co	ompl. of module(s)	
2	nume	rical grade			
Duratio	on	Module level	Other prerequisite	25	
1 seme	ster	undergraduate			
Conten	ts				
		, error approximation an oution functions, signific			average values and standard de- plications.
		ning outcomes			
In this	module				ave knowledge of practical experi-
Course	s (type	, number of weekly cont	act hours, language	— if other than Germ	an)
V + Ü (r	no info	rmation on SWS (weekly	contact hours) and	course language avai	ilable)
		sessment (type, scope, la ion on whether module o			ation offered — if not every seme-
written	exami	nation (approx. 120 mini	utes)		
Allocat	ion of _l	places			
Additio	onal inf	ormation			
	_				
Worklo	ad				
Referre	ed to in	LPOI (examination reg	ulations for teaching	g-degree programmes)
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Mathemati	cs (2008)		
Bachel	Bachelor' degree (1 major) Mathematics (2007)				
Bachelor' degree (1 major) Physics (2007)					
	Bachelor' degree (1 major) Physics (2009)				
	-	ree (1 major) Physics (20			
	Bachelor' degree (1 major) Nanostructure Technology (2008)				
	-	ree (1 major) Nanostruct			
	-	ree (1 major) Computatio			
Bachel	or's de	gree (1 major, 1 minor) P	hysics (Minor, 2008)	

Module title Abbreviation						
Advanced Un	11-PGA-NN-072-m01					
Basic Circuitr	Basic Circuitry)					
Module coord	linator		Module offered by			
Managing Dir	ector of the Institute of Ap	plied Physics	Faculty of Physics a	and Astronomy		
ECTS Meth	od of grading	Only after succ. com	pl. of module(s)			
4 (not)	successfully completed					
Duration	Module level	Other prerequisites				
1 semester	undergraduate	Recommended: 11-P	FR			
Contents						
Physical laws	of mechanics, thermodyr	namics, optics, scien	ce of electricity, vibr	ations and waves.		
Intended lear	ning outcomes					
are able to ind				experimental techniques. They hers, and to document the results		
Courses (type	, number of weekly conta	ct hours, language —	· if other than Germa	in)		
BAM): P (2 we Klassische Ph	Mechanik, Wärmelehre u ekly contact hours) ysik (Classical Physics, K hre und Schaltungen (Ele	LP): P (2 weekly conta	act hours)	hermodynamics and Electricity, ntact hours)		
				ition offered — if not every seme-		
	ion on whether module ca nas the following assessm		a bonus)			
ly complete physics-rela 2. Lab course ly complete	ed if a Testat (exam) is par ated contents of the cours in part 2: a) Preparing, pe	ssed. b) Talk (with dis se (approx. 30 minute erforming and evaluat ssed. b) Talk (with dis	scussion) to test the es). ting the experiments scussion) to test the	will be considered successful- students' understanding of the will be considered successful- students' understanding of the		
Students will nent, they mu To pass this n		ty to retake element a and b). ccessfully complete t	a) and/or element b) wo out of the three of			
Allocation of	places		-			
Additional inf	ormation					
Workload						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	Bachelor' degree (1 major) Nanostructure Technology (2008)					
-	ree (1 major) Nanostructu					
Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)						

Module title					Abbreviation	
Advanc	ed Und	lergraduate Laboratory (11-PGB-NRN-072-m01			
Module coordinator Module offered by					<u> </u>	
Managi	ng Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	ind Astronomy	
ECTS		od of grading	Only after succ. con			
2	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Conten	ts					
		of atomic physics, nuclea scilloscopes.	ar physics and wave o	optics. Basic measu	ring methods using computers	
Intende	ed learr	ning outcomes				
are able	e to ind				experimental techniques. They hers, and to document the results	
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	ın)	
Atom- u	ind Ker	Physical Optics, WOP): P nphysik (Atomic and Nuc Messtechnik (Computer	clear Physics, AKP): P	(2 weekly contact h	ours) (2 weekly contact hours)	
		e ssment (type, scope, la on on whether module ca			tion offered — if not every seme-	
• La p p Student Student dents m To pass	ab cour leted if hysics- ts mus ts will f nust pa s this m	a Testat (exam) is pass related contents of the c t register for assessment	ing and evaluating th ed. b) Talk (with disc ourse (approx. 30 mi online (registration of ty to retake element a b). ccessfully complete	ussion) to test the s nutes). deadline to be annou a) and/or element b) one out of the three	. To pass an assessment, stu-	
Allocati	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	appea	irs in				
		ree (1 major) Nanostructu	ıre Technology (2008)		
		ree (1 major) Nanostructu)		
Bachelo	Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)					

Module title Abbreviation							
Compr	Comprehensive Exam in Theoretical Physics / Nanostructure Technology 11-PREN-072-m01						
Modul	e coord	inator		Module offered b	PY		
chairpe	erson o	f examination committee		Faculty of Physic	s and Astronomy		
ECTS		od of grading	Only after succ. con	pl. of module(s)			
4	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conter	Its						
					stands the connections between cquired scientific methods.		
Intend	ed lear	ning outcomes					
		know the connections be the acquired scientific mo	•	physical and chem	ical terminology and laws and are		
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Geri	man)		
A (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language availa	ble)		
		s essment (type, scope, la ion on whether module ca			nation offered — if not every seme-		
oral ex	aminat	ion of one candidate eac	h (approx. 30 minute	s)			
Allocat	ion of	places					
Additio	onal inf	ormation					
Worklo	ad						
Referre	ed to in	LPOI (examination regu	lations for teaching-o	legree programme	es)		
Modul	e appea	ars in					
		ree (1 major) Nanostructu	0, (,			
Bachel	or' deg	ree (1 major) Nanostructu	ire Technology (2007)			

Module title Abbreviation					Abbreviation	
Compre	Comprehensive Exam in Theoretical Physics / Nanostructure Technology 11-PRN-072-m01					
Module	e coord	inator		Module offered	by	
chairpe	erson o	f examination committee		Faculty of Physic	s and Astronomy	
ECTS		od of grading	Only after succ. con	pl. of module(s)		
4	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
		of the examination is to d g and is able to apply the			rofound methodological knowledge	
Intende	ed lear	ning outcomes				
The stu fic met		have founded methodolo	gical knowledge in e	ngineering and ar	e able to apply the acquired scienti-	
Course	s (type	, number of weekly conta	ct hours, language –	· if other than Ger	man)	
A (no ir	nformat	tion on SWS (weekly cont	act hours) and cours	e language availa	ble)	
		sessment (type, scope, la ion on whether module ca			ination offered — if not every seme-	
oral exa	aminat	ion of one candidate eac	h (approx. 30 minute	s)		
Allocat	ion of j	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programm	es)	
Module	e appea	ars in				
	-	ree (1 major) Nanostructu	C , , ,			
Bachel	or' deg	ree (1 major) Nanostructu	re Technology (2007)		

Modul					Abbreviation	
Theore	tical P	nysics 1 (Theoretical Med	hanics)		11-T1-072-m01	
Module	e coord	inator		Module offered by	<u> </u>	
Manag and As	•	ector of the Institute of Th	neoretical Physics	Faculty of Physics a	and Astronomy	
ECTS	<u> </u>	od of grading	Only after succ. con	npl. of module(s)		
8	1	rical grade				
Duratio	on	Module level	Other prerequisites	i		
1 seme	ster	undergraduate				
Conten	nts					
Newtor	nian me	echanics, Lagrangian me	chanics, Hamiltonian	equation of motion	, conservation laws.	
		ning outcomes	-	•	·	
	udents		rinciples of classical	theoretical mechani	cs and the required calculation	
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	an)	
V + Ü (I	no info	rmation on SWS (weekly	contact hours) and co	ourse language avai	lable)	
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-	
written	exami	nation (approx. 120 minu	ites)			
Allocat	tion of	olaces				
Additio	onal inf	ormation				
Worklo	bad					
Referre	ed to in	LPOI (examination regu	llations for teaching-	degree programmes)	
Module	e appea	ars in				
Bachel	or' deg	ree (1 major) Mathematic	cs (2008)			
Bachel	or' deg	ree (1 major) Mathematic	cs (2007)			
Bachel	Bachelor' degree (1 major) Physics (2007)					
	Bachelor' degree (1 major) Physics (2009)					
	-	ree (1 major) Physics (20				
		ree (1 major) Nanostructi				
	-	ree (1 major) Nanostructi				
	-	ree (1 major) Computatio		09)		
Bachel	or's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2008)			

Modul					Abbreviation	
Theore	etical P	hysics 2 (Theoretical Elec	ctrostatics and Electr	odynamics)	11-T2-072-m01	
Modul	e coord	inator		Module offered b	y	
	ging Dir strophy:	ector of the Institute of Th sics	neoretical Physics	Faculty of Physics	s and Astronomy	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
8	nume	rical grade				
Durati	on	Module level	Other prerequisites	6		
1 seme	ester	undergraduate				
Conter	nts					
Electro	statics	, magnetostatics, Maxwe	ll equations, covaria	nt formulation, ele	ctrodynamics and matter.	
		ning outcomes		,, ,		
	-		rinciples of classical	electrodynamics a	nd the required calculation me-	
Course	es (type	, number of weekly conta	act hours, language –	- if other than Gerr	nan)	
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language ava	ailable)	
ster, in	format	sessment (type, scope, la ion on whether module c nation (approx. 120 minu	an be chosen to earn		nation offered — if not every seme-	
	tion of					
Additi	onal inf	ormation				
Auulti						
Worklo	bad					
	_		-			
Referre	ed to in	LPOI (examination regu	llations for teaching-	degree programme	s)	
Modul	e appe	ars in				
	-	ree (1 major) Mathematio				
	-	ree (1 major) Mathematic				
	Bachelor' degree (1 major) Physics (2007)					
	-	ree (1 major) Physics (20	•			
	-	ree (1 major) Physics (20				
	Bachelor' degree (1 major) Nanostructure Technology (2008)					
	-	ree (1 major) Nanostructi				
	-	ree (1 major) Computatio		09)		
Bache	lor's de	gree (1 major, 1 minor) Pl	nysics (Minor, 2008)			

Modul				Abbreviation		
Theore	etical Pl	hysics 3 (Theoretical C	Juantum Mechanics)		11-T3-072-m01	
Modul	e coord	inator		Module offered by	<u>р</u>	
	ing Dire	ector of the Institute of sics	Theoretical Physics	Faculty of Physics and Astronomy		
ECTS	<u> </u>	od of grading				
8		rical grade		mpl. of module(s)		
Duration Module level Other prerequisites						
1 semester		undergraduate				
Conter	nts					
			ger equation, mathema pin, hydrogen atom, m		f quantum mechanics, harmonic 5.	
Intend	ed lear	ning outcomes				
The students have knowledge of the principles of quantum mechanics and the required calculation methods.						
Course	es (type	, number of weekly co	ntact hours, language -	– if other than Germ	an)	
V + Ü (no info	rmation on SWS (week	ly contact hours) and c	ourse language avai	lable)	
ster, in	Iformat	ion on whether module	e can be chosen to earr		ation offered — if not every seme	
		nation (approx. 120 mi	inutes)			
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	oad					
Referre	ed to in	LPOI (examination re	egulations for teaching-	degree programmes)	
Modul	e appea	ars in				
		ree (1 major) Mathema	atics (2008)			
Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Mathematics (2007)						
Bachelor' degree (1 major) Physics (2007)						
Bachelor' degree (1 major) Physics (2009)						
Bachelor' degree (1 major) Physics (2008)						
Bachel	lor' deg	ree (1 major) Nanostru	cture Technology (2008	8)		
Bachel	lor' deg	ree (1 major) Nanostru	cture Technology (2007	7)		
	Bachelor' degree (1 major) Computational Mathematics (2009)					
Bachel	lor's de	gree (1 major, 1 minor)	Physics (Minor, 2008)			

Module	e title			Abbreviation			
Theore	tical P	hysics 3 FOKUS (Theoret	ical Quantum Mecha	nics)	11-T3F-072-m01		
Module	e coord	linator		Module offered by	y		
Managing Director of the Institute of Theoretical Physics and Astrophysics			neoretical Physics	Faculty of Physics and Astronomy			
ECTS	Meth	od of grading	Only after succ. cor	mpl. of module(s)			
8	nume	rical grade					
Duration Module level		Other prerequisites					
1 semester undergraduate							
Conten	ts						
		sical physics, Schrödinge gular momentum and spi			of quantum mechanics, harmonic Is		
Intend	ed lear	ning outcomes					
The stu	Idents	have knowledge of the p	rinciples of quantum	mechanics and the	e required calculation methods		
Course	s (type	, number of weekly conta	act hours, language -	– if other than Germ	nan)		
		rmation on SWS (weekly					
		sessment (type, scope, la ion on whether module c			nation offered — if not every seme		
written	exami	nation (approx. 120 minu	ites)				
Allocat	ion of	places					
		<u>.</u>					
Additio	nal inf	ormation					
Worklo	ad						
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programme	s)		
				<u> </u>	·		
Module	e appe	ars in					
		ree (1 major) Physics (20	07)				
Bachelor' degree (1 major) Physics (2009)							
	-	ree (1 major) Physics (20	-				
	Bachelor' degree (1 major) Nanostructure Technology (2008)						
Bachel	or' deg	ree (1 major) Nanostructi	ure Technology (2007	7)			

Modul	e title			Abbreviation			
Theore	etical P	hysics 4 (Theoretical T	hermodynamics and S	tatistics)	11-T4-072-m01		
Modul	e coord	linator		Module offered b	by		
	ging Dir strophy	ector of the Institute of sics	f Theoretical Physics	Faculty of Physics and Astronomy			
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)			
8	nume	rical grade					
Duration		Module level	Other prerequisites	Other prerequisites			
1 semester		undergraduate					
Conte	nts						
Princip chanic		hermodynamics, fund	amental theorems, the	rmodynamic poten	tials, principles of statistical me-		
Intend	ed lear	ning outcomes					
		have knowledge of the ethods.	e principles of thermody	ynamics and statis	tical mechanics and the required		
Course	es (type	, number of weekly co	ntact hours, language -	— if other than Ger	man)		
V + Ü (no info	rmation on SWS (week	ly contact hours) and c	ourse language av	ailable)		
ster, ir	nformat		e can be chosen to earr		ination offered — if not every seme-		
Alloca	tion of	places					
Additi	onal inf	ormation					
Workle	oad						
Referr	ed to in	LPO I (examination re	egulations for teaching-	degree programm	es)		
				0 1 0			
Modul	e appe	ars in					
		ree (1 major) Mathema	atics (2008)				
Bachelor' degree (1 major) Mathematics (2007)							
Bachelor' degree (1 major) Physics (2007)							
Bachelor' degree (1 major) Physics (2009)							
Bachelor' degree (1 major) Physics (2008)							
Bachelor' degree (1 major) Nanostructure Technology (2008)							
Bachelor' degree (1 major) Nanostructure Technology (2007)							
	Bachelor' degree (1 major) Computational Mathematics (2009)						
Bache	Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)						