

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: 2008 Responsible: Faculty of Physics and Astronomy

JMU Würzburg • generated 11-Jan-2023 • exam. reg. data record 82|224|-|-|H|2008



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)):

03-Sep-2009 (2009-28)

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 (13:	2 ECTS credits)			
Nanostructure Technolo	ogy (12 ECTS credits)			
11-N1-072-m01	Basics of NanostructureTechnology	6	NUM	28
11-N2-082-m01	Basic electronics with laboratory course	6	NUM	29
Lab Course Engineering	(18 ECTS credits)			
11-PFB-072-m01	Advanced Practical Course Bachelor	4	B/NB	35
	Advanced Undergraduate Laboratory (Classical Mechanics,		D /ND	
11-PGA-NN-072-m01	Thermodynamics, Basic Circuitry)	4	B/NB	38
	Advanced Undergraduate Laboratory (Optics, Basic Semicon-			
11-PGB-NRN-072-m01	ductor Circuits)	2	B/NB	39
11-PFI-072-m01	Industrial Internship	8	B/NB	36
Mathematics for Engine	eers (26 ECTS credits)			
11-MPI3-062-m01	Mathematics 3 for students of Physics and Engineering	8	NUM	25
10-M-NST1-072-m01	Mathematics 1 for students in Nanostructural Engineering	10	NUM	12
10-M-NST2-072-m01	Mathematics 2 for students in Nanostructural Engineering	8	NUM	13
Chemistry (10 ECTS cree				
08-CP1-072-m01	General Chemistry for Physics and Engineers	10	NUM	8
Experimental Physics (A				
	Experimental Physics 1 (Mechanics, Thermodynamics, Waves			
11-E1-072-m01	and Oscillations)	8	NUM	18
11-E2-072-m01	Experimental Physics 2 (Electrics and Magnetism)	8	NUM	19
	Experimental Physics 3 (Optics, Quantum Phenomena, Intro-			
11-E3-072-m01	duction Atomic Physics)	8	NUM	20
	Experimental Physics 7 (Solid State Phenomena [Semiconduc-			
11-E7-072-m01	tor, Superconductivity, Magnetism])	4	NUM	2
11-E5-082-m01	Experimental Physics 5 (Introduction to Solid State Physics)	8	NUM	22
11-E4-082-m01	Experimental Physics 4 (Physics of Atoms and Molecules)	6	NUM	2
Theoretical Physics (16				<u> </u>
11-T1-072-m01	Theoretical Physics 1 (Theoretical Mechanics)	8	NUM	4
, 11-T3-072-m01	Theoretical Physics 3 (Theoretical Quantum Mechanics)	8	NUM	44
11-T3F-072-m01	Theoretical Physics 3 FOKUS (Theoretical Quantum Mechanics)	8	NUM	4
Module Comprehensive		2		1 4.
	Comprehensive Exam in Theoretical Physics / Nanostructure			
11-PREN-072-m01	Technology	4	NUM	40
	Comprehensive Exam in Theoretical Physics / Nanostructure			
11-PRN-072-m01	Technology	4	NUM	4
Compulsory Electives (18			L	<u> </u>
08-NM-AW-072-m01	Nanomatrix Inorganic Materials Chemistry	6	NUM	10
08-NM-NS-072-m01	Nanoparticle Synthesis and Structuring Technologies	6	NUM	11
11-NM-WP-072-m01	Nanomatrix insulation systems and photovoltaics	6	NUM	34
11-NM-HM-072-m01	Nanomatrix semiconductor materials	6	NUM	3
11-NM-HP-072-m01	Nanomatrix Semiconductor Processing	6	NUM	32
11-NM-MB-072-m01	Principles Micro/Nano- and Optoelectronic Devices	6	NUM	3
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03-NM-BW-072-m01	03-NM-BW-072-m01 Nanomatrix Biomedical Materials								
07-NM-BS-072-m01	Nanomatrix Biocompatible Structuring Technologies	6	NUM	7					
11-NM-BV-072-m01	Nanomatrix Biophysical Analyzing Systems and Processes	6	NUM	30					
Thesis (10 ECTS credits)	Thesis (10 ECTS credits)								
11-BA-N-072-m01	Bachelor Thesis Nanostructure Technology	10	NUM	17					
Subject-specific Key Skills (14 ECTS credits)									
11-T2-072-m01	Theoretical Physics 2 (Theoretical Electrostatics and Electrody-	8	NUM	43					
	namics)								
11-T4-072-m01	Theoretical Physics 4 (Theoretical Thermodynamics and Stati-	8	NUM	46					
11 14 0/2 1101	stics)	0	Nom	40					
11-MPI4-062-m01	Mathematics 4 for Students of Physics and Engineering	8	NUM	27					
11-PFR-072-m01	Measurements and Data Analysis	2	NUM	37					
11-A1-072-m01	Computational Physics	6	NUM	14					
11-A3-072-m01	Laboratory and Measurement Technology	6	NUM	15					
11-MKS-082-m01	Introduction Course Mathematics	3	B/NB	24					

Module	e title				Abbreviation
Nanom	atrix B	iomedical Materials		_	03-NM-BW-072-m01
Module coordinator Module coordinator					<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. con	npl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites	;	
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.
		ning outcomes		· ·	
		e developed an advanced with a particular focus or			ea or technology focus of engi-
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	ın)
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					
	-	ree (1 major) Nanostructu			
Bachel	or' deg	ree (1 major) Nanostructu	ire Technology (2007	7)	

Modul	e title				Abbreviation
Nanomatrix Biocompatible Structuring Technologies 07-NM-BS-072-m01					
Module coordinator Module offered by					<u> </u>
Dean c	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			
Conter	nts				
engine scienc	ering, e e, nano	electronics and photonics	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			ion directions or technology technologies.
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	ın)
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 c			tion offered — if not every seme-
		mination (approx. 90 mir oral examination in group) oral examination of one candi- rt (approx. 10 pages)
Allocat	tion of _l	olaces			
Additio	onal inf	ormation			
Worklo	oad				
Referre	ed to in	LPOI (examination regu	llations for teaching-o	degree programmes)	
Modul	e appea	ars in			
	-	ree (1 major) Nanostructu			
Bache	lor' deg	ree (1 major) Nanostructu	ure Technology (2007)	

Module	e title				Abbreviation	
					08-CP1-072-m01	
Module	e coord	inator		Module offered by		
lecture				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 learn	ning outcomes				
to expla cal form	ain bas nulas to	ic models of the structure	e of matter. They have tions and to interpret	e developed the abil them by identifying	formation from it. They are able ity to use the language of chemi- the type of reaction. They are ab- lve them.	
Course	s (type	, number of weekly conta	ct hours, language —	if other than Germa	n)	
compo o o o Method ster, in	nent. 8-IOC-2 8-CP1-2 8-CP1-2 1 of ass formati	1-072: V (no information of 1-072: V (no information of 3-072: P (no information of ressment (type, scope, la on on whether module ca	on SWS (weekly conta on SWS (weekly conta on SWS (weekly conta nguage — if other tha an be chosen to earn	act hours) and cours act hours) and cours act hours) and cours in German, examina a bonus)	e language available) e language available) tion offered — if not every seme-	
	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-o72: 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					

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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 Chair of Chemical Technology of Material Synthe Pharmacy)							
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		
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 Syn					echnology of Material Synthesis		
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					
Bachelor' degree (1 major) Nanostructure Technology (2007)							

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 Workld Referre 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 Engineering 10-M-NST2-072-m01											
Modul	e coord	inator		Module offered by	<u> </u>						
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									
Duratio	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, la on 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										

Module 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			Faculty of Physics a	nd Astronomy
ECTS	1	od of grading	Only after succ. con	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	ict hours, language –	- if other than Germa	n)
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-
written	exami	nation (approx. 120 minu	tes)		
Allocat	tion of	olaces			
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)		
	-	ree (1 major) Physics (20			
	-	ree (1 major) Physics (20		、 、	
	-	ree (1 major) Nanostructu			
	-	ree (1 major) Nanostructu)	
васне	or's de	gree (1 major, 1 minor) Pł	iysics (Minor, 2008)		

Module	e title				Abbreviation	
Labora	tory an	d Measurement Technol	ogy		11-A3-072-m01	
Module	e coord	inator		Module offered by	<u> </u>	
			`			
Managing Director of the Institute of Applied Physics Faculty of Physics and Astronomy						
ECTS	·	od of grading	Only after succ. con	ipi. of module(s)		
6	·	rical grade				
Duratio		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			ify for admis- the respecti- e course will essment. If ssessment gistration for will be ad-	
				er date, students wil	•	
Conten	Its					
		o electronic and optical r cs, light sources, spectro				y and cryoge-
	-	ning outcomes	· · · ·			
red val Course V + Ü (r Methor	ue acques (type) no infor d of ass	cryogenics and vacuum uisition. , number of weekly conta mation on SWS (weekly sessment (type, scope, la on on whether module c	act hours, language – contact hours) and co anguage — if other the	- if other than Germa ourse language avail an German, examina	n) able)	
written	examiı	nation (approx. 120 minu	ites)			
Allocat	ion of p	olaces				
		f pool of general key skil	ls (ASO): 15 places. P	laces will be allocate	ed by lot.	
-	· · ·	ormation			- ,	
Worklo	au					
Referre	ed to in	LPOI (examination regu	llations for teaching-o	degree programmes)		
Module	e appea	in				
Bachel	or' 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		N N		
		ree (1 major) Nanostructi				
	-	ree (1 major) Nanostructi				
	-	ree (1 major) Nanostructi	_,	9) • generated 11-Jan-2023 • exa	ım. reg. da-	page 15 / 46
(2008)				or (180 ECTS) Nanostrukturte		1

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
Bachel	or The	sis Nanostructure Techr	nology		11-BA-N-072-m01
Modul	e coord	inator		Module offered by	
chairpe	erson o	f examination committe	e	Faculty of Physics a	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	· · · · · ·	· · · · ·
10	nume	rical grade		•	
Duratio	on	Module level	Other prerequisites	i	
1 seme	ster	undergraduate			
Conter	nts				
					ask in the field of nanostructure riting of the Bachelor's thesis.
Intend	ed lear	ning outcomes			
structu	ire tech		nce of a supervisor, es	pecially in accordan	nd engineering task from nano- ice with known methods and
Course	s (type	, number of weekly con	tact hours, language –	- if other than Germa	an)
no cou	rses as	signed			
		sessment (type, scope, ion on whether module			ation offered — if not every seme-
written	thesis	(approx. 25 pages)			
	tion of				
Additio	onal inf	ormation			
Worklo	ad				
Poforra	ad to in	LPOI (examination reg		degree programmes	
Modul	e appea	ars in			
		ree (1 major) Nanostruc	ture Technology (2010)	
	-	ree (1 major) Nanostruc		-	
		ree (1 major) Nanostruc			
	-	ree (1 major) Nanostruc	•, .	-	

Module title					Abbreviation	
Experi	mental	Physics 1 (Mechanics, Th	nermodynamics, Wav	es and Oscillati-	11-E1-072-m01	
ons)						
Modul	e coord	inator		Module offered by	/	
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	ster	undergraduate				
Conter	Its					
Physic	al laws	of mechanics, vibrations	and waves, thermod	ynamics		
Intend	ed lear	ning outcomes				
The stu	udents	understand the basic cor	ntexts and principles	of mechanics, vibra	ation, waves and thermodynamics	
Course	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)	
Metho	d of ass	sessment (type, scope, la	anguage — if other th	an German, examin	ation offered — if not every seme-	
		ion on whether module c			,	
written	exami	nation (approx. 120 minu	ites)			
Allocat	ion of _l	places				
Additio	onal inf	ormation				
Worklo	ad					
Poforra	d to in	LPOI (examination regu	lations for teaching	degree programme	2)	
Referre					ונ	
Modul	e appea	ars in				
		ree (1 major) Physics (20	07)			
		ree (1 major) Physics (20				
Bachel	or' deg	ree (1 major) Physics (20	o8)			
Bachel	or' deg	ree (1 major) Nanostructi	ure Technology (2008	3)		
	-	ree (1 major) Nanostructu	•, •, •,)		
Bachel	or's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2008)			

Modul	e title				Abbreviation	
Experi	Experimental Physics 2 (Electrics and Magnetism) 11-E2-072-m01					
Modul	e coord	inator		Module offered by	1	
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS		od of grading	Only after succ. con			
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	ns and waves	
÷		ning outcomes		5		
The stu	udents		texts and principles	of science of electric	ity, magnetism, electromagnetic	
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	in)	
		mation on SWS (weekly o				
ster, in written	format 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-o	degree programmes)		
Modul	e appea	ars in				
Bachel	or' deg	ree (1 major) Physics (200	07)			
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)					
Bachel	or's de	gree (1 major, 1 minor) Ph	iysics (Minor, 2008)			

Module title Abbreviation					
Experimental Physics 3 (Optics, Quantum Phenomena, Introduction Atomic 11-E3-072-m01					
Physics)					
Module c	oordinator		Module offered by		
Managing	g Director of the Institute of A	pplied Physics	Faculty of Physics a	and Astronomy	
ECTS N	lethod of grading	Only after succ. con	npl. of module(s)		
8 n	umerical grade				
Duration	Module level	Other prerequisites			
1 semeste	er undergraduate				
Contents	·				
Physical I	aws of optics, quantum pher	omena, introduction	to Atomic Physics.		
Intended	learning outcomes				
		asic contexts and prir	nciples of optics, qu	antum phenomena and Atomic	
	type, number of weekly conta	act hours, language —	- if other than Germa	an)	
	information on SWS (weekly				
· · · · ·	· · · · · · · · · · · · · · · · · · ·			ation offered — if not every seme-	
	mation on whether module c			alon oncrea in not every serve	
written ex	amination (approx. 120 minu	ıtes)			
	n of places				
		-			
Additiona	l information				
Workload	1				
worktouc					
	to in LPO I (examination regu	lations for toaching	dograa programmas		
Releffed			legree programmes,		
	•				
	ppears in				
	degree (1 major) Mathematic				
	degree (1 major) Mathematic				
Bachelor' degree (1 major) Physics (2007) Bachelor' degree (1 major) Physics (2009)					
	degree (1 major) Physics (20 degree (1 major) Physics (20				
	degree (1 major) Nanostruct)		
	degree (1 major) Nanostruct				
	degree (1 major) Nanostructi degree (1 major) Computatio	•, • ,			
	s degree (1 major, 1 minor) Pl		09)		
Dacheiul		iyoloo (Millol, 2006)			

Module title Abbreviation							
Experi	Experimental Physics 4 (Physics of Atoms and Molecules) 11-E4-082-m01						
Module coordinator Module offered by							
Manag	ging Dir	ector of the Institute of Ap	oplied Physics	Faculty of Physics	and Astronomy		
ECTS		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					
Conte	nts						
Physic	al laws:	of Atomic and Molecular	Physics.				
Intend	led lear	ning outcomes					
Quant	um meo	chanical atom model, one	/multi-electron atom	is, electronic dipole	nd Molecular Physics (atoms: e transitions, atoms in B field as ations, electronic excitations)		
Course	es (type	e, number of weekly conta	ct hours, language –	- if other than Germ	an)		
V + Ü ((no info	rmation on SWS (weekly	contact hours) and co	ourse language ava	ilable)		
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-		
writter	n exami	nation (approx. 120 minu	tes)				
	tion of						
Additi	onal inf	ormation					
	-						
Workl	oad						
Referr	ed to in	LPOI (examination regu	lations for teaching-	degree programmes	3)		
Modul	e appe	ars in					
		ree (1 major) Physics (20	08)				
	-	ree (1 major) Nanostructu	-)			
	-	gree (1 major, 1 minor) Pł					

Module title Abbreviation					
Experi	mental	Physics 5 (Introducti	on to Solid State Physic	s)	11-E5-082-m01
Modul	le coord	inator		Module offered by	
Manag	ging Dir	ector of the Institute o	of Applied Physics	Faculty of Physics	and Astronomy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
8	nume	rical grade			
Durati	on	Module level	Other prerequisites	i	
1 seme	ester	undergraduate			
Conte	nts				
		of solids: Bonding ar lectron gas)	nd structure, lattice dyna	mics, thermal prope	erties, principles of electronic pro-
Intend	led lear	ning outcomes			
The st	udents	have knowledge of th	e basic contexts and pri s of electronic properties		onding and structure, lattice dyna-
Course	es (type	, number of weekly c	ontact hours, language –	- if other than Germa	an)
V + Ü ((no info	rmation on SWS (wee	kly contact hours) and co	ourse language avai	lable)
			e, language — if other th le can be chosen to earn		ation offered — if not every seme-
writter	n exami	nation (approx. 120 n	ninutes)		
Alloca	tion of	places			
Additi	onal inf	ormation			
Workl	oad				
Referr	ed to in	LPOI (examination	regulations for teaching-	degree programmes)
Modul	e appea	ars in			
Bache	lor' deg	ree (1 major) Physics	(2008)		
	-	-	ucture Technology (2008		
	-		ational Mathematics (20	09)	
Bache	lor's de	gree (1 major, 1 mino	r) Physics (Minor, 2008)		

Module title					Abbreviation	
Experir	nental	Physics 7 (Solid State Pl	nenomena [Semicond	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				
	-	ree (1 major) Physics (20		、		
	-	ree (1 major) Nanostructu				
	-	ree (1 major) Nanostructu)		
Bachel	or's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2008)			

Modul	e title				Abbreviation	
Introdu	ntroduction Course Mathematics 11-MKS-082-mo1					
Modul	e coord	inator	Module offered by	<u> </u>		
Manag	ing Dir	ector of the Institute of A	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
3	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
		nathematics and basic ca d preparation of the mod			rriculum, especially for the intro- ntal Physics.	
Intend	ed lear	ning outcomes				
		have knowledge of the pr eoretical and Experiment		tics and elementary	calculation methods which are	
Course	es (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)	
V (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language available	e)	
		s essment (type, scope, la ion on whether module c			tion offered — if not every seme-	
written	exami	nation (approx. 120 minu	tes)			
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	bad					
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Modul	e appea	ars in				
		ree (1 major) Physics (20	09)			
	-	ree (1 major) Physics (20				
		ree (1 major) Nanostructu)		
Bachel	lor's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2008)			

Modul					Abbreviation		
Mathe	matics	3 for students of Physic	s and Engineering		11-MPI3-062-m01		
Module coordinator				Module offered by			
		ector of the Institute of T	heoretical Physics	Faculty of Physics a	and Astronomy		
-	trophys		incorecticat i hybred				
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
8	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					
			assessment at a later date, students will have to obtain the qualification for admission to assessment anew.				
Conter	its						
Ordina	ry and	partial differential equat	ions in Physics.				
Intend	ed lear	ning outcomes					
		have basic mathematica ntial equations.	l knowledge of dynan	nic equations and so	lution methods for o	common and	
Course	s (type	, number of weekly cont	act hours, language –	- if other than Germa	an)		
V + Ü (no infoi	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		sessment (type, scope, l ion on whether module o			ition offered — if not	every seme-	
written	exami	nation (approx. 120 min	utes)				
Allocat	ion of j	places					
Additio	onal inf	ormation					
			-				
Worklo	ad						
Poforr	d to in	LPOI (examination reg	ulations for toaching	degree programmes			
Referre				acsiee programmes)			
Modul	e appea	ars in					
		ree (1 major) Physics (20	007)				
		ree (1 major) Physics (20					
	-	ree (1 major) Physics (20					
	-	ree (1 major) Technology		-			
	-	ree (1 major) Technology					
	-	ree (1 major) Nanostruct					
	-	ree (1 major) Nanostruct					
Dachel	or deg	ree (1 major) Nanostruct	ure recimology (2008)			
Bachelor's	with 1 ma	jor Nanostructure Technology	-	• generated 11-Jan-2023 • exa	-	page 25 / 46	
(2008)			ta record Bachel	or (180 ECTS) Nanostrukturte	chnik - 2008		



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	1
	ing Dire	ector of the Institute of Th sics	neoretical Physics	Faculty of Physics a	and Astronomy
ECTS	- · · ·	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		l		
Functio	onal and	alysis and complex analy	sis.		
Intend	ed lear	ning outcomes			
		have basic knowledge of as the required calculation		ert space and the the	eory of functions of a complex va
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	an)
V + Ü (no infoi	rmation on SWS (weekly	contact hours) and co	ourse language avail	lable)
ster, in	formati	sessment (type, scope, la ion on whether module c nation (approx. 120 minu	an be chosen to earn		ation offered — if not every seme-
Allocat	tion of p	olaces			
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)		
		ree (1 major) Physics (20			
Bachelor' degree (1 major) Physics (2008)					
Bachelor' degree (1 major) Nanostructure Technology (2010)					
	-	ree (1 major) Nanostructı	•, .		
	-	ree (1 major) Nanostructı			
Bachel	or' deg	ree (1 major) Nanostructı	ure Technology (2007)	

Module title Abbreviation					Abbreviation
Basics	of Nan	ostructureTechnology			11-N1-072-m01
Modul	e coord	linator		Module offered by	/ /
Manag	ing Dir	ector of the Institute of A	Applied Physics	Faculty of Physics	and Astronomy
ECTS		od of grading	Only after succ. con		
6		rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts	•			
Princip	les of p	producing, characterisin	g and applying nanosi	ructures.	
Intend	ed lear	ning outcomes			
	-		undamental propertie	s, technologies, ch	aracterising methods and functi-
		ructures.			
Course	es (type	, number of weekly cont	tact hours, language –	- if other than Germ	ian)
V + S (I	no info	rmation on SWS (weekly	contact hours) and co	ourse language ava	ilable)
		sessment (type, scope, ion on whether module			ation offered — if not every seme-
written	exami	nation (approx. 90 minu	ites)		
Allocat	tion of	places			
Additio	onal inf	ormation			
Worklo	oad				
Referre	ed to in	LPOI (examination reg	ulations for teaching-	legree programmes	5)
	,				
Modul	e appea	ars in			
Bachel	lor' deg	ree (1 major) Physics (2	008)		
Bachel	lor' deg	ree (1 major) Technolog	y of Functional Materia	als (2009)	
Bachelor' degree (1 major) Technology of Functional Materials (2010)					
Bachelor' degree (1 major) Nanostructure Technology (2008)					
Bachel	lor' deg	ree (1 major) Nanostruc	ture Technology (2007)	
Bachel	lor's de	gree (1 major, 1 minor) F	Physics (Minor, 2008)		
Bachelor' degree (1 major) Technology of Functional Materials (2006)					

Modul	e title				Abbreviation	
Basic electronics with laboratory course 11-N2-082-m01						
Modul	e coord	linator		Module offered by	,	
Manag	ging Dir	ector of the Institute of A	pplied Physics	Faculty of Physics	and Astronomy	
ECTS		od of grading	Only after succ. con		,	
6	nume	erical grade		-		
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
Princip techno		passive 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 t	he field of analogous and digital	
Course	es (type	e, number of weekly cont	act hours, language –	- if other than Germ	an)	
V + P (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	ı exami	nation (approx. 90 minu	tes)			
Allocat	tion of	places				
Additio	onal in	formation				
			_			
Worklo	bad					
Referre	ed to ir	LPOI (examination reg	ulations for teaching-	degree programmes	;)	
Modul	e appe	ars in				
Bachel	lor' deg	gree (1 major) Nanostruct	ure Technology (2008	3)		
Bachel	lor's de	egree (1 major, 1 minor) P	hysics (Minor, 2008)			

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	<u>)</u>	
	-	gree (1 major) Nanostruct gree (1 major) Nanostruct	•, •		
1101111	ion ueg	מכב כב ווומוסדו ואמווספנוענו			
	r's degr	ree (1 major) Technology			

Module title Abbreviation						
Nanom	atrix s	emiconductor materials			11-NM-HM-072-m01	
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. con	pl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
nics, p	hotonic		as in the technology	-oriented materials	of energy engineering, electro- sciences, technologies of nano- niconductor materials.	
Intend	ed lear	ning outcomes				
		have advanced knowledg he field of semiconducto		lication or technolog	gy areas of engineering work,	
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	n)	
V + R (1	no 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- t (approx. 10 pages)	
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)		
Modul	e appea	ars in				
		ree (1 major) Nanostructu				
	-	ree (1 major) Nanostructu				
	-	ee (1 major) Technology c				
master	Master's degree (1 major) Technology of Functional Materials (2009)					

Module title Abbreviation					Abbreviation
Nanomatrix Semiconductor Processing11-NM-HP-072-m01					11-NM-HP-072-m01
Module coordinator Module offered by					<u> </u>
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			
		ree (1 major) Nanostructu			
	-	ee (1 major) Technology c			
Maste	r's degr	ee (1 major) Technology c	of Functional Materia	IS (2009)	

Modul	e title				Abbreviation	
Princip	Principles Micro/Nano- and Optoelectronic Devices 11-NM-MB-072-mo1					
Module coordinator Module offered by					<u> </u>	
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		
	-	ree (1 major) Nanostructi			
	-				
	Aaster's degree (1 major) Technology of Functional Materials (2010) Aaster's degree (1 major) Technology of Functional Materials (2009)				

Module title					Abbreviation			
Advan	Advanced Practical Course Bachelor 11-PFB-072-m01							
Modul	e coord	inator		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					
Conter	Its							
		luclear, Atomic and Mole ties of solids, surfaces ar		ments on cryogenic t	emperatures and correlated sy-			
Intend	ed learı	ning outcomes						
results	. They h		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			
		sessment (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).			
-	ion of p	· · · ·						
	nal inf	ormation						
Worklo	ad							
WOIKI	au							
Referred to in LPO I (examination regulations for teaching-degree programmes)								
	Module appears in							
Bachel Bachel Bachel	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)							
Bachel	Bachelor' degree (1 major) Nanostructure Technology (2007)							

Modul	Module title Abbreviation					
Indust	ndustrial Internship 11-PFI-072-m01					
Modul	Module coordinator Module offered by					
Manag	ing Dire	ector of the Institute of A	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS		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				
Conter	nts					
-		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 (I	no infor	mation 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-	
•	•	oort / fieldwork report / re cal course (20 pages)	eport on practical trai	ning / report on prac	ctical course / project report / re-	
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad		-			
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)		
Modul	e appea	ars in				
Bachel	Bachelor' degree (1 major) Nanostructure Technology (2008)					
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	or' deg	ree (1 major) Mathemati	cs (2007)		
Bachel	Bachelor' degree (1 major) Physics (2007)				
	Bachelor' degree (1 major) Physics (2009)				
	-	ree (1 major) Physics (20			
		ree (1 major) Nanostruct			
	-	ree (1 major) Nanostruct			
	Bachelor' degree (1 major) Computational Mathematics (2009)				
Bachel	or's de	gree (1 major, 1 minor) P	hysics (Minor, 2008)	

Module title Abbreviation						
	Advanced Undergraduate Laboratory (Classical Mechanics, Thermodynamics, 11-PGA-NN-072-mo1					
Basic Circuitry)						
Module coordinator	•					
Managing Director of the Institu	te of Appl	lied Physics	Faculty of Physics a	nd Astronomy		
ECTS Method of grading	0	only after succ. com	pl. of module(s)			
4 (not) successfully comp	leted					
Duration Module level	0)ther prerequisites				
1 semester undergraduate	R	ecommended: 11-P	FR			
Contents						
Physical laws of mechanics, the	rmodynaı	mics, optics, sciend	ce of electricity, vibra	ations and waves.		
Intended learning outcomes						
The students have knowledge a are able to independently plan a in a measurement protocol.				experimental techniques. They hers, and to document the results		
Courses (type, number of weekl	y contact	hours, language —	if other than Germa	n)		
Beispiele aus Mechanik, Wärme BAM): P (2 weekly contact hours Klassische Physik (Classical Phy Elektrizitätslehre und Schaltung) vsics, KLP	P): P (2 weekly conta	act hours)			
Method of assessment (type, so ster, information on whether mo				tion offered — if not every seme-		
This module has the following a			a Dollus)			
 Lab course in part 1: a) Preparely completed if a Testat (examphysics-related contents of the course in part 2: a) Preparely course in part 2: a) 	ing, perfo) is passe e course ring, perfo) is passe e course	orming and evaluat ed. b) Talk (with dis (approx. 30 minute orming and evaluat ed. b) Talk (with dis (approx. 30 minute	scussion) to test the es). ing the experiments scussion) to test the es).	students' understanding of the will be considered successful- students' understanding of the		
	oortunity ents a) ar nust succ	to retake element and b). essfully complete t	a) and/or element b) wo out of the three of	. To pass an assessment compo- courses.		
Allocation of places	· ·		·	· · · · · · · · · · · · · · · · · · ·		
Additional information						
Workload						
Referred to in LPO I (examination	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
Bachelor' degree (1 major) Nano	structure	e Technology (2008))			
Bachelor' degree (1 major) Nano						
Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)						

Module title					Abbreviation
Advanced Undergraduate Laboratory (Optics, Basic Semiconductor Circuits)					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 (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	d to in	LPOI (examination regu	lations 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						
Compre	Comprehensive Exam in Theoretical Physics / Nanostructure Technology 11-PRN-072-mo1					
Module coordinator 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	e title				Abbreviation		
Theore	etical Pl	hysics 1 (Theoretical Mec	hanics)		11-T1-072-m01		
Modul	Module coordinator Module offered by						
	ing Dire	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)			
8	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ester	undergraduate					
Conter	nts						
Newto	nian me	echanics, Lagrangian me	chanics, Hamiltonian	equation of motion	, conservation laws.		
		ning outcomes	-	•			
	udents		rinciples of classical	theoretical mechanic	cs and the required calculation		
Course	s (type	, number of weekly conta	act hours, language –	– if other than Germa	an)		
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)		
ster, in	format	ion on whether module c	an be chosen to earn		tion offered — if not every seme-		
		nation (approx. 120 minu	ites)				
Allocat	tion of	places					
	_						
Additio	onal inf	ormation					
Worklo	oad						
Referre	ed to in	LPOI (examination regu	llations for teaching-	degree programmes)			
Modul	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)						
Bachel	Bachelor' degree (1 major) Physics (2009)						
Bachel	or' deg	ree (1 major) Physics (20	08)				
Bachel	or' deg	ree (1 major) Nanostructu	ure Technology (2008	3)			
Bachel	or' deg	ree (1 major) Nanostructu	ure Technology (2007	7)			
	-	ree (1 major) Computatio		09)			
Bachel	or's de	gree (1 major, 1 minor) Pł	nysics (Minor, 2008)				

Module title					Abbreviation	
Theor	etical P	hysics 2 (Theoretical	Electrostatics and Elect	rodynamics)	11-T2-072-m01	
Modul	le coord	linator		Module offered	by	
	ging Dir strophy	ector of the Institute o sics	f Theoretical Physics	Faculty of Physics and Astronomy		
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)		
8		rical grade				
Duration Module level Other prerequisites						
1 semester undergraduate						
Conte	nts	•	•			
Flectro	ostatics	magnetostatics. Max	well equations, covaria	nt formulation, el	ectrodynamics and matter.	
		ning outcomes	<u>area</u> equations, corana			
			e principles of classical	electrodynamics a	and the required calculation me-	
thods.	•					
Course	es (type	, number of weekly co	ontact hours, language -	– if other than Gei	rman)	
V + Ü ((no info	rmation on SWS (weel	kly contact hours) and c	ourse language av	vailable)	
			e, language — if other th le can be chosen to earr		ination offered — if not every seme	
writter	n exami	nation (approx. 120 m	iinutes)			
Alloca	tion of	places				
Additi	onal inf	ormation				
Workl	oad					
Referr	ed to in	LPOI (examination r	egulations for teaching-	degree programm	es)	
Modul	le appe	ars in				
Bache	lor' deg	ree (1 major) Mathem	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)						
	-		ucture Technology (200;			
Bachelor' degree (1 major) Computational Mathematics (2009)						
Racho	lor's de	gree (1 major, 1 minor	Dhusies (Miner and)			

Module title					Abbreviation	
Theore	etical P	hysics 3 (Theoretical	Quantum Mechanics)		11-T3-072-m01	
Module coordinator				Module offered by	odule offered by	
Managing Director of the Institute of Theoretical Physics and Astrophysics			f Theoretical Physics	Faculty of Physics and Astronomy		
ECTS	<u> </u>	od of grading	Only after succ. co	mpl. of module(s)		
8		rical grade				
Duration Module level Other prerequisites						
1 semester undergraduate						
Conter	nts	•	•			
			nger equation, mathem spin, hydrogen atom, m		f quantum mechanics, harmonic s.	
Intend	ed lear	ning outcomes				
The stu	udents	have knowledge of th	e principles of quantum	mechanics and the	required calculation methods.	
		-	ontact hours, language -			
			kly contact hours) and c			
ster, in	format	ion on whether modu	le can be chosen to ear		ation offered — if not every sem	
		nation (approx. 120 m	linutes)			
Alloca	tion of	places				
Additio	onal inf	ormation				
Worklo	bad					
Referre	ed to in	LPOI (examination r	egulations for teaching-	degree programmes)	
				2 . 0		
Modul	e appea	ars in				
		ree (1 major) Mathem	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)						
	-		ucture Technology (200			
	-		ucture Technology (200)			
	-		ational Mathematics (20			
Bache	lor's de	gree (1 major, 1 minor) Physics (Minor, 2008)			

Module title Abbreviation					Abbreviation
Theoretical Physics 3 FOKUS (Theoretical Quantum Mechanics) 11-7				11-T3F-072-m01	
Modul	e coord	inator		Module offered by	•
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)	
8	nume	rical grade			
Duration Module level Other prerequisite				6	
1 semester undergraduate					
Conten	Its				
		sical physics, Schrödinge sular momentum and spi			quantum mechanics, harmonic
Intend	ed lear	ning outcomes			
The stu	idents l	have knowledge of the p	rinciples of quantum	mechanics and the	required calculation methods
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	an)
		mation on SWS (weekly			
		sessment (type, scope, la on on whether module c			ation offered — if not every seme
written	exami	nation (approx. 120 minu	ites)		
Allocat	ion of p	olaces			
Additic	onal inf	ormation			
Worklo	ad		-		
	au				
Poforre	d to in	LPOI (examination regu	lations for toaching	dogroo programmos	
Referre				uegree programmes	
Module)		
Bachelor' degree (1 major) Physics (2007) Bachelor' degree (1 major) Physics (2009)					
		τρε τη πιαιώτι Ρηνείζε (20	001		
Bachel	-				
Bachel Bachel	or' deg	ree (1 major) Physics (20 ree (1 major) Physics (20 ree (1 major) Nanostructi	08)	3)	

Module 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 prerequisit			Other prerequisites	5		
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)					