

Module Catalogue for the Subject

Technology of Functional Materials

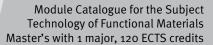
as a Master's with 1 major with the degree "Master of Science" (120 ECTS credits)

Examination regulations version: 2010 Responsible: Faculty of Chemistry and Pharmacy



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The subject is divided into

section / sub-section	ECTS credits	starting page
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General Compulsory Electives	30	16
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Focus Subject A: Biocompatible materials	30	67
Focus Subject B: Technical functional materials	30	74
Thesis	25	85



Content and Objectives of the Programme

The »Technology of Functional Material« course programme (120 ECTS credits) with the Master of Science qualification prepares students for work of a scientific nature in the interdisciplinary area of materials science with a focus on functional materials. Students deepen their knowledge of specific topics and the methodical basics of the scientific work from their Bachelor studies. This course also prepares students for PhD-studies (Dr.rer.nat or Dr.-Ing.). The interdisciplinary character of this degree programme is reflected in co-operations with the Fachhochschule Würzburg-Schweinfurt, the Fraunhofer Institut für Silicatforschung, the Süddeutsches Kunststoffzentrum Würzburg, and the Bavarian Centre for Applied Energy Research (ZAE Bayern). These bring students into contact with the many topics of modern functional materials in the areas of chemistry, physics, materials science, and bio materials. The compulsory topics (35 ECTS credits) consist of lectures and practical training courses from the areas of Physics and Chemistry on mechanical/thermal and optical/electronic material properties, as well as nano-scale and sensor/actuator materials. These topics include a colloquium for the master thesis (5 ECTS credits) as well as a project assignment (10 ECTS credits) which can - as is the case for the master thesis - be undertaken at the universities and at the named research institutes participating in the course program or in industrial companies. The optional topics are divided into general topics (30 ECTS credits), where students may choose from Chemistry, Physics, Computer Science and Mathematics, and specific topics (30 ECTS credits). Here, students may choose between the Bio Materials and Technical Functional Materials subject areas. In their master thesis (25 ECTS credits) students show that they are able to deal predominantly independently with a thematically and temporally restricted experimental or theoretical topic from (engineering) sciences on the basis of their acquired methods and scientific skills. The results of the master thesis are presented and graded in a compulsory colloquium. The internationally comparable Master Degree qualifies students for scientifically oriented work in research and development in materials science with a focus on functional materials, as well as for attending a PhD study program.



Abbreviations used

Course types: $\mathbf{E} = \text{field trip}$, $\mathbf{K} = \text{colloquium}$, $\mathbf{O} = \text{conversatorium}$, $\mathbf{P} = \text{placement/lab course}$, $\mathbf{R} = \text{project}$, $\mathbf{S} = \text{seminar}$, $\mathbf{T} = \text{tutorial}$, $\ddot{\mathbf{U}} = \text{exercise}$, $\mathbf{V} = \text{lecture}$

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:

ASP02007

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

29-Apr-2010 (2010-23)

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.



Compulsory Courses

(35 ECTS credits)



Module	e title	-	Abbreviation			
Mecha	Mechanical and Thermal Material Properties				11-E5T-092-m01	
Module	Module coordinator			Module offered by		
	Managing Director of the Institute of Applied Physics			Faculty of Physics a	nd Astronomy	
ECTS		od of grading	Only after succ. con	· · · · · · · · · · · · · · · · · · ·	ind Astronomy	
5		rical grade		ipi. or modute(3)		
Duratio		Module level	Other prerequisites			
1 seme	ster	graduate	Admission prerequisite to assessment: successful completion of appro 50% of exercises. Certain prerequisites must be met to qualify for admi sion to assessment. The lecturer will inform students about the respect 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 admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification			
Conten	ts	<u> </u>	for admission to ass	essment anew.		
Physica	al laws	of solids: Bonding and st	tructure, lattice dynai	mics, thermal and m	echanical properties.	
Intende	ed lear	ning outcomes	·			
The stu	idents	have knowledge of mech	anical/thermal mater	ial characteristics.		
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü (1	no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	t every semester, information on whether	
groups	(appro		ate) or c) project rep	ort (approx. 10 pages	date each or oral examination in s, time to complete: 1 to 4 weeks)	
Allocat	ion of _I	places				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
	Module appears in					
Master	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)					



Module	title		Abbreviation		
Opto-electronic Material Properties			ies		11-MOE-092-m01
Module	coord	linator		Module offere	ed by
Manag	ing Dir	ector of the Institute	of Applied Physics	Faculty of Phy	rsics and Astronomy
ECTS	Meth	od of grading	Only after succ.	compl. of module((s)
5	nume	erical grade			
Duratio	n	Module level	Other prerequisi	tes	
Admission prerequisite to assessment: successful completion of ap 50% of exercises. Certain prerequisites must be met to qualify for a sion to assessment. The lecturer will inform students about the respondence of the course. Registration for the course be considered a declaration of will to seek admission to assessment students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration assessment into effect. Students who meet all prerequisites will be mitted to assessment in the current or in the subsequent semester. assessment at a later date, students will have to obtain the qualific for admission to assessment anew.				sites must be met to qualify for admis ill inform students about the respectiourse. Registration for the course will to seek admission to assessment. If cation for admission to assessment be lecturer will put their registration for who meet all prerequisites will be addit or in the subsequent semester. For its will have to obtain the qualification	
Contents					
Physical principles of optoelectronic material properties and applications.					
Intended learning outcomes					
The stu	dents	know the principles	of optoelectronic mate	rial characteristic	s
Cource	C (4		hours Janguage — if other than	C =	

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Bachelor' degree (1 major) Physics (2010)

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

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)

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

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



Master's degree (1 major) FOKUS Physics (2010) Master's degree (1 major) Functional Materials (2012)



Module title Abbreviation					
Nanoso	ale Ma	terials		08-PCM4-092-m01	
Module	Module coordinator			Module offered by	
lecture	r of the	seminar "Nanoskalige <i>N</i>	laterialien"	Institute of Physica	l and Theoretical Chemistry
ECTS	Metho	od of grading	Only after succ. com	ipl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
		iscusses advanced topic paracterisation methods			e structure, properties, fabricati- ials.
Intende	ed learı	ning outcomes			
		able to characterise nano noscale materials.	scale materials. They	are able to name ar	nalytical methods and applicati-
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
a) writte		mination (approx. 90 mir	utes) or b) oral exam	ination (approx. 20	minutes) or c) talk (approx. 40
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master	Master's degree (1 major) Technology of Functional Materials (2010)				



Module title					Abbreviation
Technology of Sensor and Actor Materials including Smart Fluids					08-SAM-092-m01
Modul	Module coordinator			Module offered by	
holder thesis	of the	Chair of Chemical Techno	ology of Material Syn-	Chair of Chemical T	echnology of Material Synthesis
ECTS	Meth	od of grading	Only after succ. com	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	graduate			
Conter	nts		•		
					s piezoelectrics, shape memory ogical fluids, magnetofluids.
Intend	ed lear	ning outcomes			
Studer	nts hav	e developed fundamenta	l knowledge in the ar	ea of sensory and ac	tuatory materials.
Course	es (type,	number of weekly contact hours,	language — if other than Ger	man)	
V + P (ı	no info	rmation on SWS (weekly	contact hours) and co	urse language avail	able)
module i	s credital	ole for bonus)	age — if other than German, o	examination offered — if no	ot every semester, information on whether
		nation (90 minutes)			
Allocat	tion of	places			
Additio	onal ini	ormation			
Worklo	o <u>ad</u>				
Teachi	ng cycl	e			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
					
Module appears in					
Master Master Master	Master's degree (1 major) Physics (2010) Master's degree (1 major) Physics (2011) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009)				
		ree (1 major) Nanostructu			
Master's degree (1 major) Nanostructure Technology (2010)					



Module	e title	ı			Abbreviation
Resear	ch proj	ect			08-PR-092-m01
Module	Module coordinator			Module offered by	
holder thesis	of the (Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis
ECTS	Meth	od of grading	Only after succ. com	ıpl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate	-		
Conten	ts				
This mo	odule g	ives students the opport	unity to work indeper	ndently on experime	nts on a topic in functional mate-
Intende	ed lear	ning outcomes			
Studen in writt	ts are a en forn	able to independently wo	rk on a defined topic	in functional materi	als and to present their findings
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
R (no ir	forma	tion on SWS (weekly cont	act hours) and cours	e language available	e)
		sessment (type, scope, langua ole for bonus)	ge — if other than German, ϵ	examination offered — if no	ot every semester, information on whether
		k. 10 to 15 pages) essessment: German or Er	nglish		
Allocat	ion of	places			
-					
Additio	nal inf	ormation			
Worklo	ad				
-					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
					
Module appears in					
Master's degree (1 major) Technology of Functional Materials (2010)					
Master	's degr	ee (1 major) Technology o	of Functional Material	s (2009)	

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



Module	title	·	Abbreviation			
Master	Thesis	s' Colloquium	o8-MKoll-TF-092-mo1			
Module	coord	inator	Module offered by			
Dean o	f Studi	es Funktionswerkstoffe (F	Functional Materials)		echnology of Material Synthesis	
ECTS		od of grading	Only after succ. com			
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Master	's thes	is defence.				
Intende	ed lear	ning outcomes				
Studen	ts are a	able to orally defend thei	r Master's thesis.			
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
K (no ir	format	tion on SWS (weekly cont	act hours) and cours	e language available	e)	
		sessment (type, scope, langua ole for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
final co	lloquiu	ım (approx. 90 minutes)				
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	Module appears in					
	Master's degree (1 major) Technology of Functional Materials (2010)					
Master	Master's degree (1 major) Technology of Functional Materials (2009)					



Compulsory Electives

(60 ECTS credits)

General Compulsory Electives

(30 ECTS credits)



Module	e title	<u>'</u>	Abbreviation		
Labora	tory an	d Measurement Techno	logy		11-A3-072-m01
Module	e coord	inator		Module offered by	
Manag	ing 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	rical grade			
Duratio	on	Module level	Other prerequisites		
1 semester undergraduate A		50% of exercises. Co sion to assessment, ve details at the beg be considered a dec students have obtai over the course of the assessment into eff mitted to assessme	ertain prerequisites of the lecturer will infogrant of the course claration of will to see the qualification he semester, the lecture of the current or in the current will er date, students will er date.	successful completion of approx. must be met to qualify for admisorm students about the respective. Registration for the course will ek admission to assessment. If in for admission to assessment curer will put their registration for eet all prerequisites will be adnithe subsequent semester. For I have to obtain the qualification	

Contents

Introduction to electronic and optical measuring methods of physical metrology, vacuum technology and cryogenics, cryogenics, light sources, spectroscopic methods and measured value acquisition.

Intended learning outcomes

The students have acquired the following transferable skills: Electronic and optical measuring methods in physical metrology, cryogenics and vacuum technology, cryogenics, light sources, spectroscopic methods and measured value acquisition.

 $\textbf{Courses} \ (\textbf{type}, \, \textbf{number of weekly contact hours, language} - \textbf{if other than German})$

 $V + \ddot{U}$ (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 120 minutes)

Allocation of places

Only as part of pool of general key skills (ASQ): 15 places. Places will be allocated by lot.

Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2007)

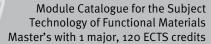
Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2009)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Physics (2008)

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





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

Bachelor' degree (1 major) Nanostructure Technology (2008)

Bachelor' degree (1 major) Nanostructure Technology (2007)

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)

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

Bachelor's degree (1 major, 1 minor) Physics (Minor, 2008)

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



Modul	e title			Abbreviation		
Nanomatrix insulation systems and photovoltaics					11-NM-WP-072-m01	
Modul	Module coordinator Modu					
Manag	ing Dir	ector of the Institute of A	pplied Physics	Faculty of Physics a	and Astronomy	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites	i		
1 seme	ester	undergraduate				
Conter	ıts	-				
The stu	ed lear udents				gy areas of engineering work,	
especi	ally in t	he field of thermal insul	ation systems and ph	otovoltaics.		
Course	es (type, i	number of weekly contact hours,	language — if other than Ge	rman)		
V + R (ı	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)						
a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)						
Allocation of places						
Additional information						

Additional information

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Workload

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Teaching cycle

--

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Bachelor' degree (1 major) Nanostructure Technology (2008)

Bachelor' degree (1 major) Nanostructure Technology (2007)

Master's degree (1 major) Technology of Functional Materials (2010)



Module title				Abbreviation		
Nanom	Nanomatrix semiconductor materials 11-NM-HM-072-m01					
Modul	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of A	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS	Metho	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				
Conter	its					
nics, p	hotonic		as in the technology	-oriented materials	of energy engineering, electro- sciences, technologies of nano- niconductor materials.	
Intend	ed learı	ning outcomes				
		nave advanced knowledg he field of semiconducto		lication or technolog	gy areas of engineering work,	
Course	S (type, r	number of weekly contact hours,	language — if other than Ger	rman)		
V + R (1	no infor	mation on SWS (weekly	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		mination (approx. 90 mir oral examination in group			oral examination of one candition (approx. 10 pages)	
Allocation of places						
Additional information						
						
Worklo	ad					

Teaching cycle

--

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

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Module appears in

Bachelor' degree (1 major) Nanostructure Technology (2008)

Bachelor' degree (1 major) Nanostructure Technology (2007)

Master's degree (1 major) Technology of Functional Materials (2010)



Module title					Abbreviation
Nanomatrix Semiconductor Processing					11-NM-HP-072-m01
Modul	e coord	linator	Module offered by		
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	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conte	nts	,			
Intend The st	led lear udents	omponents and system on ning outcomes have advanced knowled the field of semiconductor	ge of one or more app		niconductor processes. gy areas of engineering work,
Course	es (type, i	number of weekly contact hours,	language — if other than Ge	rman)	
V + R (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, languable for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)					
Alloca	tion of	places			
Δdditi	onal inf	ormation			

Additional information

Workload

Teaching cycle

$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

Bachelor' degree (1 major) Nanostructure Technology (2008)

Bachelor' degree (1 major) Nanostructure Technology (2007)

Master's degree (1 major) Technology of Functional Materials (2010)



Module title Abbreviation						
Nanomatrix Biophysical Analyzing Systems and Processes 11-NM-BV-072-m01						
Module coordinator				Module offered by		
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conter	ıts					
nics, p	hotonic Iring, co	s and biophysics as well	as in the technology	-oriented materials s	of energy engineering, electro- sciences, technologies of nano- physical analysis systems and	
Intend	ed lear	ning outcomes				
		nave advanced knowledg he field of biophysical ar		-	gy areas of engineering work,	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + R (1	no infor	mation on SWS (weekly	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		mination (approx. 90 mir oral examination in group			oral examination of one candi- t (approx. 10 pages)	
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
	Module appears in					
Bachel	Bachelor' degree (1 major) Nanostructure Technology (2008)					

Bachelor' degree (1 major) Nanostructure Technology (2007)

Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009)



Module title				Abbreviation		
Ordina	ry Diffe	erential Equations		10-M-ODE-082-m01		
Module	e coord	linator		Module offered by		
Dean o	f Studi	es Mathematik (Matl	nematics)	Institute of Mathematics		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites	Other prerequisites		
1 semester		undergraduate	sessment. The lectuat the beginning of sidered a declaration dents have obtained the course of the sessment into effected to assessment i	s must be met to qualify for admission to as- rer will inform students about the respective details the course. Registration for the course will be con- n of will to seek admission to assessment. If stu- d the qualification for admission to assessment over mester, the lecturer will put their registration for as- t. Students who meet all prerequisites will be admit- n the current or in the subsequent semester. For as- date, students will have to obtain the qualification for sment anew.		

Contents

Existence and uniqueness theorem; continuous dependence of solutions on initial values; systems of linear differential equations; matrix exponential series; linear differential equations of higher order.

Intended learning outcomes

The student is acquainted with the fundamental concepts and methods of the theory of ordinary differential equations. He/she is able to apply these methods to practical problems.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English if agreed upon with the examiner

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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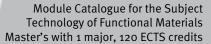
Module appears in

Bachelor' degree (1 major) Computer Science (2007)

Bachelor' degree (1 major) Computer Science (2010)

Bachelor' degree (1 major) Physics (2008)

Bachelor' degree (1 major) Technology of Functional Materials (2009)





Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

Bachelor' degree (1 major) Aerospace Computer Science (2009)

Bachelor' degree (1 major) Aerospace Computer Science (2011)

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)

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

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)



Module title					Abbreviation	
Applied	d Spect	troscopy 3			08-PS3-092-m01	
Module	e coord	inator		Module offered by		
lecture	r of lec	ture "Praktische Spektro	skopie 3"	Institute of Physica	l and Theoretical Chemistry	
ECTS	Metho	od of grading	Only after succ. con	mpl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
This module gives students the opportunity to apply their theoretical knowledge of spectroscopic methods in practice and to interpret readings or graphs. We will record and analyse UV-VIS, fluorescence and vibration spectra and discuss modern mass spectrometry methods.						
Intended learning outcomes						
Students are able to work with different spectrometers and to interpret the resulting spectra. They are able to conduct error discussions.						

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

V (no information on SWS (weekly contact hours) and course language available)

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

1 written examination (approx. 90 minutes) or 2 written examinations (approx. 60 or 90 minutes each) or 3 written examinations (approx. 60 minutes each) or oral examination of one candidate each (approx. 20 minutes) or oral examination in groups (groups of 2, approx. 30 minutes)

Allocation of places

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Additional information

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Workload

--

Teaching cycle

--

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

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Module appears in

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

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)



Module title					Abbreviation		
Organic Chemistry for students of engineering 08-IOC4-092-mo1							
Module coordinator Module offered by							
lecture	er of lec	ture "Organische Chemie	2 4"	Institute of Organic	Chemistry		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Durati	on	Module level	Other prerequisites				
1 seme	ester	undergraduate	Registration for asso	essment: Yes, as spe	ecified.		
Conte	nts						
This m	odule d	discusses biologically im	portant bonding class	ses, their reactions a	ind syntheses.		
		ning outcomes	-				
Studer	nts hav	e become familiar with b	iologically important	bonding classes, the	eir reactions and syntheses.		
Course	es (type,	number of weekly contact hours,	language — if other than Ge	man)	·		
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		sessment (type, scope, langua ole for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether		
writter	exami	nation (90 minutes)					
Alloca	tion of	places					
Additio	onal inf	ormation					
Workle	oad						
Teachi	ng cycl	e					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	e appe	ars in					
Maste	Master's degree (1 major) Technology of Functional Materials (2010)						
Maste	Master's degree (1 major) Technology of Functional Materials (2009)						



Module title				Abbreviation		
Organi	c Semi	conductor		11-OHL-092-m01		
Module	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute	of Applied Physics	Faculty of Physics and Astronomy		
ECTS	Meth	od of grading	Only after succ. c	ompl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisit	Other prerequisites		
Duration Module level 1 semester graduate		50% of exercises. sion to assessme ve details at the be considered a distudents have obsover the course of assessment into emitted to assessm	Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification			

Contents

Physical principles of organic semiconductors, molecular and polymer electronics and sensor technology, applications.

Intended learning outcomes

The students have advanced knowledge of organic semiconductors.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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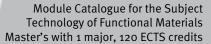
Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

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

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





Master's degree (1 major) Technology of Functional Materials (2009)

Master's degree (1 major) Nanostructure Technology (2011)

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

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

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

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

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



Module title					Abbreviation	
Polymeric Materials 1: Technology of Modifying Polymers					08-PW1-092-m01	
Module	e coord	inator		Module offered by	,	
holder thesis	of the (Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts		•			
logies	for the				; properties of polymers; technoes for the characterisation of po-	
Intend	ed lear	ning outcomes				
such as nufactu cessing	s inject ured pro g mach	ion moulding) and under oducts. They have becomines and tools.	stand the different was familiar with ways	ays of influencing th to calculate complex	chnologies, processing methods e properties of materials and ma- c flow conditions in polymer pro-	
	-	number of weekly contact hours, l				
		mation on SWS (weekly o				
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether	
written	examiı	nation (90 minutes)	,			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module						
	_	ee (1 major) Technology (
Master	Master's degree (1 major) Technology of Functional Materials (2009)					



Module title	Abbreviation						
Polymeric Materials 2: Technology of	08-PW2-092-m01						
Module coordinator	Module offered by						
holder of the Chair of Chemical Techn thesis	ology of Material Syn-	Chair of Chemical T	echnology of Material Synthesis				
ECTS Method of grading	Only after succ. con	npl. of module(s)					
5 numerical grade							
Duration Module level	Other prerequisites						
1 semester graduate							
Contents							
Principles of and technologies for the ons between filler materials and polyr (e.g. electrical behaviour, bactericidal rheology, mechanical behaviour, colo	mers, determination of l behaviour) and influe	f the special propert	ies of functionalised polymers				
Intended learning outcomes							
interactions between filler materials a tionalised polymers (e.g. electrical be influenced by functionalisation (e.g. r Courses (type, number of weekly contact hours, V + P (no information on SWS (weekly	haviour, bactericidal k heology, mechanical k , language — if other than Ger	pehaviour) and unde pehaviour, colour, su man)	rstand how other properties are irface).				
Method of assessment (type, scope, langumodule is creditable for bonus)	age — if other than German, o	examination offered — if no	ot every semester, information on whether				
written examination (90 minutes)	_						
Allocation of places							
	_						
Additional information							
Workload							
To a bin manual a							
reaciling cycle	Teaching cycle						
Referred to in LPO I (examination regulatio	iis ior teaching-degree progra	mmes)					
Module appears in							
Master's degree (1 major) Technology	of Functional Material	5 (2010)					
	Master's degree (1 major) Technology of Functional Materials (2010)						



Module title Abbreviation					Abbreviation	
Data bases 2 10-I-DB2-092-m01					10-I-DB2-092-m01	
Module coordinator Module offered by					I.	
Dean o	f Studi	es Informatik (Computer	Science)	Institute of Compu	ter Science	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	its					
Data w	arehou	ses and data mining; XM	L databases; web da	tabases;introductio	n to Datalog.	
Intend	ed lear	ning outcomes				
The stu	dents	possess an advanced kn	owledge of database	s, XML and data min	ing.	
Course	S (type, i	number of weekly contact hours,	language — if other than Ge	rman)		
V + Ü (ı	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	lable)	
		sessment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		nation (50 minutes) or or 5 minutes)	al examination (one o	candidate each: 15 n	ninutes, groups of 2: 20 minutes,	
Allocat	ion of	places				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	ımmes)		
Module	e appea	ars in				
Master	Master's degree (1 major) Technology of Functional Materials (2010)					
Master	Master's degree (1 major) Technology of Functional Materials (2009)					



Module	Module title Abbreviation					
E-Learn	ning				10-l-EL-092-m01	
Module	coord	inator		Module offered by		
holder	of the (Chair of Computer Scienc	e VI	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
design,	, intera		design, quality assur		, content structuring, multimedia ementation, learning platforms,	
Intende	ed learı	ning outcomes				
The stu		oossess a theoretical and	d practical knowledge	e about eLearning an	d are able to assess possible ap-	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (r	no infor	mation on SWS (weekly	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		nation (50 minutes) or or 5 minutes)	al examination (one o	andidate each: 15 m	ninutes, groups of 2: 20 minutes,	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
	,					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	Module appears in					
	Master's degree (1 major) Technology of Functional Materials (2010)					
Master	Master's degree (1 major) Technology of Functional Materials (2009)					



Module title Abbreviation						
Information Retrieval 10-					10-I-IR-092-m01	
Modul	e coord	inator		Module offered by	<u> </u>	
Dean c	of Studio	es Informatik (Computer	Science)	Institute of Comput	ter Science	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Duration	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
ges an thods	d parad to supp	ligms, structured queries ort IR (e. g. recommenda), search engine (e. g	. architecture, crawl	levance feedback, query langua- ing, interfaces, link analysis), me ation, information extraction).	
		ning outcomes				
		possess theoretical and p know-how to create a sea	_	n the area of informa	ation retrieval and have acquired	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü (no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
		mination (approx. 50 min pprox. 20 minutes, group			ate each: approx. 15 minutes,	
Alloca	tion of p	olaces	,			
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ng cycl	e				
						
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module appears in						
Master's degree (1 major) Technology of Functional Materials (2010)						



Module title Abbreviation						
Materia	als for I	high voltage insula	tion and high voltage syst	ems	99-HIS-092-m01	
Module	e coord	inator		Module offered by		
		culty of Electrical E Sciences Würzburg-		University of Appli furt (FHWS)	ed Sciences Würzburg- Schwein-	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	unknown				
Conten	its					
No info	rmatio	n on contents availa	able.			
Intend	ed learı	ning outcomes				
No info	rmatio	n on intended learn	ing outcomes available.			
Course	!S (type, r	number of weekly contact l	hours, language — if other than Ger	rman)		
V + Ü +	P (no i	nformation on SWS	(weekly contact hours) an	d course language a	available)	
		sessment (type, scope, le for bonus)	language — if other than German,	examination offered — if n	ot every semester, information on whether	
written	exami	nation (approx. 90 r	ninutes)			
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	<u></u> е				
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	ırs in				
Master	Master's degree (1 major) Technology of Functional Materials (2010)					
Master	Master's degree (1 major) Technology of Functional Materials (2009)					



Modul	e title	-	Abbreviation						
Model	ling and	d simulation for technolo	99-MSTS-092-m01						
Modul	e coord	inator		Module offered by					
		aculty of Mechanical Engi	_	University of Applied Sciences Würzburg- Schweinfurt (FHWS)					
ECTS	Meth	od of grading	Only after succ. con	ompl. of module(s)					
5	nume	rical grade		-					
Duration Module level		Other prerequisites							
1 semester		unknown							
Contents									
No information on contents available.									
Intended learning outcomes									
No information on intended learning outcomes available.									
Courses (type, number of weekly contact hours, language — if other than German)									
V + Ü (no information on SWS (weekly contact hours) and course language available)									
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)									
written examination (approx. 90 minutes) or modelling assignment in the form of a project (expenditure of time for modelling assignment to be specified at the beginning of the course)									
Alloca	tion of _I	places							
Additional information									
Workload									
Teaching cycle									
Referred to in LPO I (examination regulations for teaching-degree programmes)									
Module appears in									
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)									



Module	e title			Abbreviation				
Chemic	cal Nan	otechnology: Analy	tics and Applications		08-FS5-101-m01			
Module	e coord	linator		Module offered by				
holder thesis	of the	Chair of Chemical Te	chnology of Material Syn-	Chair of Chemical Technology of Material Synthesis				
ECTS	Meth	Method of grading Only after succ.		mpl. of module(s)				
5	nume	erical grade						
Duration		Module level	Other prerequisites	Other prerequisites				
1 semester		graduate						
Contents								

The module provides an application-oriented introduction to the characterisation methods of nanochemistry and includes practical exercises. It also discusses thermoanalysis, rheological processes and dynamic light scattering. The lecture also offers insights into the applications of nanomaterials in the industrial and technological sectors.

Intended learning outcomes

Students have developed an advanced knowledge of sol-gel chemistry and biomineralisation.

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

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

- o8-FS5-1-101: V (no information on SWS (weekly contact hours) and course language available)
- o8-FS5-2-101: V (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-FS5-1-101: Sol-Gel Chemistry 2

- 2 ECTS, Method of grading: numerical grade
- a) oral examination (approx. 15 minutes) or b) written examination (approx. 45 minutes)

Assessment in module component o8-FS5-2-101: Application oriented Characterization of colloidal and polymeric systems

- 3 ECTS, Method of grading: numerical grade
- a) oral examination (approx. 20 minutes) or b) written examination (approx. 45 minutes)

Allocation of places

Number of places: 20. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in the respective degree subject; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. Quota 3 (25% of places): allocation by lot. In this procedure, applicants who already have successfully completed at least one module component of the respective module will be given preferential consideration. A waiting list will be maintained and places re-allocated as they become available.

Additional information

The course is offered as a block course at the end of the semester.

Workload



Teaching cycle

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

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Module appears in

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

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

Master's degree (1 major) Technology of Functional Materials (2010)



Module	Module title Abbreviation						
Coating	Coating Technology based on Vapour Deposition 08-FS6-101-m01						
Module	Module coordinator Module offered by						
Dean of	f Studi	es Funktionswerkstoffe (F	unctional Materials)	Chair of Chemical T	echnology of Material Synthesis		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	graduate					
Conten	ts						
					er materials. Layer production oduction on an industrial scale.		
Intende	ed lear	ning outcomes					
		e developed an advanced odern CVD and PVD coatir		nase layer depositio	n processes and have become fa-		
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
V + Ü (r	o info	rmation on SWS (weekly o	contact hours) and co	urse language avail	able)		
		sessment (type, scope, langua ele for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether		
a) writte	en exa	mination (approx. 90 min	utes) or b) oral exam	ination (approx. 30	minutes)		
Allocati	ion of p	olaces		.,, -			
Additio	nal inf	ormation					
Worklo	ad						
Teachir	ıg cycl	e					
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)			
Module	appea	ars in					
Master'	Master's degree (1 major) Technology of Functional Materials (2010)						



Module title					Abbreviation
Basic principles of cell biology and tissue regeneration					03-SP1A1-101-m01
Module coordinator				Module offered by	l.
1		Chair of Orthopaedics and ve Medicine	d holder of the Chair	Faculty of Medicine	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
		netabolism, differentiatio chanobiology (bioreactor		ll/cell interactions, o	cell adhesion, 2D/3D and surface
Intende	ed lear	ning outcomes			
Studen nobiolo		e developed a knowledge	of cell biology, meta	bolism, differentiati	on, adhesion to surfaces, mecha-
Course	S (type, ı	number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
	techn	ical course (approx. 10 pa			ctical course / project report / re. . 90 minutes) or b) presentation
Allocat	ion of	places			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module	appe	ars in			
	_	ee (1 major) Technology o		s (2010)	
Master	's degr	ee (1 major) Functional M	aterials (2012)		



Module	Module title Abbreviation				
Fundan	nentals	of Tissue Engineering a	nd Quality Managem	ent	03-SP1A2-101-m01
Module	coord	inator		Module offered by	
		Chair of Regenerative Medunctional Materials in Med		Faculty of Medicine	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
ves and	d blood				xtracellular matrix, supply of ner- valuation of medical devices ac-
Intende	d lear	ning outcomes			
Studen	ts are f	amiliar with the fundame	ntal principles of tiss	sue engineering and	quality management.
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)	
V + Ü +	P (no i	nformation on SWS (weel	kly contact hours) an	d course language a	vailable)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
	techni	cal course (approx. 10 pa			ctical course / project report / re- 90 minutes) or b) presentation
Allocat	ion of _I	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulations	for teaching-degree progra	mmes)	
Module	appea	ars in			
1	Module appears in Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Functional Materials (2012)				



Module title Abbreviation						
Materi	als use	d for surgical implants			03-SP2A1-101-m01	
Module coordinator				Module offered by		
holder	of the	Chair of Orthopaedics (Ja	akob/Ebert)	Faculty of Medicine		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites	i		
1 seme	ester	graduate				
Conter	nts					
		application of different rs, teeth).	nedical implants (card	diovascular system,	catheter systems, organs of per-	
Intend	ed lear	ning outcomes				
		e developed a knowledg and interaction with the		fimplants in differen	t organs and tissues and their	
Course	es (type, r	number of weekly contact hours,	language — if other than Ge	rman)		
V + Ü +	- P (no i	nformation on SWS (wee	ekly contact hours) an	d course language a	vailable)	
		sessment (type, scope, langu ole for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
port or		ical course (approx. 10 p			ctical course / project report / rego minutes) or b) presentation	
Allocat	tion of	places	,			
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ns for teaching-degree progra	ımmes)		
Modul	e appea	ars in				
	_	ee (1 major) Technology		ls (2010)		
Master	Master's degree (1 major) Functional Materials (2012)					



Module	e title	-			Abbreviation	
Materials for biosensors, tissue engineering and tissue reg				reneration	03-SP2A2-101-m01	
Module	Module coordinator			Module offered by	,	
		Chair of Orthopaedics and ve Medicine	d holder of the Chair	Faculty of Medicine		
ECTS	Meth	od of grading	Only after succ. con	ipl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
					protein adsorption on surfaces eraction (nano-microstructures).	
Intende	ed lear	ning outcomes				
Studen	ts have	e developed a knowledge	of the interaction of	the biosystem with 1	materials.	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü +	P (no i	nformation on SWS (weel	kly contact hours) an	d course language a	vailable)	
		sessment (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
	techni	cal course (approx. 10 pa			ctical course / project report / re- . 90 minutes) or b) presentation	
Allocat	ion of	places				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Module	appea	ars in				
Master	's degr	ee (1 major) Technology o	of Functional Material	s (2010)		
Master	Master's degree (1 major) Functional Materials (2012)					



Module	Module title Abbreviation					
Carrier materials and devices for therapeutic compounds					03-SP3A1-101-m01	
Module	e coord	linator		Module offered by		
holder Dentist		Chair of Functional Mater	ials in Medicine and	Faculty of Medicine		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
_		nd binding of active agent rgeting and release of the	•	onalisation of particl	es for (intracellular) transport	
Intende	ed lear	ning outcomes				
		e developed a knowledge of particles for (intracellu			agents in particles and of the fun- elease of active agents.	
Course	S (type, i	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
port on	techn				ctical course / project report / re- . 90 minutes) or b) presentation	
Allocat	-					
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	ımmes)		
Module	Module appears in					
	_	ee (1 major) Technology o		ls (2010)		
Master	Master's degree (1 major) Functional Materials (2012)					



Modul	Module title Abbreviation					
Microsystems for biological and medicinal Applications					03-SP3A2-101-m01	
Module coordinator				Module offered by	l.	
		Chair of Functional Mater holder of the Chair of Reg		Faculty of Medicine		
ECTS	Meth	od of grading	Only after succ. con	ipl. of module(s)		
5	nume	rical grade	-			
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conter	its					
		Irug delivery systems, lab r regenerative medicine a			actor technology, lab course: na-	
Intend	ed lear	ning outcomes				
		e developed a knowledge eactor technology, nanop			d lab-on-a-chip systems for bio- otein biochemistry.	
Course	S (type, 1	number of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)	
		sessment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
port or	techn				ctical course / project report / re- 90 minutes) or b) presentation	
Allocat						
Additio	nal inf	ormation				
	-					
Worklo	ad					
	-					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Modul	e appe	ars in				
	_	ree (1 major) Technology c ree (1 major) Functional M		S (2010)		



Module	title				Abbreviation
Electrochemical Energy Storage and Conversion					08-EEW-101-m01
Module	coord	inator		Module offered by	
holder thesis	of the (Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis
ECTS Method of grading Only after succ. compl. of module(s)					
5	nume	rical grade			
Duratio					
1 seme	ster	graduate			
Conten	ts		Į.		
um and cal dou (Si, CIS	I nickel ble lay , CIGS,	l metal hydride, sodium s er capacitors, redox-flow GaAs, organic and dye s	sulphur, sodium nicke batteries, fuel cell sy	el chloride, lithium io estems (AFC, PEMFC,	ems such as lead, nickel cadmion accumulators), electrochemi, DMFC, PAFC, SOFC), solar cells
		ning outcomes	- f - l t l i l -		
		e developed a knowledge ge to research problems.	of electrochemical e	nergy storage and co	onversion and are able to apply
		number of weekly contact hours, l	anguage — if other than Ger	man)	
		nformation on SWS (weel			vailable)
Method	d of ass	sessment (type, scope, langua	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
		le for bonus)			
written	examiı	nation (90 minutes) and I	lab report (approx. 5	pages)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
			,		
Worklo	ad				
Teachi	ng cycl	e	,		
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
		· · · · · · · · · · · · · · · · · · ·		·	
Module	e appea	ars in			
		ree (1 major) Nanostructu	ıre Technology (2010)		
Master	's degr	ee (1 major) Physics (201	o)		
Master	's degr	ee (1 major) Physics (201	1)		
	_	ee (1 major) Technology o		s (2010)	
Master	Master's degree (1 major) Nanostructure Technology (2011)				

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



Module title Abbreviation					Abbreviation	
Structu	Structure and Properties of Modern Materials: Experiments and Simulations 08-MW-101-m01					
Module	coord	inator		Module offered by		
holder thesis	of the	Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis	
ECTS Method of grading Only after succ. compl. of module(s)						
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Materia simulat		erties of metals and cerar	mics: correlation of st	tructure/property rel	ations through experiments and	
Intende	ed lear	ning outcomes				
perties Course V + S (r	s (type, i	number of weekly contact hours, l	anguage — if other than Ger contact hours) and co	_{man)} ourse language avail	f materials and the resulting pro- able) of every semester, information on whether	
module is	creditab	ole for bonus)	ge — II other than German, t	examination onered — ii no	nt every semester, information on whether	
		45 minutes)				
Allocat	ion of	places				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	е				
						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	appea	ars in				
Master	's degr	ee (1 major) Technology c	of Functional Material	ls (2010)		



Module title Abbreviation					
Organic Functional Materials					08-OCM-FM-101-m01
Module coordinator Module offered by					
lecture	r of the	seminar "Organische Fu	nktionsmaterialien"	Institute of Organic	Chemistry
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites	i	
1 seme	ster	graduate			
Conten	ts				
sical ef	fects ir nents s	n organic molecular and p	oolymeric semicondu	ctors as well as their	is on fundamental (photo)phy- r application in (opto)electronic ganic solar cells as well as in non-
Intende	ed lear	ning outcomes			
ents su near op	ch as f		ganic light-emitting d	liodes or in organic p	cion in (opto)electronic compon- ohotovoltaics as well as in nonli-
		tion on SWS (weekly cont			<u> </u>
Method	d of ass				ot every semester, information on whether
					minations: 60 or 90 minutes s (groups of 2, approx. 30 minu-
Allocat	ion of p	olaces	,		
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
	,				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	ımmes)	
Module	appea	nrs in			

Master's degree (1 major) Technology of Functional Materials (2010)



Module	e title				Abbreviation
Introduction to Functional Analysis					10-M-FAN-072-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	sessment. The lecturation at the beginning of sidered a declaration dents have obtained the course of the sessment into effected to assessment i	rer will inform stude the course. Registrat n of will to seek adn d the qualification fo mester, the lecturer t. Students who mee n the current or in th date, students will h	alify for admission to asents about the respective details tion for the course will be connission to assessment. If stuor admission to assessment over will put their registration for aset all prerequisites will be admitted subsequent semester. For astave to obtain the qualification for

Banach spaces and Hilbert spaces, bounded operators, principles of functional analysis.

Intended learning outcomes

The student knows the fundamental concepts and methods of functional analysis as well as the pertinent proof methods, is able to apply methods from linear algebra and analysis to functional analysis, and realises the broad applicability of the theory to other branches of mathematics.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English if agreed upon with the examiner

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 73 (1) 1. Mathematik Analysis

Module appears in

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Mathematics (2007)

Bachelor' degree (1 major) Technology of Functional Materials (2009)

Bachelor' degree (1 major) Technology of Functional Materials (2010)

Bachelor' degree (1 major) Economathematics (2009)



Bachelor' degree (1 major) Economathematics (2008)

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

Bachelor' degree (1 major) Computational Mathematics (2009)

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)

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

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)

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



Module title Numerical Mathematics 1				Abbreviation		
				10-M-NM1-082-m01		
Module	e coord	linator		Module offered by		
Dean o	f Studi	es Mathematik (Matl	nematics)	Institute of Mathematics		
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
8	nume	rical grade				
Duratio	on	Module level	Other prerequisites	Other prerequisites		
1 seme	ester	undergraduate	sessment. The lectuat the beginning of sidered a declaration dents have obtaine the course of the sessment into effected to assessment is	s must be met to qualify for admission to as- rer will inform students about the respective details the course. Registration for the course will be con- n of will to seek admission to assessment. If stu- d the qualification for admission to assessment over mester, the lecturer will put their registration for as- t. Students who meet all prerequisites will be admit- n the current or in the subsequent semester. For as- date, students will have to obtain the qualification for sment anew.		

Solution of systems of linear equations and curve fitting problems, nonlinear equations and systems of equations, interpolation with polynomials, splines and trigonometric functions, numerical integration.

Intended learning outcomes

The student is acquainted with the fundamental concepts and methods in numerical mathematics, applies them to practical problems and knows about their typical fields of application.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English if agreed upon with the examiner

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 73 (1) 5. Mathematik Angewandte Mathematik

Module appears in

Bachelor' degree (1 major) Computer Science (2010)

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2009)

Bachelor' degree (1 major) Physics (2012)



Bachelor' degree (1 major) Physics (2008)

Bachelor' degree (1 major) Technology of Functional Materials (2009)

Bachelor' degree (1 major) Technology of Functional Materials (2010)

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

Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

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

Bachelor' degree (1 major) Computational Mathematics (2009)

Bachelor' degree (1 major) Aerospace Computer Science (2009)

Bachelor' degree (1 major) Aerospace Computer Science (2011)

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

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

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)

Master's degree (1 major) Nanostructure Technology (2011)

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

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

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)



Module	e title				Abbreviation
Numeri	ical Ma	thematics 2			10-M-NM2-082-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semester undergraduate		Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.			

Solution methods and applications for eigenvalue problems, linear programming, initial value problems for ordinary differential equations, boundary value problems.

Intended learning outcomes

The student is able to draw a distinction between the different concepts of numerical mathematics and knows about their advantages and limitations concerning the possibilities of application in different fields of natural and engineering sciences and economics.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English if agreed upon with the examiner

Allocation of places

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Additional information

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Workload

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Teaching cycle

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$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

§ 73 (1) 5. Mathematik Angewandte Mathematik

Module appears in

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2009)

Bachelor' degree (1 major) Physics (2012)



Bachelor' degree (1 major) Physics (2008)

Bachelor' degree (1 major) Technology of Functional Materials (2009)

Bachelor' degree (1 major) Technology of Functional Materials (2010)

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

Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

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

Bachelor' degree (1 major) Computational Mathematics (2009)

Bachelor' degree (1 major) Aerospace Computer Science (2009)

Bachelor' degree (1 major) Aerospace Computer Science (2011)

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

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

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)

Master's degree (1 major) Nanostructure Technology (2011)

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

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

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)



Module	e title	,	Abbreviation			
Progra	mming	course for students of M	10-M-PRG-082-m01			
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathematics		
ECTS	Metho	od of grading	Only after succ. compl. of module(s)			
3	(not)	successfully completed				
Duration Module level			Other prerequisites			
1 semester		undergraduate	Admission prerequisite to assessment: regular attendance (attendance monitored, a maximum of one incident of unexcused absence).			
Conten	Contents					

Basics of a modern programming language (e. g. C or Fortran) taking into account the particular needs in mathematics.

Intended learning outcomes

The student is able to work independently on small programming exercises and standard programming problems in mathematics.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

P (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

project in the form of programming exercises (as specified at the beginning of the course) Language of assessment: German, English if agreed upon with the examiner

Allocation of places

Additional information

Workload

Teaching cycle

$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

§ 73 (1) 5. Mathematik Angewandte Mathematik

Module appears in

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2009)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Physics (2008)

Bachelor' degree (1 major) Technology of Functional Materials (2009)

Bachelor' degree (1 major) Technology of Functional Materials (2010)

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

Bachelor' degree (1 major) Economathematics (2009)

Bachelor' degree (1 major) Economathematics (2008)

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

Bachelor' degree (1 major) Computational Mathematics (2009)

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

Master's degree (1 major) Technology of Functional Materials (2010)



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



title				Abbreviation
terorie	nted Mathematics			10-M-COM-082-m01
coord	inator		Module offered by	
f Studi	es Mathematik (Mathema	atics)	Institute of Mathematics	
Metho	od of grading	Only after succ. con	npl. of module(s)	
(not)	successfully completed			
Duration Module level		Other prerequisites		
ster	undergraduate	Admission prerequisite to assessment: regular attendance of exercise (attendance monitored, a maximum of one incident of unexcused absence).		
t	coord Studi Metho (not)	coordinator Studies Mathematik (Mathematics Method of grading (not) successfully completed Module level	coordinator Studies Mathematik (Mathematics) Method of grading (not) successfully completed n Module level Ster undergraduate Admission prerequi (attendance monito	coordinator Studies Mathematik (Mathematics) Method of grading (not) successfully completed Module level Module offered by Institute of Mathematics Only after succ. compl. of module(s) Module level Other prerequisites Ster undergraduate Admission prerequisite to assessment: (attendance monitored, a maximum of other presented)

Introduction to modern mathematical software for symbolic computation (e. g. Mathematica or Maple) and numerical computation (e. g. Matlab) to supplement the basic modules in analysis and linear algebra ((10-M-ANA) or 10-M-ANL) and 10-M-LNA). Computer-based solution of problems in linear algebra, geometry, analysis, in particular differential and integral calculus; visualisation of functions.

Intended learning outcomes

The student learns the use of advanced modern mathematical software packages, and is able to assess their fields of application to solve mathematical problems.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

project in the form of programming exercises (as specified at the beginning of the course)

Assessment offered: once a year, summer semester

Language of assessment: German, English if agreed upon with the examiner

Allocation of places

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Additional information

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Workload

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Teaching cycle

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$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

§ 73 (1) 5. Mathematik Angewandte Mathematik

Module appears in

Bachelor' degree (1 major) Computer Science (2010)

Bachelor' degree (1 major) Mathematics (2008)

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2009)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Physics (2008)

Bachelor' degree (1 major) Technology of Functional Materials (2009)

Bachelor' degree (1 major) Technology of Functional Materials (2010)

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

Bachelor' degree (1 major) Economathematics (2009)



Bachelor' degree (1 major) Economathematics (2008)

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

Bachelor' degree (1 major) Computational Mathematics (2009)

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

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)

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

Bachelor's degree (1 major, 1 minor) Mathematics (Minor, 2008)

First state examination for the teaching degree Gymnasium Mathematics (2009)



Module	e title				Abbreviation		
Physic	Physical chemistry of supramolecular assemblies 08-PCM5-102-m01						
Module	e coord	inator		Module offered by			
lecture kularer		-	he Chemie Supramole-	Institute of Physica	l and Theoretical Chemistry		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites	1			
1 seme	ster	graduate					
Conten	ıts						
cal pro	perties	of aggregates as well	eractions between mole as key applications of s		he formation and physical-chemi- nistry.		
		ning outcomes	-1-1-4		tunting a black decore		
in the f	ield. Th	,	ormation and physical-c		trating a high degree of expertise of aggregates. They can name mo-		
Course	S (type, r	number of weekly contact hou	ırs, language — if other than Ge	rman)			
S + Ü (1	no info	rmation on SWS (week	cly contact hours) and co	ourse language avail	able)		
		sessment (type, scope, lar le for bonus)	nguage — if other than German,	examination offered — if no	ot every semester, information on whether		
minute	s)	nation (90 minutes) a ssessment: German o		of one candidate ead	ch (20 minutes) and/or talk (30		
Allocat	-	-					
Additio	nal inf	ormation					
Worklo	ad						
Teaching cycle							
Doforro	d to in	IPO I (avamination ragula	tions for teaching-degree progra	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
	נט ווו	LF O F (examination regula	tions for teaching-degree progra	illilles)			
Module	2000	are in					
Module appears in Master's degree (1 major) Chemistry (2013)							
Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010)							
	_	ee (1 major) Mathema					
	_	•	gy of Functional Materia	ls (2010)			
	_		gy of Functional Materia	•			
Master	Master's degree (1 major) Computational Mathematics (2012)						



Module	e title				Abbreviation	
Semico	onducto	or Nanostructures			11-HNS-092-m01	
Module	e coord	inator		Module offered by		
Manag	ing Dir	ector of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade	<u></u>			
Duratio	on	Module level	Other prerequisites	Other prerequisites		
1 semester graduate		graduate	sessment. The lecturate the beginning of sidered a declaration dents have obtained the course of the sessment into effect ted to assessment it sessment at a later	Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.		

Semiconductor nanostructures are frequently referred to as "artificial materials". In contrast to atoms, molecules or macroscopic crystals, their electronic, optical and magnetic properties can be systematically tailored by changing their size. The lecture addresses technological challenges in the preparation of semiconductor nanostructures of varying dimensions (2D, 1D, oD). It provides the basic theoretical concepts to describe their properties, with a focus on optical properties and light-matter coupling. Moreover, it discusses the challenges and concepts of novel optoelectronic and quantum photonic devices based on such nanostructures, including building blocks for quantum communication and quantum computing architectures.

Intended learning outcomes

The students know the theoretical principles and characteristics of semiconductor nanostructures. They have knowledge of the technological methods to fabricate such structures, and of their applications to novel photonic devices. They are able to apply their knowledge to problems in this field of research.

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

R + V (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)

Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.

Language of assessment: German, English

Allocation of places --Additional information --Workload ---



Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

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

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

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

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

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

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

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Nanostructure Technology (2011)

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

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

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

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

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



sessment. The lecturer will inform students about the respective detain 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 a sessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For a sessment at a later date, students will have to obtain the qualification	Module title Abbreviation						
Managing Director of the Institute of Applied Physics Faculty of Physics and Astronomy	Quantı	ım Trai	nsport in Semicond	uctor Nanostructures	11-QTH-102-m01		
Certain prerequisites Gertain prerequisites Certain prerequisites Certain prerequisites Gertain prerequisites Certain prerequisites Certain prerequisites Gertain prerequisites Gert	Module	e coord	linator		Module offered by		
Duration Module level Other prerequisites 1 semester graduate Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective detains 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 on the course of the semester, the lecturer will put their registration for a sessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For a sessment at a later date, students will have to obtain the qualification	Manag	ing Dir	ector of the Institute	of Applied Physics	Faculty of Physics and Astronomy		
Duration 1 semester graduate Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective detains 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 on the course of the semester, the lecturer will put their registration for a sessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For a sessment at a later date, students will have to obtain the qualification	ECTS	Meth	od of grading	Only after succ. o	compl. of module(s)		
Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective detain 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 on the course of the semester, the lecturer will put their registration for a sessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For a sessment at a later date, students will have to obtain the qualification	6	nume	rical grade				
sessment. The lecturer will inform students about the respective detain 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 on the course of the semester, the lecturer will put their registration for a sessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For a sessment at a later date, students will have to obtain the qualification	Duratio	on	Module level	Other prerequisit	Other prerequisites		
admission to assessment anew.	graduate Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective det 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 the course of the semester, the lecturer will put their registration for sessment into effect. Students who meet all prerequisites will be ad ted to assessment in the current or in the subsequent semester. For						

The lecture addresses the fundamental transport phenomena of electrons in nanostructures. This includes the topics of: ballistic and diffuse transport, electron interference effects, quantisation of conductivity, interaction phenomena between electrons, Coulomb blockade, thermoelectric properties, description of spin-dependent transport phenomena, topological insulators, solid-state quantum computers.

Intended learning outcomes

The students have mastered the basics of electronics of nanostructures in theory and practice. They know functions and applications of respective components.

 $\textbf{Courses} \ (\textbf{type, number of weekly contact hours, language} - \textbf{if other than German})$

V + R (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)

Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.

Language of assessment: German, English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Master's with 1 major Technology of Functional Ma-	
terials (2010)	



Module appears in

Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

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

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

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

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Nanostructure Technology (2011)

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



Module	title			Abbreviation		
Polymers II					03-PM2-122-m01	
Module	coord	inator		Module offered by		
holder Dentist		Chair of Functional Mater	ials in Medicine and	Faculty of Medicine		
ECTS	Metho	od of grading	Only after succ. com	ıpl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
tions - group a graphic	control analysis es, poly	led radical polymerisatio s, mass spectrometry) - c mer functionalisation).	n - polymer character	isation (e.g. gel per	olyaddition - ionic polymerisa- meation chromatography, end- block-copolymers, polymer topo-	
		ning outcomes		. 1.c		
	-	uire an advanced knowled	• • • • • • • • • • • • • • • • • • • •		nd characterisation.	
		number of weekly contact hours, l			11.	
		mation on SWS (weekly o				
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	et every semester, information on whether	
a) writt (30 mir	en exar nutes)	,		ination of one candi	date each (20 minutes) or c) talk	
Allocat						
Additio	nal inf	ormation				
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
		ee (1 major) Chemistry (2	013)			
	_	ee (1 major) Chemistry (2	-			
	_	ee (1 major) Technology o		s (2010)		
Master's degree (1 major) Functional Materials (2012)						



Module	e title		Abbreviation			
Chemically and bio-inspired Nanotechnology for Material Syn				Synthesis	08-NT-122-m01	
Module	e coord	linator		Module offered by		
holder thesis	holder of the Chair of Chemical Technology of Material Synthesis			Chair of Chemical Technology of Material Synthesis		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duration Module level (Other prerequisites				
1 seme	1 semester graduate					
Conten	Contents					

This module provides an introduction to the synthesis methods of sol-gel chemistry and discusses the methods of analysis used to characterise the generated materials. It also discusses the fundamental principles of biomineralisation and uses examples to introduce students to bio-inspired material synthesis.

Intended learning outcomes

Students have developed an advanced knowledge of sol-gel chemistry and biomineralisation.

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

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

- 08-NT-1-122: V (no information on SWS (weekly contact hours) and course language available)
- 08-NT-2-122: V (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-NT-1-122: Sol-Gel Chemistry 1: Fundamentals

- 2 ECTS, Method of grading: numerical grade
- a) written examination (approx. 45 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)

Assessment in module component o8-NT-2-122: From Biomineralisation to biologically inspired Materials Synthesis

- 3 ECTS, Method of grading: numerical grade
- a) written examination (approx. 45 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)

Allocation of places **Additional information** Workload **Teaching cycle Referred to in LPO I** (examination regulations for teaching-degree programmes)

Module appears in

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



Bachelor' degree (1 major) Functional Materials (2012)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)



Focus

(30 ECTS credits)

All modules that are taken must come from the same focus subject (either A or B).



Focus Subject A: Biocompatible materials

(30 ECTS credits)



Module	Module title Abbreviation					
Basic principles of cell biology and tissue regeneration 03-SP1A1-101-m01					03-SP1A1-101-m01	
Module	coord	inator		Module offered by	l.	
		Chair of Orthopaedics and ve Medicine	d holder of the Chair	Faculty of Medicine		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
I		netabolism, differentiatio chanobiology (bioreactor		ll/cell interactions, c	eell adhesion, 2D/3D and surface	
Intende	ed lear	ning outcomes				
Studen nobiolo		e developed a knowledge	of cell biology, meta	bolism, differentiati	on, adhesion to surfaces, mecha-	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, (examination offered — if no	ot every semester, information on whether	
	techni	cal course (approx. 10 pa			ctical course / project report / re- . 90 minutes) or b) presentation	
Allocat	ion of _I	olaces				
Additio	nal inf	ormation				
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in					
	_	ee (1 major) Technology c ee (1 major) Functional M		S (2010)		



Module title Abbreviation						
Fundan	Fundamentals of Tissue Engineering and Quality Management 03-SP1A2-101-m01					
Module	coord	inator		Module offered by	l	
		Chair of Regenerative Medunctional Materials in Me		Faculty of Medicine		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
ves and	d blood				xtracellular matrix, supply of ner- valuation of medical devices ac-	
Intende	ed lear	ning outcomes				
Studen	ts are i	familiar with the fundame	ental principles of tiss	sue engineering and	quality management.	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	man)		
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
port on	techni				ctical course / project report / re- . 90 minutes) or b) presentation	
Allocat	ion of	places				
Additio	nal inf	ormation				
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in					
	_	ee (1 major) Technology o		s (2010)		
Master's degree (1 major) Functional Materials (2012)						



Module title					Abbreviation		
Materi	als use	d for surgical implants		03-SP2A1-101-m01			
Modul	e coord	inator		Module offered by			
holder	of the	Chair of Orthopaedics (Ja	kob/Ebert)	Faculty of Medicine			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ester	graduate					
Conter	nts						
		application of different n s, teeth).	nedical implants (card	diovascular system, o	catheter systems, organs of per-		
Intend	ed lear	ning outcomes					
		e developed a knowledge and interaction with the		implants in differen	t organs and tissues and their		
Course	es (type, r	number of weekly contact hours,	language — if other than Gei	rman)			
V + Ü +	- P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)		
		sessment (type, scope, langua ble for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether		
port or		ical course (approx. 10 pa			ctical course / project report / re- . 90 minutes) or b) presentation		
Alloca	tion of	places					
			-				
Additio	onal inf	ormation					
Workload							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Modul	e appea	ars in					
	_	ee (1 major) Technology		ls (2010)			
Master	Master's degree (1 major) Functional Materials (2012)						



Modul	e title		Abbreviation						
Materi	als for	biosensors, tissue engin	eering and tissue reg	generation	03-SP2A2-101-m01				
Modul	e coord	inator		Module offered by					
		Chair of Orthopaedics an ve Medicine	d holder of the Chair	Faculty of Medicine					
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)					
5	nume	rical grade							
Duration Module level		Other prerequisites							
1 semester		graduate	-						
Conter	Contents								
Interaction of biosystems with materials, biodegradation versus inert materials, protein adsorption on surfaces as an information broker for sensors, biological materials, structure-function interaction (nano-microstructures).									
Intended learning outcomes									
Studer	ts have	e developed a knowledge	of the interaction of	the biosystem with I	materials.				
Course	S (type, i	number of weekly contact hours,	anguage — if other than Ger	rman)					
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)				
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)									
placement report / fieldwork report / report on practical training / report on practical course / project report / report on technical course (approx. 10 pages) and a) written examination (approx. 90 minutes) or b) presentation (approx. 30 minutes)									
Allocation of places									
Additio	onal inf	ormation							
Workload									
Teaching cycle									
Referred to in LPO I (examination regulations for teaching-degree programmes)									
Module appears in									
Master	Master's degree (1 major) Technology of Functional Materials (2010)								
Master	Master's degree (1 major) Functional Materials (2012)								



Module	e title	,			Abbreviation				
Carrier	materi	als and devices for thera	peutic compounds		03-SP3A1-101-m01				
Module	coord	inator		Module offered by					
holder Dentist		Chair of Functional Mater	ials in Medicine and	Faculty of Medicine					
ECTS	Method of grading Only after succ. c			mpl. of module(s)					
5	nume	rical grade							
Duration		Module level	Other prerequisites						
1 seme	ster	graduate							
Conten	Contents								
Integration and binding of active agents in particles, functionalisation of particles for (intracellular) transport processes, targeting and release of the active agents.									
Intende	ed lear	ning outcomes							
Students have developed a knowledge of the integration and binding of active agents in particles and of the functionalisation of particles for (intracellular) transport processes, targeting and release of active agents.									
Course	Courses (type, number of weekly contact hours, language — if other than German)								
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)				
	Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)								
placement report / fieldwork report / report on practical training / report on practical course / project report / report on technical course (approx. 10 pages) and a) written examination (approx. 90 minutes) or b) presentation (approx. 30 minutes)									
Allocation of places									
Additional information									
Workload									
Teaching cycle									
Referred to in LPO I (examination regulations for teaching-degree programmes)									
Module appears in									
	Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Functional Materials (2012)								



Module	title	,		Abbreviation		
Micros	ystems	for biological and medic	inal Applications		03-SP3A2-101-m01	
Module	coord	inator		Module offered by	l .	
		Chair of Functional Mater holder of the Chair of Reg		Faculty of Medicine	2	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
		rug delivery systems, lab r regenerative medicine a		•	actor technology, lab course: na-	
Intende	ed lear	ning outcomes	,			
		e developed a knowledge eactor technology, nanop			d lab-on-a-chip systems for bio- otein biochemistry.	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü +	P (no i	nformation on SWS (wee	kly contact hours) an	d course language a	vailable)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
	techni	ical course (approx. 10 pa			ctical course / project report / re. . 90 minutes) or b) presentation	
Allocat	ion of _I	places				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
						
Module	Module appears in					
	_	ee (1 major) Technology o		s (2010)		
Master	's degr	ee (1 major) Functional M	aterials (2012)			



Focus Subject B: Technical functional materials

(30 ECTS credits)



e title		Abbreviation			
atrix in	sulation systems and ph	11-NM-WP-072-m01			
e coord	inator		Module offered by	<u> </u>	
ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy	
Metho	od of grading	Only after succ. com	ıpl. of module(s)		
nume	rical grade				
on	Module level	Other prerequisites			
ster	undergraduate				
ıts					
hotonic	s and biophysics as well	as in the technology	oriented materials	sciences, technologies of nano-	
ed learı	ning outcomes				
		• • •	-	gy areas of engineering work,	
S (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)		
no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)	
		ge — if other than German, e	examination offered — if no	ot every semester, information on whether	
en exa	mination (approx. 90 min				
tion of p	olaces				
nal inf	ormation				
ad		,			
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
or' deg	ree (1 major) Nanostructu	ıre Technology (2008)		
Bachelor' degree (1 major) Nanostructure Technology (2007)					
	e coord ing Dire nume nume on ester Its les and hotonic iring, co ics. ed learn idents l ally in t is (type, n no infor d of ass s creditab en exam ach or o cion of p	matrix insulation systems and phee coordinator ing Director of the Institute of Ap Method of grading numerical grade Module level ester undergraduate Its Iles and specific knowledge of enhotonics and biophysics as well aring, components and system dics. Ided learning outcomes Idents have advanced knowledge ally in the field of thermal insulates (type, number of weekly contact hours, I no information on SWS (weekly of dof assessment (type, scope, languates creditable for bonus) Iden examination (approx. 90 minusch or oral examination in group and information In ach or oral examination in group and information In ach or oral examination in group and information In ach or oral examination in group and information In ach or oral examination in group and information In ach or oral examination in group and information In ach or oral examination in group and information In a cycle In a	re coordinator ing Director of the Institute of Applied Physics Method of grading numerical grade numerical grade on Module level other prerequisites ster undergraduate on Module level other prerequisites on Module level on Module level on Grading on Module level on Module level on Grading on Grad	detrix insulation systems and photovoltaics e coordinator ing Director of the Institute of Applied Physics Method of grading Only after succ. compl. of module(s) numerical grade on Module level Other prerequisites ster undergraduate its les and specific knowledge of engineering work in the application fields thotonics and biophysics as well as in the technology-oriented materials string, components and system development, especially in the field of the ics. ed learning outcomes idents have advanced knowledge of one or more application or technologically in the field of thermal insulation systems and photovoltaics. If (type, number of weekly contact hours, language — if other than German) no information on SWS (weekly contact hours) and course language avail dof assessment (type, scope, language — if other than German, examination offered — if not screditable for bonus) en examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) and or or all examination in groups (approx. 30 minutes) or d) project report in the field of in LPO I (examination regulations for teaching-degree programmes) et appears in or' degree (1 major) Nanostructure Technology (2008)	

Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2009)



Module title					Abbreviation	
Nanomatrix semiconductor materials 11-NM-HM-072-m01					11-NM-HM-072-m01	
Modul	Module coordinator Modu			Module offered by		
Manag	ging Dir	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)		
6	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conte	nts					
structi	uring, c	cs and biophysics as well omponents and system d ning outcomes	σ,		sciences, technologies of nano- niconductor materials.	
		have advanced knowledg the field of semiconducto		lication or technolog	gy areas of engineering work,	
Course	es (type,	number of weekly contact hours, I	anguage — if other than Ger	rman)		
V + R (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)						
a) written examination (approx. 90 minutes) or b) talk (approx. 30 minutes) or c) oral examination of one candidate each or oral examination in groups (approx. 30 minutes) or d) project report (approx. 10 pages)						
Alloca	tion of	places				

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Bachelor' degree (1 major) Nanostructure Technology (2008)

Bachelor' degree (1 major) Nanostructure Technology (2007)

Master's degree (1 major) Technology of Functional Materials (2010)

Master's degree (1 major) Technology of Functional Materials (2009)



Module title					Abbreviation	
Organic Chemistry for students of engineering 08-IOC4-092-mo1					08-I0C4-092-m01	
Module coordinator Module offered by					I.	
lecture	er of lec	ture "Organische Chemie	2 4"	Institute of Organic	Chemistry	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate	Registration for asso	essment: Yes, as spe	ecified.	
Conte	ıts		•			
This m	odule d	discusses biologically im	portant bonding class	ses, their reactions a	and syntheses.	
Intend	ed lear	ning outcomes				
Studer	nts hav	e become familiar with b	iologically important	bonding classes, the	eir reactions and syntheses.	
Course	es (type,	number of weekly contact hours,	language — if other than Ge	man)	·	
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	lable)	
		sessment (type, scope, langua ole for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
writter	exami	nation (90 minutes)				
Alloca	tion of	places				
-						
Additio	onal inf	ormation				
Workle	oad					
Teachi	ng cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	e appe	ars in				
Maste	r's degr	ree (1 major) Technology	of Functional Materia	ls (2010)		
Maste	Master's degree (1 major) Technology of Functional Materials (2009)					



Module	e title	-		Abbreviation		
Organic Semiconductor				11-OHL-092-m01		
Module	Module coordinator			Module offered by		
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics and Astronomy		
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites	Other prerequisites		
1 semester graduate Ad 50 si ve be st ov as m		50% of exercises. C sion to assessment ve details at the beg be considered a destudents have obta over the course of the assessment into efficients.	site to assessment: successful completion of approx. ertain prerequisites must be met to qualify for admis. The lecturer will inform students about the respectiginning of the course. Registration for the course will claration of will to seek admission to assessment. If ined the qualification for admission to assessment the semester, the lecturer will put their registration for fect. Students who meet all prerequisites will be adnit in the current or in the subsequent semester. For er date, students will have to obtain the qualification sessment anew.			

Contents

Physical principles of organic semiconductors, molecular and polymer electronics and sensor technology, applications.

Intended learning outcomes

The students have advanced knowledge of organic semiconductors.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 90 minutes) or b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate, for modules with less than 4 ECTS credits approx. 20 minutes) or c) project report (approx. 10 pages, time to complete: 1 to 4 weeks) or d) presentation/seminar presentation (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

--

Teaching cycle

--

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

--

Module appears in

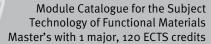
Bachelor' degree (1 major) Physics (2010)

Bachelor' degree (1 major) Physics (2012)

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

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

Master's degree (1 major) Technology of Functional Materials (2010)





Master's degree (1 major) Technology of Functional Materials (2009)

Master's degree (1 major) Nanostructure Technology (2011)

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

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

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

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

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



Module title Abbreviation					Abbreviation		
Polyme	eric Mat	terials 1: Technology of M	Modifying Polymers		08-PW1-092-m01		
Module	coord	inator		Module offered by			
holder thesis	of the (Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
5	numei	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	ts						
logies f	or the i				; properties of polymers; techno- es for the characterisation of po-		
Intende	ed learr	ning outcomes					
portant such as nufactu	productions injections	ction technologies (polyr ion moulding) and under	ner synthesis method stand the different w	ls, compounding tec ays of influencing th	r with the characteristics of im- chnologies, processing methods e properties of materials and ma- c flow conditions in polymer pro-		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V + P (n	o infor	mation on SWS (weekly o	contact hours) and co	urse language availa	able)		
			ge — if other than German, e	examination offered — if no	ot every semester, information on whether		
		le for bonus)					
		nation (90 minutes)					
Allocat	ion or p	olaces					
	nal inf	ormation					
Additio	iiat iiii	ormation					
Worklo							
	au						
Teachir	ng cycle	A					
	Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	appea	rs in					
		ee (1 major) Technology o	of Functional Material	s (2010)			
Master	Master's degree (1 major) Technology of Functional Materials (2009)						



Module title					Abbreviation	
Polyme	Polymeric Materials 2: Technology of Modifying Fillers for Polymers 08-PW2-092-m01					
Module	Module coordinator M					
holder thesis	of the (Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis	
ECTS	Metho	od of grading	Only after succ. com	ıpl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ıts					
ons be (e.g. el	tween f ectrical	iller materials and polym	ers, determination of behaviour) and influe	the special properti	er to modify polymers, interacti- ies of functionalised polymers tion on other properties (e.g.	
Intend	ed lear	ning outcomes				
tionalis influen	sed pol		aviour, bactericidal be eology, mechanical b	pehaviour) and unde pehaviour, colour, su	e the special properties of func- rstand how other properties are irface).	
		mation on SWS (weekly o			able)	
		•			ot every semester, information on whether	
		le for bonus)				
written	exami	nation (90 minutes)				
Allocat	tion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
	_					
Teachi	Teaching cycle					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	rs in				
	_	ee (1 major) Technology o				
Master	Master's degree (1 major) Technology of Functional Materials (2009)					



Module title					Abbreviation
Electro	chemic	al Energy Storage and Co	onversion		08-EEW-101-m01
Module	Module coordinator			Module offered by	
holder thesis	of the (Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)	
5	nume	rical grade			
Duratio		Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts	0			
cal dou (Si, CIS	ible lay , CIGS,		batteries, fuel cell sy	stems (AFC, PEMFC,	on accumulators), electrochemi, DMFC, PAFC, SOFC), solar cells
		e developed a knowledge ge to research problems.	or electrochemical e	nergy storage and c	onversion and are able to apply
		number of weekly contact hours, I	anguage — if other than Ger	man)	
		nformation on SWS (weel			vailable)
		· · · · · · · · · · · · · · · · · · ·			ot every semester, information on whether
		le for bonus)	ge ii other than derman, t	examination offered in the	of every semester, information on whether
written	exami	nation (90 minutes) and	lab report (approx. 5	pages)	
Allocat	-	-			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	 P			
	.5 cyc.				
Possessed to in IRO1 () is a large of the l					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in Bachelor' degree (1 major) Nanostructure Technology (2010)					
	_	ee (1 major) Physics (201		,	
		ee (1 major) Physics (201			
	_	ee (1 major) Technology (s (2010)	
	_	ee (1 major) Nanostructu			
Mantada da mara (mara)					

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



Module title					Abbreviation	
Structu	re and	Properties of Modern Ma	and Simulations	08-MW-101-m01		
Module	Module coordinator Module offered I					
holder thesis	of the (Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade	-			
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	-			
Conten	ts					
Materia simula		erties of metals and cerar	nics: correlation of st	ructure/property rel	ations through experiments and	
Intende	ed lear	ning outcomes				
perties	•			·	f materials and the resulting pro-	
	-	number of weekly contact hours, l			- hls	
		mation on SWS (weekly o	· · · · · · · · · · · · · · · · · · ·		·	
		ole for bonus)	ge — If other than German, 6	examination offered — if no	ot every semester, information on whether	
talk (ap	prox. 2	45 minutes)				
Allocat	ion of _I	olaces				
	,					
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	appea	ars in				
Master	's degr	ee (1 major) Technology c	of Functional Material	s (2010)		



Module title				Abbreviation		
Organi	c Funct	ional Materials			08-OCM-FM-101-m01	
Module	e coord	inator		Module offered by		
lecture	r of the	seminar "Organische Fu	nktionsmaterialien"	Institute of Organic	Chemistry	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
sical ef	fects in nents s	organic molecular and p	oolymeric semicondu	ctors as well as their	is on fundamental (photo)phy- r application in (opto)electronic ganic solar cells as well as in non-	
Intende	ed learı	ning outcomes				
ents su near op	ich as f	ield effect transistors, org	ganic light-emitting d	iodes or in organic p	ion in (opto)electronic compon- hotovoltaics as well as in nonli-	
		number of weekly contact hours, licion on SWS (weekly cont			<u></u>	
		le for bonus)	ge — II other than German, (exammation onered — ii no	ot every semester, information on whether	
					minations: 60 or 90 minutes s (groups of 2, approx. 30 minu-	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Workload						
Teaching cycle						
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Module	Module appears in					

Master's degree (1 major) Technology of Functional Materials (2010)



Thesis

(25 ECTS credits)



Module	Module title Abbreviation					
Master	-Thesis	5			08-MT-TF-092-m01	
Module	coord	inator		Module offered by		
Dean o	f Studi	es Funktionswerkstoffe (I	Functional Materials)	Chair of Chemical T	echnology of Material Synthesis	
ECTS	Metho	od of grading	Only after succ. com	ıpl. of module(s)		
25	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	Registration for assessupervisor.	essment on a continu	uous basis as agreed upon with	
Conten	ts					
		be expected to research a principles of good scienti		d topic in the techno	ology of functional materials, ad-	
Intende	ed lear	ning outcomes				
		able to conduct research t the results of their work		dhering to the princi	ples of good scientific practice,	
Course	S (type, r	number of weekly contact hours, I	language — if other than Ger	man)		
no cou	rses as	signed				
		sessment (type, scope, langua ole for bonus)	age — if other than German, e	examination offered — if no	ot every semester, information on whether	
written Langua		ssessment: German, Eng	glish			
Allocat	ion of p	places				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in					
Master's degree (1 major) Technology of Functional Materials (2010)						
Master	's degr	ee (1 major) Technology (of Functional Material	s (2009)		