

Subdivided Module Catalogue for the Subject

Technology of Functional Materials

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

Examination regulations version: 2006 Responsible: Faculty of Chemistry and Pharmacy

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Course of Studies - Contents and Objectives

The curriculum of Bachelor of Science program with specialization in Technology of Functional Materials is intended to provide students with hands-on practical experience in the field of functional materials for advanced technologies. This program offers students the opportunity to acquire basic knowledge and comprehensive understanding of key techniques commonly related to modern functional materials. It is an interdisciplinary course which involves lectures dealing with basic principles of chemistry, physics, mathematics, engineering, electronics and materials science. This course is closely coordinated by Fraunhofer Institut für Silicatforschung, Fachhochschule Würzburg-Schweinfurt, Bayerischen Zentrum für Angewandte Energieforschung and Süddeutschen Kunststoffzentrum. Through this course students are given an opportunity to become well-educated and well-rounded individuals with a broad range of skills. In the bachelors thesis process, the students are supposed to demonstrate their ability to apply their theoretical and practical knowledge and to solve material science related problems. The bachelors certification enables students to qualify for scientific occupation in the field of functional materials for advanced technologies. Moreover, students are encouraged to do additional industrial internships or Master of Science to further develop their knowledge and skills.

Abbreviations used

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

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

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

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

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

Conventions

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

Notes

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

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

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

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14-Mar-2007 (2007-5)
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03-Sep-2007 (2007-19)

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.

The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	page
Compulsory Courses (135	ECTS credits)		•	
08-IAC-062-m01	Experimental Chemistry, General and analytical laboratory course for engineering students	10	NUM	17
08-IOC-062-m01	Organic Chemistry for students of medicine, biomedicine, den- tal medicine, engineering and natural science	10	NUM	19
08-IPC-062-m01	Physical Chemistry for engineering students	20	NUM	21
10-I-EPIN-062-m01	Introduction to computer science of all faculties	5	NUM	27
99-TM-062-m01	Fundamentals of Engineering Mechanics	5	NUM	47
10-M-TFU1-062-m01	Mathematics 1 for students of Technology of Functional Materi- als	8	NUM	33
11-MPI3-062-m01	Mathematics 3 for students of Physics and Engineering	8	NUM	37
11-ENNF1-062-m01	Introduction to Physics Part 1 for students of Physics Related Minor Subjects	7	NUM	35
11-ENNF2-062-m01	Introduction to Physics Part 2 for students of Physics Related Minor Subjects	7	NUM	36
08-CT-062-m01	Chemical Technology of Material Synthesis Lecture, exercises	10	NUM	13
11-PPT-062-m01	Physical Technology of Material Synthesis, laboratory course	4	NUM	41
03-TV-062-m01	Technology of Composite Materials and Technology of Compo- site Materials laboratory course	5	NUM	7
99-IP-062-m01	Laboratory Course of Engineering (mechanical and electrical engineering)	5	NUM	46
99-CA-062-m01	Computer-based Construction and Assembly	5	NUM	43
10-M-TFU2-062-m01	Mathematics 2 for students of Technology of Functional Mate- rials	7	NUM	34
11-PNNF-062-m01	Physics Laboratory Course for students of Physics Related Mi- nor Subjects	3	B/NB	40
11-TMS-062-m01	Physical Technology of Material Synthesis. Lecture, exercises	6	NUM	42
99-EL1-062-m01	Basics of Electronics 1	5	NUM	44
99-EL2-062-m01	Basics of Electronics 2	5	NUM	45
Compulsory Electives (5 E	CTS credits)			
10-I-DB-072-m01	Data bases	5	NUM	26
11-N1-072-m01	Basics of NanostructureTechnology	6	NUM	39
10-M-ODE-082-m01	Ordinary Differential Equations	5	NUM	31
08-BC-TF-062-m01	Biochemistry for students of Technology of Functional Materi- als	3	NUM	9
08-BM-062-m01	From Biomineralisation to biologically inspired Materials Syn- thesis	2	NUM	11
08-SGC-062-m01	Sol-Gel Chemistry 1: Basics	2	B/NB	25
03-TF-FBM-062-m01	Functional Biomaterials for students of Technology of Functio- nal Materials. Lectures, laboratory course	5	NUM	6
08-AC1-TF-062-m01	Basics of General and Analytical Chemistry for students of Technology of Functional Materials	5	NUM	8

page 4 / 47

08-NT-091-m01	Chemically and biologically inspired Nanotechnology for Mate- rials Synthesis	5	NUM	23		
10-M-COM-072-m01	Computeroriented Mathematics	3	B/NB	28		
10-M-FAN-072-m01	Introduction to Functional Analysis	5	NUM	29		
08-PKC-072-m01	Programming course for Chemistry Majors	5	B/NB	24		
Subject-specific Key Skills	(15 ECTS credits)		<u>.</u>			
08-FS1-062-m01	Material Science 1 (basic introduction)	4	NUM	14		
08-FS2-062-m01	Material Science 2 (the material groups)	5	NUM	15		
08-FS3-062-m01	Material testing: Solid State Analytics	6	NUM	16		
Thesis (12 ECTS credits)			<u>.</u>			
08-BT-062-m01	Bachelor's Thesis	12	NUM	12		
Colloquium (3 ECTS credits	Colloquium (3 ECTS credits)					
08-BKOLL-062-m01	Bachelor Thesis' Colloquium	3	NUM	10		

Modu	le title			Abbreviation		
			s of Technology of Func	tional Materials.	03-TF-FBM-062-m01	
Lectures, laboratory course						
Modu	le coord	inator		Module offered by	/	
holde Dentis		Chair of Functional Ma	terials in Medicine and	Faculty of Medicir	ie	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Durati	ion	Module level	Other prerequisites			
1 sem	ester	undergraduate				
Conte	nts					
		principles and specific ication and characteri		; in natural science:	s in the field of biomaterials with	
Intend	ded lear	ning outcomes				
Stude	nts have	e developed an advan	ced knowledge in the fie	eld of biomaterials	for use in implants.	
Cours	es (type	, number of weekly co	ntact hours, language –	- if other than Germ	nan)	
V + P ((no infoi	rmation on SWS (week	ly contact hours) and co	ourse language ava	ilable)	
			, language — if other th e can be chosen to earn		nation offered — if not every seme-	
		oort / fieldwork report ical course (approx. 10		ining / report on pr	actical course / project report / re-	
Alloca	tion of	places				
			,			
Additi	onal inf	ormation				
Workl	oad					
Referr	red to in	LPOI (examination re	egulations for teaching-	degree programme:	s)	
Modu	le appea	ars in				
			gy of Functional Materia	als (2006)		

Modul	e title				Abbreviation	
Technology of Composite Materials and Technology of Composite Materia					03-TV-062-m01	
laboratory course Module coordinator Module offere						
				Module offered by		
holder Dentist		Chair of Functional Mater	ials in Medicine and	Faculty of Medicine		
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio		Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
	tical ar ich mat		knowledge of the fab	rication and evaluat	ion of composite respectively	
Intend	ed lear	ning outcomes				
		e developed a knowledge ich materials.	of the theoretical an	d practical foundatio	ons of the fabrication and evalua-	
Course	es (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)	
• o Metho ster, in Assess low. Ur vidual	d of ass d of ass aformation sment in nless st assess	ion on whether module can this module comprises ated otherwise, successf	n SWS (weekly conta inguage — if other tha an be chosen to earn the assessments in t ful completion of the	ct hours) and course an German, examina a bonus) he individual modul module will require	e language available) ation offered — if not every seme- e components as specified be- successful completion of all indi-	
• 3 • Assess	3 ECTS, sment i	Method of grading: nume n module component o3- Method of grading: (not)	erical grade TV-2-062: Technolog	y of Composite Mate		
Allocat	tion of _l	places				
Additio	onal inf	ormation				
Workload						
Referre	ed to in	LPOI (examination regu	lations for teaching-o	degree programmes)		
Modul	e appea	ars in				
		ree (1 major) Technology	of Functional Materia	als (2006)		

Modul	e title		Abbreviation				
Basics	of Gen	eral and Analytical Chem	08-AC1-TF-062-m01				
tional Materials							
Modul	e coord	inator		Module offered by			
lecture	er of lec	ture "Experimentalchemi	e" (Experimental	Institute of Inorgan	ic Chemistry		
Chemi			,				
ECTS	_	od of grading	Only after succ. con	npl. of module(s)			
5		rical grade					
Duratio		Module level	Other prerequisites				
1 seme	ester	undergraduate					
Conter	nts						
					of chemistry. It focuses on partic-		
		cid-base reactions, the pe luces fundamental mode			omplexometry. In addition, the		
					c chemistry.		
		ning outcomes					
					formation from it. They are ab- bility to use the language of che-		
					ng the type of reaction. Students		
					nd their application areas.		
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	n)		
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)		
		sessment (type, scope, la ion on whether module c			tion offered — if not every seme-		
written	n exami	nation (60 minutes)	_				
Allocat	tion of	places					
Additio	onal inf	ormation					
Worklo	oad						
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Modul	e appea	ars in					
		ree (1 major) Technology					

Modul	e title			Abbreviation	
Biochemistry for students of Technology of Functional Materials 08-BC-TF-062-m01					
Modul	e coord	linator	·		
holder	ofthe	Chair of Biochemistry		Chair of Biochemis	stry
ECTS		od of grading	Only after succ. con	npl. of module(s)	
3	nume	rical grade			
Duratio	on	Module level	Other prerequisites	i	
1 seme	ster	undergraduate			
Conter	nts				
Compr mistry.	-	ectures and exercises, thi	s module acquaints s	tudents with the fu	ndamental principles of bioche-
Intend	ed lear	ning outcomes			
		e become familiar with th cal processes in cellular		ples of biochemistr	y. They are able to describe the
Course	e s (type	, number of weekly conta	act hours, language –	- if other than Germ	an)
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avai	ilable)
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-
written	exami	nation (60 minutes)			
Allocat	tion of	places			
	_				
Additio	onal inf	ormation			
Worklo	ad				
Referre	ed to in	LPOI (examination regu	ulations for teaching-	degree programmes	;)
Modul	e appe	ars in			
	-	ree (1 major) Technology ree (1 major) Technology			

Module title Abbreviation							
Bachelor Thesis' Colloquium 08-BKOLL-062-m01							
Module coordinator Module offered by							
Dean o	f Studi	es Funktionswerkstoffe (l	Functional Materials)	Chair of Chemical T	echnology of Material Synthesis		
ECTS	Meth	od of grading	Only after succ. com	npl. of module(s)			
3	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Bachel	or's the	esis defence.	-				
Intende	ed lear	ning outcomes					
Studen	its are a	able to orally defend thei	r Bachelor's thesis.				
Course	s (type	, number of weekly conta	act hours, language —	- if other than Germa	an)		
K (no ir	nforma	tion on SWS (weekly cont	tact hours) and cours	e language available	e)		
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-		
final co	olloquit	um (60 minutes)					
Allocat	ion of	places					
Additio	onal inf	ormation					
	_						
Worklo	ad						
Referre	ed to in	LPO I (examination regu	lations for teaching-o	degree programmes)			
Module appears in							
Bachelor' degree (1 major) Technology of Functional Materials (2009)							
Bachel	Bachelor' degree (1 major) Technology of Functional Materials (2009)						
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	als (2006)			

Module title					Abbreviation		
From B	liomine	ralisation to biologica	lly inspired Materials S	ynthesis	08-BM-062-m01		
Module coordinator				Module offere	ed by		
holder thesis	ofthe	Chair of Chemical Tech	nology of Material Syn-	Chair of Chen	nical Technology of Material Synthesis		
ECTS		od of grading	Only after succ. con	npl. of module	(s)		
2	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ester	undergraduate					
Conter	nts						
		liscusses the fundame nspired material synth		neralisation ar	nd uses examples to introduce stu-		
Intend	ed lear	ning outcomes					
Studer	nts have	e developed an advand	ed knowledge of biomi	neralisation.			
Course	es (type	, number of weekly co	ntact hours, language –	- if other than (German)		
V (no i	nforma	tion on SWS (weekly co	ontact hours) and cours	e language ava	ailable)		
			, language — if other the can be chosen to earn		amination offered — if not every seme-		
oral ex	aminat	ion (approx. 15 minute	s)				
Allocat	tion of	places					
Additio	onal inf	ormation					
Worklo	ad						
Referre	ed to in	LPO I (examination re	gulations for teaching-	degree progran	nmes)		
Modul	e appea	ars in					
Bachel	Bachelor' degree (1 major) Technology of Functional Materials (2006)						

Module	e title				Abbreviation	
Bachel	or's Th	esis			08-BT-062-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Funktionswerkstoffe (F	unctional Materials)		echnology of Material Synthesis	
ECTS		od of grading	Only after succ. com			
12	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate	Registration for asse	essment on a contin	uous basis as agreed upon with	
			supervisor.			
Conten	ts					
		ives students the opport scientific methods they l			problem within a given time frame	
		ning outcomes				
Studen	its are a				the principles of good scientific	
-		, number of weekly conta			n)	
no cou	rses as	signed				
		sessment (type, scope, la on on whether module ca			tion offered — if not every seme-	
written Langua		ssessment: German or Ei	nglish			
Allocat			.3			
Additio	onal inf	ormation				
Worklo	ad					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor' degree (1 major) Technology of Functional Materials (2009)						
Bachelor' degree (1 major) Technology of Functional Materials (2010)						
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	als (2006)		

Module title				Abbreviation		
Chemical Tech	nology of Material Synt	hesis Lecture, exerci	ses	08-CT-062-m01		
Module coord	inator		Module offered by			
holder of the (thesis	Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis		
	od of grading	Only after succ. con	pl. of module(s)			
	rical grade					
Duration	Module level	Other prerequisites				
1 semester	undergraduate					
Contents						
		and practical princip	es of the chemical t	echnology of material synthesis.		
Intended lear	ning outcomes					
	e become familiar with th nd are able to apply the k			he chemical technology of materi- rch problems.		
Courses (type	, number of weekly conta	ct hours, language –	· if other than Germa	in)		
• 08-CT-2	-062: P (no information o	n SWS (weekly conta	ct hours) and course			
	sessment (type, scope, la on on whether module ca			ition offered — if not every seme-		
	ated otherwise, successf			e components as specified be- successful completion of all indi-		
Chemical Tech	n module component o8- nnology of Material Synth Method of grading: nume	esis Lecture, exercis		ial Synthesis Lecture, exercises		
	n module component o8- Method of grading: (not)			ial Synthesis Lecture, exercises		
Allocation of p	olaces					
Additional inf	ormation					
Workload						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
 Module appea	urs in					
Bachelor' degree (1 major) Technology of Functional Materials (2006)						
	<u>, , , , , , , , , , , , , , , , , , , </u>					

Module title Abbreviation							
Materi	al Scie	nce 1 (basic introduction		08-FS1-062-m01			
Module coordinator				Module offered by			
Dean c	of Studi	es Funktionswerkstoffe	(Functional Materials)	Chair of Chemical	Fechnology of Material Synthesis		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
4	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ester	undergraduate					
Conter	nts						
		liscusses the fundamen erties of materials.	ntal relations between o	chemical bonding, t	he structure, the microstructure		
Intend	ed lear	ning outcomes					
Students have become familiar with the fundamental relations between chemical bonding, the structure, the microstructure and the properties of materials. They have developed the ability to apply them to research problems.							
		e and the properties of i	materials. They have d	eveloped the ability	to apply them to research pro-		
blems.		e and the properties of r , number of weekly con					
blems. Course	es (type		tact hours, language –	- if other than Germa	an)		
blems. Course V (no in Metho	es (type nformation d of ass	, number of weekly con tion on SWS (weekly co	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an)		
blems. Course V (no in Metho	es (type nformation d of ass	, number of weekly con tion on SWS (weekly con sessment (type, scope,	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an) e)		
blems. Course V (no in Metho ster, in 	es (type nformation d of ass	, number of weekly con tion on SWS (weekly con sessment (type, scope, ion on whether module	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an) e)		
blems. Course V (no in Metho ster, in 	es (type nforma d of ass nformat	, number of weekly con tion on SWS (weekly con sessment (type, scope, ion on whether module	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an) e)		
blems. Course V (no in Metho ster, in Allocat	es (type nforma d of ass iformat tion of p	, number of weekly con tion on SWS (weekly con sessment (type, scope, ion on whether module	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an) e)		
blems. Course V (no in Metho ster, in Allocat	es (type nforma d of ass iformat tion of p	, number of weekly con tion on SWS (weekly con sessment (type, scope, ion on whether module places	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an) e)		
blems. Course V (no in Metho ster, in Allocat	es (type nformat d of ass format tion of p	, number of weekly con tion on SWS (weekly con sessment (type, scope, ion on whether module places	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an) e)		
blems. Course V (no in Metho ster, in Allocat Additic	es (type nformat d of ass format tion of p	, number of weekly con tion on SWS (weekly con sessment (type, scope, ion on whether module places	tact hours, language — ntact hours) and cours language — if other tha	- if other than Germa e language availabl an German, examina	an) e)		
blems. Course V (no in Metho ster, in Allocat Worklo 	es (type nforma d of ass format tion of p onal inf	, number of weekly con tion on SWS (weekly con sessment (type, scope, ion on whether module places	tact hours, language – ntact hours) and cours language — if other tha can be chosen to earn	- if other than Germa e language availabl an German, examina a bonus)	an) e) ation offered — if not every seme		
blems. Course V (no in Metho ster, in Allocat Worklo 	es (type nforma d of ass format tion of p onal inf	, number of weekly cont tion on SWS (weekly con sessment (type, scope, ion on whether module places	tact hours, language – ntact hours) and cours language — if other tha can be chosen to earn	- if other than Germa e language availabl an German, examina a bonus)	an) e) ation offered — if not every seme		
blems. Course V (no in Metho ster, in Allocat Worklo Referre	es (type nforma d of ass format tion of p onal inf	, number of weekly cont tion on SWS (weekly con- sessment (type, scope, ion on whether module places ormation	tact hours, language – ntact hours) and cours language — if other tha can be chosen to earn	- if other than Germa e language availabl an German, examina a bonus)	an) e) ation offered — if not every seme		

Module title Abbreviation						
Material Science 2 (the material groups) 08-FS2-062-m01						
Module coordinator Module offered by						
Dean of Studies Funktionswerkstoffe (Functional Materials) Chair of Chemical Technology of Material Syn						
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
This mo	odule d	leals with the fabrication	and properties of the	e main material grou	ps.	
Intende	ed lear	ning outcomes				
		e developed a knowledge knowledge to research pr		d properties of the r	nain material groups and are able	
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	ın)	
V + Ü (r	no infoi	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-	
written	exami	nation (60 minutes)				
Allocat	ion of _l	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor' degree (1 major) Technology of Functional Materials (2009)						
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	ıls (2006)		

Module	Module title Abbreviation						
Materia	Material testing: Solid State Analytics 08-FS3-062-m01						
Module	e coord	inator		Module offered by			
Dean of	f Studie	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)			
6	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
This mo	odule d	eals with the fundament	al principles of solid-	state analysis.			
Intende	ed learı	ning outcomes					
		e become familiar with the	e fundamental princi	ples of solid-state a	nalysis and are able to apply the		
		, number of weekly conta	ct hours, language —	if other than Germa	in)		
V + P (n	io infor	mation on SWS (weekly o	ontact hours) and co	urse language avail	able)		
		essment (type, scope, la on on whether module ca			tion offered — if not every seme-		
written	examiı	nation (60 minutes)					
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module	e appea	irs in					
Bachelo	Bachelor' degree (1 major) Technology of Functional Materials (2006)						

Module	e title				Abbreviation	
Experin	nental	Chemistry, General and a	08-IAC-062-m01			
ring stu						
Module	<u>e coord</u>	inator	Module offered by			
lecture Chemis		ture "Experimentalchemi	e" (Experimental	Institute of Inorgani	ic Chemistry	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
les, me module exercis autono ques, tl opportu Intende Studen le to ex mical fo are able are able loped t approp	This module provides students with an overview of the fundamental principles of chemistry. It focuses on partic- les, metals, acid-base reactions, the periodic table, chemical equilibrium and complexometry. In addition, the module introduces fundamental models of chemistry and principles of inorganic chemistry. It includes practical exercises based on the lecture on experimental chemistry and its extension. After a safety briefing, the students autonomously conduct experiments in the laboratory. The course focuses on laboratory safety, simple lab techni- ques, the synthesis of simple substances and analyses of unknown substances. In addition, students have the opportunity to advance their laboratory knowledge. Intended learning outcomes Students are able to explain the principles of the periodic table and to extract information from it. They are ab- le to explain basic models of the structure of matter. They have developed the ability to use the language of che- mical formulas to describe chemical reactions and to interpret them by identifying the type of reaction. Students are able to describe the main quantitative and qualitative analytical methods and their application areas. They are able to identify fundamental problems in chemistry and perform experiments to solve them. They have deve- loped the ability to perform the necessary stoichiometric calculations and describe the chemical processes in an appropriate manner, both in written and oral form.					
Course	s (type	, number of weekly conta	ct hours, language —	· if other than Germa	n)	
compo • o	nent. 8-IAC-1	omprises 2 module comp 1-062: V (no information o 2-062: P (no information o	on SWS (weekly conta	act hours) and cours		
		sessment (type, scope, la on on whether module ca			tion offered — if not every seme-	
	less st	ated otherwise, successf			e components as specified be- successful completion of all indi-	
• 5 • w Assess • 5 • V to	 Assessment in module component o8-IAC-1-o62: Experimental Chemistry 5 ECTS, Method of grading: numerical grade written examination (approx. 90 minutes) Assessment in module component o8-IAC-2-o62: General and analytical Chemistry Lab for engineering students 5 ECTS, Method of grading: (not) successfully completed Vortestate (pre-experiment exams, approx. 15 minutes each), assessment of practical performance, Nachtestate (post-experiment exams, approx. 15 minutes each) 					
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					

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

Module appears in

Bachelor' degree (1 major) Technology of Functional Materials (2009) Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Technology of Functional Materials (2006)

Module	title		Abbreviation					
-	Drganic Chemistry for students of medicine, biomedicine, dental medicine, en-							
-		natural science						
Module				Module offered by				
für Stuc	lierend	pervisor "Organisch-chem e der Ingenieurwissensc		Institute of Organic	Chemistry			
ECTS		od of grading	Only after succ. con	pl. of module(s)				
10		rical grade						
Duratio		Module level	Other prerequisites					
1 semes		undergraduate						
Conten								
		rovides students with an fundamental techniques			organic chemistry. In addition, it			
Intende	ed learr	ning outcomes						
		become familiar with the problems in chemistry an			nistry. They are able to identify			
Courses	s (type,	number of weekly conta	ct hours, language –	- if other than Germa	n)			
compor • 0	nent. 8-IOC-1 8-IOC-2	omprises 3 module comp 1-072: V (no information o 2-062: P (no information 3-062: S (no information	on SWS (weekly cont on SWS (weekly cont	act hours) and cours act hours) and cours	se language available)			
Method	l of ass		nguage — if other th	an German, examina	tion offered — if not every seme-			
	less st	ated otherwise, successf			e components as specified be- successful completion of all indi-			
tal med • 3 • w Assess	icine, e ECTS, I rritten e ment ir	engineering and natural s Method of grading: nume examination (approx. 60 a module component o8-	ccience prical grade minutes) IOC-2-062: Organic (Chemistry Lab for eng	s of medicine, biomedicine, den- gineering students			
 V te O Assessi 3 	ortesta estate (nly afte ment ir ECTS,	post-experiment exams, er successful completion	s, approx. 15 minutes approx. 15 minutes e of module compone IOC-3-062: Tutorial c erical grade	each), assessment o each) nts: 08-IOC-1	of practical performance, Nach- istry Lab for engineering students			
Allocati								
Additio	nal info	ormation						
Worklo	ad							
Peferre	d to in	LPO I (examination regu	lations for toaching	lagrae programmes)				
			actions for teaching-(
Module	appea	rs in						
	Module appears in							

Bachelor' degree (1 major) Technology of Functional Materials (2009) Bachelor' degree (1 major) Technology of Functional Materials (2006)

Module	e title				Abbreviation	
Physic	al Cher	nistry for engineering st	udents		08-IPC-062-m01	
Module	e coord	inator		Module offered by		
lab course supervisor "Physikalische Chemie für Studier					l and Theoretical Chemistry	
		eurwissenschaften, Prakt		,	,	
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
20		rical grade				
Duratio		Module level	Other prerequisites			
1 seme		undergraduate]			
Conten						
		rovides students with a e fundamental technique			physical chemistry. In additic	on, it
Intend	ed lear	ning outcomes				
		e become familiar with th problems in chemistry ar			nistry. They are able to ident	ify
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	n)	
This mo compo		omprises 3 module com	ponents. Information	on courses will be li	sted separately for each mod	ule
• c	08-IPC-1				ourse language available) ourse language available)	
		3-062: P (no information				
		sessment (type, scope, la on on whether module o			tion offered — if not every se	me-
					e components as specified be	a.
	nless st	ated otherwise, success			successful completion of all i	
engine studen	ering st ts Lecti		es Physical Chemistry		lynamics, electrochemistry) fo electrochemistry) for engined	
troscop gineeri	oy) for e ng stuc	engineering students Phy	vsical Chemistry 2 (ba		of quantum mechanics and s chanics and spectroscopy) fo	
Assess	ment i	examination (approx. 90 n module component o8 Method of grading: (not)	-IPC-3-062: Physical		ering students, laboratory co	urse
Allocat	ion of _l	olaces				
 - ؛ ! د ! م						
Aaditio 	onal inf	ormation				
Worklo	ad					
Referre	ed to in	LPOI (examination reg	ulations for teaching-	degree programmes)		
Module	e appea	ars in				
		jor Technology of Functional		nerated 11-Jan-2023 • exam. r		47
Aaterials (:	2006)		Bachelor (180 ECTS)	Technologie der Funktionsw	erkstoffe - 2006	

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

Module	e title				Abbreviation
Chemic	ally an	d biologically inspired N	lanotechnology for M	aterials Synthesis	08-NT-091-m01
Module	e coord	inator		Module offered by	
holder thesis	of the (Chair of Chemical Techno	ology of Material Syn-	Chair of Chemical T	echnology of Material Synthesis
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
of analy	ysis us		nerated materials. It	also discusses the f	istry and discusses the methods undamental principles of biomi- ynthesis.
Intende	ed leari	ning outcomes			
Studen	ts have	e developed an advanced	l knowledge of sol-ge	l chemistry and bior	nineralisation.
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	ın)
compoi • 0	nent. 98-NT-1-	091: V (no information o -091: V (no information c	n SWS (weekly conta	ct hours) and course	
ster, in	formati	on on whether module c	an be chosen to earn	a bonus)	ition offered — if not every seme
	iless st	ated otherwise, success			e components as specified be- successful completion of all indi
als Syn 2 0 Assess thesis 3	thesis ECTS, ral exa ment in ECTS,	Method of grading: num mination (approx. 15 mir	erical grade nutes) -NT-2-091: From Biom erical grade		spired Nanotechnology for Mater ogically inspired Materials Syn-
Allocat		••			
			-		
Additio	nal inf	ormation			
Auditio					
 Worklo					
WUIKIO	au		-		
 Def-					
Keterre	a to in	LPOI (examination regu	liations for teaching-o	legree programmes)	
		•			
Module					
	-	ree (1 major) Technology		-	
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	als (2006)	

Modul	e title				Abbreviation	
Progra	Programming course for Chemistry Majors 08-PKC-072-m01					
Modul	e coord	inator		Module offered by	<u> </u>	
lecture	er of lec	ture "Programmierkurs fü	ir Chemiker"	Institute of Physica	l and Theoretical Chemistry	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate	Registration for ass	essment: Yes, as spe	ecified.	
Conter	nts					
		provides an introduction t d to problems in chemist		of a programming lar	nguage and discusses how they	
Intend	ed lear	ning outcomes				
Studer chemis		able to describe the fund	amentals of the prog	ramming language a	nd to apply them to problems in	
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	n)	
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		s essment (type, scope, la ion on whether module c			tion offered — if not every seme-	
practic	al exar	nination: completion of p	orogramming exercise	S		
Allocat	tion of	places				
Additio	onal inf	ormation	-			
Worklo	bad					
Referre	ed to in	LPO I (examination regu	llations for teaching-	degree programmes)		
Modul	e appea	ars in				
		ree (1 major) Chemistry (2007)			
	-	ree (1 major) Chemistry (• •			
	-	ree (1 major) Technology		als (2006)		

Module title Abbreviation					
Sol-Ge	l Chem	istry 1: Basics			08-SGC-062-m01
Modul	e coord	inator		Module offered by	<u> </u>
holder thesis	ofthe	Chair of Chemical Techno	logy of Material Syn-	Chair of Chemical T	echnology of Material Synthesis
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
2	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
		provides an introduction t ed to characterise the ge		ods of sol-gel chem	istry and discusses the methods
Intend	ed lear	ning outcomes			
Studer	nts have	e developed an advanced	l knowledge of sol-ge	l chemistry.	
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)
V (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language available	e)
		s essment (type, scope, la ion on whether module c			ation offered — if not every seme-
oral ex	aminat	ion (approx. 15 minutes)			
Allocat	tion of	places			
Additio	onal inf	ormation			
Worklo	ad				
Referre	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)	
			U		
Modul	e appea	ars in			
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	als (2006)	

Module title Abbreviation					Abbreviation
Data bases					10-l-DB-072-m01
Module	coord	inator		Module offered by	
Dean of	Studie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Content	ts				
Relatior saction	-		atements; database	olanning and normal	l forms; xml data modelling; tran-
Intende	d lear	ning outcomes			
		oossess a knowledge abo g in XML.	out database modelli	ng and queries in SC	L, transactions as well as easy
Courses	s (type,	, number of weekly conta	ct hours, language —	if other than Germa	n)
V + Ü (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		essment (type, scope, la on on whether module ca			tion offered — if not every seme-
		nation (50 minutes) or ora 5 minutes)	al examination (one c	andidate each: 15 m	ninutes, groups of 2: 20 minutes,
Allocati	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
Referre	d to in	LPOI (examination regu	lations for teaching-c	legree programmes)	
Module	appea	irs in			
Bachelo	or' deg	ree (1 major) Computer Se	cience (2007)		
	-	ree (1 major) Mathematic			
	-	ree (1 major) Mathematic			
	-	ree (1 major) Technology		-	
	-	ree (1 major) Technology			
		ree (1 major) Business Inf			
		ree (1 major) Business Inf			
	0	ree (1 major) Business Inf	, , ,	,	
	-	ree (1 major) Computation		•	
Bachelo	Bachelor' degree (1 major) Technology of Functional Materials (2006)				

Module	e title				Abbreviation
Introdu	iction t	o computer science of al	faculties		10-I-EPIN-062-m01
Module coordinator M				Module offered by	
Dean o	f Studie	es Informatik (Computer	Science)	Institute of Comput	er Science
ECTS		od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Repres	entatio	n of information and web	sites (HTML, XML, El	BNF), databases, pro	ogramming (Java).
Intende	ed learı	ning outcomes			
		possess a basic knowled s and programming in Jav		ntation of informatio	n and websites (HTML, XML, EB-
Course	s (type	, number of weekly conta	ct hours, language –	· if other than Germa	n)
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		s essment (type, scope, la on on whether module ca			tion offered — if not every seme-
		nation (50 minutes) or ora 5 minutes)	al examination (one c	andidate each: 20 n	ninutes, groups of 2: 25 minutes,
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)	
Module	e appea	irs in			
		ree (1 major) Technology	of Functional Materia	ils (2009)	
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	Ils (2010)	
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	ıls (2006)	

Modul	e title				Abbreviation
Compu	uterorie	nted Mathematics			10-M-COM-072-m01
Modul	e coord	inator		Module offered by	
Dean o	of Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
3	(not)	successfully completed			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conte	nts				
rical co 10-M-L	omputa .NA). Co	tion (e. g. Matlab) to sup	plement the basic mo f problems in linear a	odules in analysis ar	Nathematica or Maple) and nume- nd linear algebra (10-M-ANA and nalysis, in particular differential
Intend	ed lear	ning outcomes			
		earns the use of advanced cation to solve mathema		cal software package	es, and is able to assess their
Course	es (type	, number of weekly conta	ict hours, language –	- if other than Germa	ın)
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, la ion on whether module ca			tion offered — if not every seme-
projec	t in the	form of programming exe	rcises (expenditure o	of time as specified a	at the beginning of the course)
Alloca	tion of _l	places			
Additi	onal inf	ormation			
Workle	oad				
Referr	ed to in	LPOI (examination regu	lations for teaching-	degree programmes)	
	e appea				
		ree (1 major) Computer S			
		ree (1 major) Mathematic			
		ree (1 major) Physics (200 ree (1 major) Technology		als (2006)	
Dacile	ioi ueg	iee (I major) recimology	or runctional materia	115 (2000)	

Module	e title				Abbreviation		
Introdu	iction t	o Functional Analysis			10-M-FAN-072-m01		
Module	Module coordinator			Module offered by			
Dean of	f Studie	es Mathematik (Mathe	matics)	Institute of Mathematics			
ECTS Method of grading Only after succ. compl. of module(s)							
5		rical grade					
Duratio	· · · · · ·	Module level	Other prerequisites				
Duration Module level 1 semester undergraduate		Certain prerequisite sessment. The lectu at the beginning of sidered a declaratio dents have obtained the course of the se sessment into effec ted to assessment i sessment at a later	Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for				
			admission to asses	sment anew.			
Conten	ts						
Banach	i space	s and Hilbert spaces, I	oounded operators, pri	nciples of functional	analysis.		
Intende	ed learn	ning outcomes					
methoo broad a	ls, is al applica	ole to apply methods f bility of the theory to o	concepts and methods rom linear algebra and ther branches of mathe ntact hours, language –	analysis to functiona ematics.	al analysis, and reali		
		· · · · · ·	ly contact hours) and co				
Method	d of ass	essment (type, scope,	language — if other th can be chosen to earn	an German, examina		every seme-	
written by an o 2, appr	examir ral exa ox. 30 I	nation (approx. 90 min mination of one candio minutes)	utes); if announced by date each (approx. 20 r nglish if agreed upon w	the lecturer, the writ ninutes) or an oral ex		•	
Allocat	ion of p	olaces					
Additio	nal info	ormation					
Worklo	ad						
Referre	d to in	LPOI (examination re	gulations for teaching-	degree programmes)			
		hematik Analysis					
Module							
Bachelo Bachelo Bachelo Bachelo Bachelo Bachelo	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's Materials (2		or Technology of Functional		nerated 11-Jan-2023 • exam. ı I Technologie der Funktionsw	-	page 29 / 47	

Julius-Maximilians-UNIVERSITÄT WÜRZBURG

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)

Ordinary Differenti				Abbreviation		
oralitary Differentia	al Equations			10-M-ODE-082-m01		
Module coordinato			Madula offered by			
			Module offered by			
	Dean of Studies Mathematik (Mathematics) Institute of Mathematics					
ECTS Method of		Only after succ. com	ipl. of module(s)			
5 numerical grade						
· · · · · ·	ule level	Other prerequisites				
1 semester undergraduate		Certain prerequisites must be met to qualify for admission to as- sessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be con- sidered a declaration of will to seek admission to assessment. If stu- dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for as- sessment into effect. Students who meet all prerequisites will be admit- ted to assessment in the current or in the subsequent semester. For as- sessment at a later date, students will have to obtain the qualification for			ctive details ill be con- nt. If stu- ssment over ation for as- ill be admit- ster. For as-	
		admission to assess	sment anew.			
ferential equations Intended learning of	, matrix exponent outcomes	continuous dependanc ial series, linear differe	ntial equations of hi	gher order.		
		Indamental concepts a nese methods to praction		heory of ordinary dif	erential	
Courses (type, num	ber of weekly con	tact hours, language —	if other than Germa	ın)		
V + Ü (no informatio	on on SWS (weekl	y contact hours) and co	ourse language avail	able)		
		language — if other tha can be chosen to earn		tion offered — if not	every seme-	
by an oral examination 2, approx. 30 minut	tion of one candic tes)	utes); if announced by late each (approx. 20 n nglish if agreed upon w	ninutes) or an oral ex			
Allocation of places		<u> </u>				
	-					
Additional information	tion					
Warklasd						
Workload						
Referred to in LPO	l (examination reg	gulations for teaching-o	legree programmes)			
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) Technology of Functional Materials (2010) Bachelor' degree (1 major) Economathematics (2009) Bachelor' degree (1 major) Economathematics (2008)						
					page 31 / 47	

Julius-Maximilians-UNIVERSITÄT WÜRZBURG

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

Module title					Abbreviation					
Mathematics 1 for students of Technology of Functional Materials					10-M-TFU1-062-m01					
Modul	e coord	linator		Module offer	ed by					
Dean c	of Studi	es Mathematik (Mather	natics)	Institute of M	athematics					
ECTS		od of grading	Only after succ. con	npl. of module	(s)					
8	nume	rical grade								
Durati	on	Module level	Other prerequisites	;						
1 seme	ster	undergraduate								
Conter	nts									
		nbers and functions, se le differential equations		ifferential and	integral calculus in one variable, vecto					
Intend	ed lear	ning outcomes								
Course V + Ü (es (type no info	interpret the results. e, number of weekly con rmation on SWS (weekly	/ contact hours) and co	ourse language	e available)					
		sessment (type, scope, ion on whether module			amination offered — if not every seme-					
Allocat	tion of	places								
Additio	onal inf	formation								
Worklo	bad									
Referre	ed to in	LPOI (examination reg	ulations for teaching-	degree prograr	nmes)					
Modul	e appe	ars in								

Module title					Abbreviation	
Mathematics 2 for students of Technology of Functional Materia				aterials	10-M-TFU2-062-m01	
Modul	e coord	linator		Module offered	by	
Dean o	of Stud	ies Mathematik (Mathem	atics)	Institute of Matl	nematics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
7	nume	erical grade				
Durati	on	Module level	Other prerequisites	i		
1 seme	ester	undergraduate				
Conte	nts					
		and systems of linear equivariables, differential ec			eory, differential and integral calcu-	
Intend	ed lear	ning outcomes				
Course V + Ü (Metho	es (type (no info od of as	le to interpret the results e, number of weekly cont rmation on SWS (weekly	act hours, language – contact hours) and co	ourse language a		
	IIUIIIai	ion on whether module			ination offered — if not every seme-	
	_	ion on whether module of			•	
 Alloca	tion of	ion on whether module of			•	
	tion of	ion on whether module of places			•	
	tion of	ion on whether module of			•	
	tion of	ion on whether module of places			•	
	tion of onal in	ion on whether module of places			•	
 Additio	tion of onal in	ion on whether module of places			•	
 Additio Worklo	tion of onal in oad	ion on whether module of places	can be chosen to earn	a bonus)	ination offered — if not every seme-	
 Additio Worklo	tion of onal in oad	ion on whether module of places	can be chosen to earn	a bonus)	ination offered — if not every seme-	
 Additio Worklo Referro 	tion of onal in oad	ion on whether module of places	can be chosen to earn	a bonus)	ination offered — if not every seme-	

Module title Abbreviation					
Introdu	iction t	o Physics Part 1 for stude	ed Minor Subjects	11-ENNF1-062-m01	
Module coordinator Module offered by					
		ector of the Institute of Ar	nlied Physics	Faculty of Physics a	and Astronomy
ECTS	<u> </u>	od of grading	Only after succ. com	· · · · · · · · · · · · · · · · · · ·	
7		rical grade			
, Duratio		Module level	Other prerequisites		
1 seme		undergraduate			
Conten	ts		<u> </u>		
		bration theory, thermody	namics		
		ning outcomes			
		have basic knowledge of	nhysics for engineeri	ng students	
		, number of weekly conta		-	n)
					•
		mation on SWS (weekly o			•
		sessment (type, scope, la on on whether module ca			tion offered — if not every seme-
		nation (approx. 120 minu	les)		
Allocat			(4.5.0)		11 1 .
		f pool of general key skill	s (ASQ): 20 places. P	laces will be allocat	ed by lot.
Additio	nal inf	ormation			
Worklo	ad				
Referre	d to in	LPOI (examination regu	lations for teaching-o	legree programmes)	l
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Mathematic	s (2008)		
	-	ree (1 major) Mathematic			
	-	ree (1 major) Mathematic			
	-	ree (1 major) Mathematic	-		
	-	ree (1 major) Mathematic			
		ree (1 major) Technology			
	-	ree (1 major) Technology			
	-	ree (1 major) Computatio		•	
		ree (1 major) Computatio			
	-	ree (1 major) Computatio			
	-	ree (1 major) Computatio ree (1 major) Aerospace (-	
	-	ree (1 major) Aerospace (ree (1 major) Aerospace (•	
	-	ree (1 major) Aerospace (ree (1 major) Aerospace (•	•	
	-	ree (1 major) Functional N	•	· · · · ·	
		ree (1 major) Technology		ls (2006)	

Module title Abbreviation					Abbreviation	
Introdu	uction t	o Physics Part 2 for stud	ed Minor Subjects	11-ENNF2-062-m01		
Module	Module coordinator Module offered by					
		ector of the Institute of Ap	plied Physics	Faculty of Physics a	and Actronomy	
ECTS	-	od of grading	Only after succ. com			
7		rical grade				
, Duratio		Module level	Other prerequisites			
1 seme		undergraduate				
Conten	its					
		ctricity, magnetism, optic	Atomic Physics			
		ning outcomes	.s, Atomic i flysics.			
	-					
		have basic knowledge of	· ·	-	`	
		, number of weekly conta				
		mation on SWS (weekly o				
					tion offered — if not every seme-	
		on on whether module ca		a bonus)		
		nation (approx. 120 minu	tes)			
Allocat						
Only as	s part o	f pool of general key skill	s (ASQ): 20 places. P	laces will be allocat	ed by lot.	
Additio	onal inf	ormation				
Worklo	ad					
Referre	ed to in	LPOI (examination regu	lations for teaching-c	legree programmes)		
Module	e appea	ars in				
		ree (1 major) Mathematic	s (2008)			
	-	ree (1 major) Mathematic				
Bachel	or' deg	ree (1 major) Mathematic	s (2012)			
Bachel	or' deg	ree (1 major) Mathematic	s (2013)			
Bachel	or' deg	ree (1 major) Mathematic	s (2007)			
	-	ree (1 major) Technology		-		
	-	ree (1 major) Technology				
	-	ree (1 major) Computatio		-		
	-	ree (1 major) Computatio		•		
Bachel	or' deg	ree (1 major) Computatio	nal Mathematics (20:	12)		
	-	ree (1 major) Computatio		-		
		ree (1 major) Aerospace (
Bachel	or' deg	ree (1 major) Aerospace (Computer Science (20	914)		
Bachel	or' deg	ree (1 major) Aerospace (Computer Science (20	011)		
		ree (1 major) Functional N				
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	ls (2006)		

Module	e title				Abbreviation
Mathe	Mathematics 3 for students of Physics and Engineering				11-MPI3-062-m01
Module coordinator				Module offered by	
Manag and As		ector of the Institute of T	heoretical Physics	Faculty of Physics a	and Astronomy
ECTS	1	od of grading	Only after succ. con	npl. of module(s)	
8		rical grade			
Duratio	I	Module level	Other prerequisites		
		undergraduate			successful completion of approx.
1 semester undergraduate			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 ad-		
					n the subsequent semester. For
					l have to obtain the qualification
			for admission to as	sessment anew.	
Conten	lts				
Ordina	ry and	partial differential equat	tions in Physics.		
Intend	ed lear	ning outcomes			
		have basic mathematica ntial equations.	Il knowledge of dynan	nic equations and so	lution methods for common and
Course	s (type	, number of weekly cont	act hours, language –	– if other than Germa	in)
V + Ü (ı	no infoi	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, l ion on whether module			tion offered — if not every seme-
written	exami	nation (approx. 120 min	utes)		
Allocat					
Allocat			_		
- : -: ا ـ ا م	nal !	ormation			
AUGITIC	mat inf	ormation			
Worklo	ad				
Referre	ed to in	LPOI (examination reg	ulations for teaching-	degree programmes)	
Module	e appea	ars in			
	-	ree (1 major) Physics (20			
	-	ree (1 major) Physics (20	•		
	-	ree (1 major) Physics (20			
	-	ree (1 major) Technolog		-	
	-	ree (1 major) Technolog			
	-	ree (1 major) Nanostruci			
	-	ree (1 major) Nanostruct			
васhel	or deg	ree (1 major) Nanostruci	ture Technology (2008	5)	
	•.1	ior Technology of Functional	INTLA Combuse a se	nerated 11-lan-2023 • exam. I	reg. data record page 37 / 47



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

Module title Abbreviation					Abbreviation
Basics	of Nan	ostructureTechnology			11-N1-072-m01
Modul	e coord	inator		Module offered by	
Manag	ing Dire	ector of the Institute of A	pplied Physics	Faculty of Physics a	and Astronomy
ECTS		od of grading	Only after succ. con		,
6		rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
Princip	les of p	producing, characterising	and applying nanost	ructures.	
		ning outcomes	<u> </u>		
	-		undamental propertie	s, technologies, cha	racterising methods and functi-
ons of	nanost	ructures.			
Course	s (type	, number of weekly conta	act hours, language –	- if other than Germa	an)
V + S (1	no infoi	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
ster, in	format	ion on whether module c nation (approx. 90 minut	an be chosen to earn		ition offered — if not every seme-
Allocat	ion of	olaces			
Additic	onal inf	ormation			
Worklo	ad				
Referre	ed to in	LPOI (examination regu	 ulations for teaching-(degree programmes)	
		, U		<u> </u>	
Module	e appea	ars in			
Bachel	or' deg	ree (1 major) Physics (20	08)		
Bachelor' degree (1 major) Technology of Functional Materials (2009)					
Bachelor' degree (1 major) Technology of Functional Materials (2010)					
Bachel	or' deg	ree (1 major) Nanostruct	ure Technology (2008)	
	-	ree (1 major) Nanostruct)	
		gree (1 major, 1 minor) Pl	•		
Bachelor' degree (1 major) Technology of Functional Materials (2006)					

Module title					Abbreviation	
Physics Laboratory Course for students of Physics Related N			s of Physics Related	Minor Subjects	11-PNNF-062-m01	
Module	a coord	inator		Module offered by	Madula affarad by	
		ector of the Institute of Ar	polied Physics	Faculty of Physics a	and Astronomy	
ECTS	<u> </u>	od of grading	Only after succ. com	· · ·		
3	1	Successfully completed				
Duratio		Module level	Other prerequisites			
1 seme		undergraduate				
Conten		undergraduate	<u> </u>			
		bration theory, thermody	namics, optics, X-ray	s, nuclear magnetic	resonance, Atomic and Nuclear	
Physics	5.					
Intende	ed lear	ning outcomes				
The stu	dents l	know the principles of Ph	ysics.			
Course	s (type	, number of weekly conta	ct hours, language –	- if other than Germa	an)	
P (no ir	format	ion on SWS (weekly cont	act hours) and cours	e language availabl	e)	
		-			ation offered — if not every seme-	
		on on whether module ca			interest in her every senie	
a) oral	test (ap	prox. 15 minutes) during	experiment and b) u	ngraded written exa	mination (approx. 90 minutes)	
Allocat		· · · · · · · · · · · · · · · · · · ·	· · · ·			
Only as	part o	f pool of general key skill	s (ASQ): 15 places. P	laces will be allocat	ed by lot.	
		ormation			,	
Worklo	ad					
Poforro	d to in	LPOI (examination regu	lations for toaching	logroo programmos		
Referre		LFUT (examination regu		legiee programmes)	
Module	annes	urs in				
		ree (1 major) Mathematic	s (2008)			
		ree (1 major) Mathematic				
		ree (1 major) Mathematic				
		ree (1 major) Mathematic				
	-	ree (1 major) Mathematic	-			
		ree (1 major) Technology		als (2009)		
	Bachelor' degree (1 major) Technology of Functional Materials (2010)					
	-	ree (1 major) Computatio				
	-	ree (1 major) Computatio		•		
Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2012)						
Bachel	Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013)					
	or' deg	ree (1 major) Computatio	nal Mathematics (20:	13)		
Bachel	-	ree (1 major) Computatio ree (1 major) Functional N	-	13)		

Module title Abbreviation							
Physic	Physical Technology of Material Synthesis, laboratory course 11-PPT-062-m01						
Module	e coord	inator		Module offered by			
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics a	and Astronomy		
ECTS		od of grading	Only after succ. con	npl. of module(s)			
4	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Growth	and co	oating procedures, metho	ds of characterisatio	n and exemplary str	ucturing technologies.		
Intend	ed lear	ning outcomes					
The stu terial s			actical basics of mat	erial characterisatio	n and physical technology for ma-		
Course	s (type	, number of weekly conta	ict hours, language –	- if other than Germa	an)		
P (no ir	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	e)		
		s essment (type, scope, la on on whether module ca			tion offered — if not every seme-		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	e appea	ars in					
Bachel	or' deg	ree (1 major) Technology	of Functional Materia	als (2006)			

Module title Abbreviation					Abbreviation
Physical Technology of Material Synthesis. Lecture, exercises 11-TMS-062-m01					
Modul	e coord	linator		Module offered I	by
Manag	ing Dir	ector of the Institute of A	pplied Physics	Faculty of Physic	s 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 seme	ester	undergraduate			
Conter	nts				
		nd practical principles of cturing technology, grow	•	• / ·	electrics, metals and oxides. Prin-
Intend	ed lear	ning outcomes			
The stu thesis	udents	have knowledge of the t	heoretical and practic	al principles of ph	ysical technology for material syn-
Course	es (type	, number of weekly cont	act hours, language –	- if other than Ger	man)
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language av	ailable)
		sessment (type, scope, l ion on whether module (ination offered — if not every seme-
Allocat	tion of	places			
Additio	onal inf	ormation			
Worklo	bad				
Referre	ed to in	LPOI (examination reg	ulations for teaching-	degree programm	es)
	-				
-					
Modul	e appe	ars in			

Module title Abbreviation					Abbreviation
Compu	Computer-based Construction and Assembly				99-CA-062-m01
Modul	e coord	inator		Module offered by	<u> </u>
		culty of Mechanical Engi lied Sciences Würzburg-S	-	University of Applic furt (FHWS)	ed Sciences Würzburg- Schwein-
ECTS		od of grading	Only after succ. cor	npl. of module(s)	
5	nume	rical grade			
Durati	on	Module level	Other prerequisites	6	
1 seme	ester	undergraduate			
Conter	nts				
•		ve view of the process of ted example.	product developmer	it, including the corr	esponding specialist subjects ba-
Intend	ed lear	ning outcomes			
		•	U		opment of products with a focus typing and product validation.
Course	es (type	, number of weekly conta	act hours, language -	– if other than Germa	an)
V + Ü (no infoi	mation on SWS (weekly	contact hours) and c	ourse language avai	lable)
		essment (type, scope, la on on whether module c			ation offered — if not every seme-
Alloca	tion of _l	olaces			
Additi	onal inf	ormation			
Workle	oad		-		
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	e appea	urs in			
		ree (1 major) Technology	of Functional Materi	als (2006)	

Module title Abbreviation					Abbreviation
Basics	of Elec	tronics 1			99-EL1-062-m01
Modul	e coord	inator		Module offered by	
				University of Applie	ed Sciences Würzburg- Schwein-
	<u> </u>	Sciences Würzburg-Schw		furt (FHWS)	
ECTS		od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts				
Theore tors.	tical an	d practical principles of	science of electricity,	passive linear netw	orks, principles of semiconduc-
Intend	ed lear	ning outcomes			
		have basic knowledge of semiconductors.	theoretical and pract	ical science of elect	ricity, especially of passive linear
Course	es (type	, number of weekly conta	act hours, language –	- if other than Germa	an)
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avai	able)
		sessment (type, scope, la ion on whether module c			ation offered — if not every seme-
Allocat	tion of p	olaces			
			-		
Additio	onal inf	ormation			
Worklo	ad				
Referre	ed to in	LPOI (examination regu	llations for teaching-o	degree programmes))
Modul	e appea	ars in			
Bachel	lor' deg	ree (1 major) Technology	of Functional Materia	als (2006)	

Module title Abbreviation					Abbreviation	
Basics	Basics of Electronics 2				99-EL2-062-m01	
Modul	e coord	inator		Module offered by		
		culty of Electrical Engine Sciences Würzburg-Schwe		University of Applie furt (FHWS)	d Sciences Würzburg- Schwein-	
ECTS	1	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
		d practical principles of t logy, combinatorial circui	•		basic circuits, basic elements of	
Intend	ed lear	ning outcomes				
		nave theoretical and prac ements of digital technol			ectrical engineering, basic cir- al circuits.	
Course	es (type	, number of weekly conta	ct hours, language –	· if other than Germa	n)	
V + Ü (no infoi	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		e ssment (type, scope, la on on whether module ca			tion offered — if not every seme-	
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	bad					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	e appea	irs in				
	• •	ree (1 major) Technology	of Functional Materia	Ils (2006)		

Modul	e title		Abbreviation					
Labora	atory Co	ourse of Engineering (al engineering)	99-IP-062-m01				
Modul	e coord	linator		Module offered by				
chanic	al Engi	Faculties of Electrical neering at the Univers weinfurt	Engineering and Me- ity of Applied Sciences	University of Applied Sciences Würzburg- Schwein- furt (FHWS)				
ECTS	Meth	od of grading	Only after succ. cor	nly after succ. compl. of module(s)				
5	nume	rical grade		· · · ·				
Duration Module level			Other prerequisites	Other prerequisites				
1 semester undergraduate		undergraduate						
Conte	nts							
Engine	ering la	aboratory and internsl	hip experiments.					
Intend	ed lear	ning outcomes						
The sturing.	udents	have practical experie	ences in applying engine	ering methods in e	electrical and mechanical enginee-			
Course	es (type	, number of weekly co	ontact hours, language –	– if other than Gerr	nan)			
P (no i	nforma	tion on SWS (weekly o	contact hours) and cours	se language availal	ole)			
			e, language — if other th le can be chosen to earn		nation offered — if not every seme			
Alloca	tion of	places						
Additi	onal inf	ormation						
Workle	oad							
Referr	ed to in	LPOI (examination r	regulations for teaching-	degree programme	es)			
-		•						
Modul	e appea	ars in						

Module title Abbreviation									
Fundamentals of Engineering Mechanics 99-TM-062-mo1									
Module	e coord	inator		Module offered by					
		aculty of Mechanical Engi lied Sciences Würzburg-S	-	University of Applied Sciences Würzburg- Schwein- furt (FHWS)					
ECTS		od of grading		ter succ. compl. of module(s)					
5		rical grade							
Duration Module level		Other prerequisites							
1 semester		undergraduate							
Contents									
Basics of statistics, strength of materials and dynamics.									
Intende	ed lear	ning outcomes							
The students have methodological competencies in determining forces and stress resultants, in calculating ten- sions and deformations and in dimensioning components.									
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 seme- ster, information on whether module can be chosen to earn a bonus)									
written examination (90 minutes)									
Allocation of places									
Additional information									
Workload									
Referred to in LPO I (examination regulations for teaching-degree programmes)									
Module appears in									
Bachelor' degree (1 major) Technology of Functional Materials (2009)									
	Bachelor' degree (1 major) Technology of Functional Materials (2010)								
Bachelor' degree (1 major) Technology of Functional Materials (2006)									