

Module Catalogue

for the Subject

Functional Materials

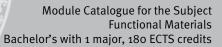
as a Bachelor's with 1 major with the degree "Bachelor of Science" (180 ECTS credits)

Examination regulations version: 2015 Responsible: Faculty of Chemistry and Pharmacy Responsible:

JMU Würzburg • generated 18-Apr-2025 • exam. reg. data record 82|g81|-|-|H|2015

Contents

The subject is divided into		4
Learning Outcomes		5
Abbreviations used, Conven	tions, Notes, In accordance with	7
Compulsory Courses		8
Mathematics		9
Mathematics 1 for Students of Fu	nctional Materials	10
Mathematics 2 for Students of Fu		11
	ysics and related Disciplines (Differential Equations)	12
Modules Mathematics/Sta		14
Classical Physics 1 for Students of		15
Classical Physics 2 for Students of		17
Introduction to the Physics of Fu	Idents of Physics Related Disciplines	19 20
Chemistry		
Experimental Chemistry		21 22
General and analytical Chemistry	Lab for engineering students	27
Organic Chemistry 1		28
Organic Chemistry 2		33
Organic Chemistry for engineering		35
Thermodynamics, Kinetics, Electr	,	36
	and spectroscopy for engineering students	38
Physical Chemistry (lab) for engir Molecular Materials (Lecture)		40 41
Molecular Materials (Practical Co	urse)	41
Engineering		44
Basics of Electronics 1		45
Basics of Electronics 2		46
Biology / Medicine		47
Principles of Cell Biology and Tis		48
Biomaterials (Lecture and Practic		49
Advanced Laboratory Cour		50
Advanced Laboratory Course of F	unctional Materials	51
Compulsory Electives		52
Engineering		53
Basics of Applied Mechanics		54
Laboratory Course of Mechanical		55
Construction, Calculation and As	semply of Technical Products	56
Physics		57
Introduction to Nanoscience Laboratory Course Physical Techr	pology of Material Synthesis	58
Data and Error Analysis	lology of material Synthesis	59 60
Mathematics and Compute	er Science	62
Computational Mathematics		63
Ordinary Differential Equations fo	r students of other subjects	65
Introduction to Functional Analys		67
Numerical Mathematics 1 for stud	-	68
Numerical Mathematics 2 for students		70
Databases	of Mathematics and other subjects	71 73
Introduction to Computer Science	e for Students of all Faculties	75
·		
Bachelor's with 1 major Functional Materials (2015)	JMU Würzburg • generated 18-Apr-2025 • exam. reg. da- ta record Bachelor (180 ECTS) Funktionswerkstoffe - 2015	page 2 / 106



Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Chemistry	76
Programming and numerical methods	77
Biochemistry 1	78
Quantum Chemistry	80
Applied Spectroscopy 3	82
Practical spectroscopy 1	83
Chemically and bio-inspired Nanotechnology for Material Synthesis	84
Medicine	86
Physical Technology of Material Synthesis (Lecture and Practical Course)	87
Polymer Chemistry 1 (Lecture and Practical Course)	88
Principles of Tissue Engineering	90
Additional Qualifications	91
Industrial Internship (Short)	92
Foreign Studies (Short)	93
Courses Related to Functional Materials outside of the Natural Sciences	94
Courses Related to Functional Materials inside of the Natural Sciences	95
Key Skills Area	96
General Key Skills	97
Subject-specific Key Skills	98
Material Science 1 (Basic introduction)	99
Material Science 2 (The Material Groups)	101
Modern Bio Analytical Methods (Lecture and practical course)	103
Thesis	104
Bachelor Thesis Functional Materials Research	105
Bachelor Thesis Functional Materials Defense	106



The subject is divided into

section / sub-section	ECTS credits	starting page
Compulsory Courses	128	8
Mathematics		9
Modules Mathematics/Statistics		14
Chemistry		21
Engineering		44
Biology / Medicine		47
Advanced Laboratory Course		50
Compulsory Electives	20	52
Engineering		53
Physics		57
Mathematics and Computer Science		62
Chemistry		76
Medicine		86
Additional Qualifications		91
Key Skills Area	20	96
General Key Skills	5	97
Subject-specific Key Skills	15	98
Thesis	12	104

Learning Outcomes

German contents and learning outcome available but not translated yet.

Wissenschaftliche Befähigung

- Die Absolventinnen und Absolventen können ein breites interdisziplinäres Grundlagenwissen aus den wichtigsten Disziplinen der Materialwissenschaften abrufen. Die Absolventinnen und Absolventen verstehen die mathematischen, theoretischen und experimentellen Grundlagen der Materialwissenschaften und können diese anwenden. Sie besitzen Abstraktionsvermögen, analytisches Denken, Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren. Zudem sind sie in der Lage, die mannigfaltigen Inhalte der Vorlesungen aufzunehmen, schriftlich zu dokumentieren sowie durch die Vor- und Nachbereitung den Stoff für die Prüfungsvorbereitung zu gliedern und zu ordnen. Die Grundlagen hierfür werden in Vorlesungen und Übungen der Chemie, Mathematik und Physik vermittelt und mittels Klausuren überprüft.
- Die Absolventinnen und Absolventen können unter Anleitung Experimente durchführen, analysieren und die erhaltenen Ergebnisse darstellen und bewerten. Vermittelt werden diese Fähigkeiten im Rahmen von Laborpraktika während des Studiums. Die Überprüfung der Zielerreichung findet durch Kolloquien, die Versuchsdurchführung und das Verfassen von Protokollen statt.
- Die Absolventinnen und Absolventen setzten die erlernten theoretischen und experimentellen Methoden unter Anleitung zur Erlangung neuer Erkenntnisse ein. Die angeleitete Anwendung der erlernten theoretischen und experimentellen Methoden findet im Rahmen der Bachelorarbeit statt. Die Absolventinnen und Absolventen sind in der Lage, sich mit Hilfe von Fachliteratur in neue Aufgabengebiete einzuarbeiten, naturwissenschaftliche Methoden unter Anleitung auf konkrete experimentelle oder theoretische Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten. Auch diese Fähigkeiten werden im Rahmen der Vorbereitung und Anfertigung der Bachelorarbeit vermittelt und durch die anschließende Bewertung der Arbeit sowie im Kolloquium überprüft. Die Absolventinnen und Absolventen können darüber hinaus ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten, was ebenfalls durch das Abschlusskolloquium zur Bachelorarbeit sowie mündliche Prüfungen im Verlauf des Studiums überprüft wird.

Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die Absolventinnen und Absolventen können mit wissenschaftlichen Methoden auch unbekannte Probleme aus unterschiedlichen fachlichen Perspektiven analysieren und bearbeiten. Der interdisziplinäre Aufbau des Studiengangs, der Elemente aus mathematisch-, ingenieurund naturwissenschaftlichen Fachbereichen vereint, fördert von Beginn an interdisziplinäres Lernen, Denken und Verstehen. Dies wird durch den Besuch von Lehrveranstaltungen der Physik, Mathematik und Chemie vermittelt und durch die erfolgreiche Absolvierung der Module bestätigt. Diese Problemlösungskompetenz können die Absolventinnen und Absolventen gewinnbringend in ihrer Berufspraxis einsetzen.
- Die Absolventinnen und Absolventen sind darüber hinaus in der Lage, theoretisches Wissen in der Praxis anzuwenden. Der Praxisbezug ist durch die eingangs genannten Kooperationspartner gegeben, sodass die Studierenden in Rahmen von Vorlesungen und Laborpraktika bereits Kontakt zu praxisorientierten außeruniversitären Forschungseinrichtungen haben. Überprüft wird diese Fähigkeit durch Kolloquien, Protokolle und nicht zuletzt die Abschlussarbeit.
- Die Absolventinnen und Absolventen können unterschiedliche Aufgaben parallel und unter Zeitund Erfolgsdruck auch bei widrigen Rahmenbedingungen erfolgreich bearbeiten. Diese Fähigkeit wird durch die Prüfungsdichte am Ende der Vorlesungszeit erlernt und befähigt die Absolventinnen und Absolventen auch im stressigen Berufsalltag Aufgaben erfolgreich zu bearbeiten.

Bachelor's with 1 major Functional Materials (2015)	JMU Würzburg • generated 18-Apr-2025 • exam. reg. da-	page 5 / 106
	ta record Bachelor (180 ECTS) Funktionswerkstoffe - 2015	

 Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in einem heterogenen Team zusammenzuarbeiten, unterschiedliche und abweichende Ansichten produktiv zur Zielerreichung zu nutzen und auftretende Konflikte zu lösen. Diese Teamfähigkeit und Konfliktkompetenz erlernen die Studierenden in der Zusammenarbeit während Laborpraktika sowie in Arbeitskreisen während der Anfertigung ihrer Bachelorarbeit.

Persönlichkeitsentwicklung

• Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie. Die Lehrenden fördern zudem die Selbstverantwortung für den Wissenserwerb sowie ein an wissenschaftlichen Werten orientiertes Denken und Handeln. Dies beinhaltet das Streben nach Erkenntnis und Wahrheit, Eindeutigkeit, Transparenz, Objektivität, Wertefreiheit, überpersönliche Gültigkeit, Überprüfbarkeit, Verlässlichkeit, Offenheit, Selbstreflexion und Redlichkeit sowie Neuigkeit. Insbesondere die Laborarbeit und das Erstellen von Protokollen sowie die anschließende Korrektur dieser stellt die Vermittlung guter wissenschaftlicher Praxis sicher.

Befähigung zum gesellschaftlichen Engagement

• Die Absolventinnen haben ihr Wissen bezüglich wirtschaftlicher, gesellschaftlicher und naturwissenschaftlicher Fragestellungen erweitert und können begründet Position beziehen. Durch die Behandlung aktueller Forschungsthemen in den Lehrveranstaltungen werden Bezüge zu wirtschaftlichen und gesellschaftlichen Fragestellungen hergestellt. Im Rahmen der Bachelorarbeit befassen sich die Studierenden ebenfalls mit aktuellen gesellschaftlich und wirtschaftlich relevanten materialwissenschaftlichen Fragestellungen, deren Kenntnisse sowie die Fähigkeit begründet Position zu beziehen im Kolloquium überprüft werden.

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:

ASPO2015

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

12-Aug-2015 (2015-82)

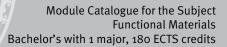
This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally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



Compulsory Courses

(128 ECTS credits)





Mathematics

(ECTS credits)

Module title Abbreviation					
Mathematics 1 for Students of Functional Materials10-M-FUN1-152-m01					10-M-FUN1-152-m01
Module coordinator Module offered					<u> </u>
Dean o	of Studio	es Mathematik (Mathema	atics)	Institute of Mathen	natics
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
		nbers and functions, seque differential equations.	uences and series, di	fferential and integr	al calculus in one variable, vector
Intend	ed lear	ning outcomes			
to simp	ole prot				learn how to apply these methods nnology of functional materials,
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V (5) + Module	• •	t in: Ü: German or Englisł	n		
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
b) oral c) oral Langua	examir examin	mination (approx. 90 to 1 nation of one candidate e ation in groups (groups o ssessment: German and bonus	ach (approx. 20 minu of 2, 15 minutes per c	ites) or	
Allocat	ion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
300 h					
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	e appea	ars in			
Bachel	or's de	gree (1 major) Functional	Materials (2015)		

Module title Abbreviation					Abbreviation
Mather	natics	2 for Students of Functio	nal Materials		10-M-FUN2-152-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	npl. of module(s)	
8	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
		ınd systems of linear equ variables, differential eqı			y, differential and integral calcu-
Intende	ed lear	ning outcomes			
method	ds to pi				tics. They learn to apply these echnology of functional materials
Course	S (type, 1	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V (5) + Module	• •	t in: Ü: German or Englisł	1		
		s essment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
b) oral c) oral (examir examir ge of a	mination (approx. 90 to 1 nation of one candidate e nation in groups of 2 cand ussessment: German and, bonus	ach (approx. 20 minu lidates (groups of 2, a	ıtes) or	per candidate)
Allocat	ion of	places			
Additio	nal inf	ormation			
Worklo	ad				
240 h					
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	appea	ars in			
Bachel	or's de	gree (1 major) Functional	Materials (2015)		
		gree (1 major) Functional			
Bachel	or's de	gree (1 major) Functional	Materials (2025)		

Module					Abbreviation		
	Mathematics 3 for Students of Physics and related Disciplines (Differential 11-M-D-152-m01 Equations) Interpretential						
Module	e coord	inator		Module offered by			
Manag and As		ector of the Institute of Th sics	neoretical Physics	Faculty of Physics a	and Astronomy		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
8	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Basics of ordinary differential equations in physics. Ordinary differential equations and systems of differential equations. Fundamentals of function theory. 1. Ordinary differential equations 1.1 Solution methods 1.2 Existence and uniqueness theorem 1.3 Systems of differential equations 1.4 Greens function for inhomogeneous problems 1.5 Hermitsche DGL, Legendre DGL 2. Function theory 2.1 Complex functions 2.2 Differentiation, holomorphic functions 2.3 Singularities in the complex 2.4 Complex integration and the Cauchy integral theorem 2.5 Laurent series, residual theorem, Fourier transformation 2.6 Analytical continuation, meromorphic functions, whole functions 2.7 gamma, beta, hypergeometric functions, sets of Weierstrasse and Mittag-Leffler 2.8 Differential equations in the complex, Bessel differential equation 2.9 Saddle point method							
		ar differential equations	of 1st order				
		ning outcomes	- 41	terred the set			
on met	hods fo	-	uations as well as th	•	quations and knowledge of soluti- ions of a complex variable and is		
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) + Module		t in: Ü: German or Englisł	n				
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if n	ot every semester, information on whether		
		nation (approx. 120 minu ssessment: German and					
Allocat	ion of p	olaces					
Additio	nal inf	ormation					

Workload

240 h

Teaching cycle

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

--

Module appears in

Bachelor's degree (1 major) Physics (2015)

Bachelor's degree (1 major) Nanostructure Technology (2015)

Bachelor's degree (1 major) Functional Materials (2015)

Bachelor's degree (1 major) Physics (2020)

Bachelor's degree (1 major) Nanostructure Technology (2020)

Bachelor's degree (1 major) Functional Materials (2021)

Bachelor's degree (1 major) Quantum Technology (2021)

exchange program Physics (2023)

Bachelor's degree (1 major) Functional Materials (2025)



Modules Mathematics/Statistics

(ECTS credits)

Module title Abbreviation						
Classical Phys	sics 1 for Students of Phy	vsics related Disciplin	ies	11-ENNF1-152-m01		
Module coord	inator		Module offered by			
Managing Dire	Managing Director of the Institute of Applied Physics			and Astronomy		
ECTS Metho	od of grading	Only after succ. con	npl. of module(s)			
7 nume	rical grade					
Duration	Module level	Other prerequisites				
1 semester	undergraduate	13 exercise sheets p approx. 50% of exer	er semester). Stude cises will qualify for	nts who successfully completed admission to assessment. The		
Contents						
DurationModule levelOther prerequisites1 semesterundergraduateAdmission prerequisite to assessment: completion of exercises (approx 13 exercise sheets per semester). Students who successfully completed approx. 50% of exercises will qualify for admission to assessment. The lecturer will inform students about the respective details at the beginnin of the semester.						

Intended learning outcomes

The students understand the basic contexts and principles of mechanics, vibration, waves and kinetic theory of gases. They are able to apply mathematical methods to the formulation of physical contexts and autonomously apply their knowledge to the solution of mathematical-physical tasks.

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

V (4) + Ü (2)

Module taught in: Ü: German or English

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)

Language of assessment: German and/or English

Allocation of places

Additional information

Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment to whose not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.

Workload

210 h

Teaching cycle

--

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

Module appears in

Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Aerospace Computer Science (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major) Aerospace Computer Science (2017) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Mathematics (2023)

Module	e title		Abbreviation			
Classic	al Phys	ics 2 for Students of Ph	nes	11-ENNF2-152-m01		
Module	Module coordinator			Module offered by		
Manag	Managing Director of the Institute of Applied Physics			Faculty of Physics a	ind Astronomy	
ECTS	CTS Method of grading Only after succ. compl. of module(s)					
7	<u> </u>	ical grade				
Duration Module level Other prerequisites						
1 seme		undergraduate	Admission prerequi	site to assessment:	completion of exerci nts who successfully	
			approx. 50% of exer	cises will qualify for	admission to assess espective details at t	sment. The
Conten	nts		of the semester.			
		mics (linked to 11-E-M);	temperature and gua	ntity of boat thorma	meter Kolvin scala	
2. Heat 3. Fund 4. Heat 5. Real phenor 6. Elect point c 7. Gaus cial syr 8. Elect equipo lace eff 9. Matt on, the 10. Cap dia in t ectric d 11. Elect 12. Res ohmic,	t conduc damenta t engine gases a mena (o trostatic harge; ssian se mmetrie trical po tertial s fects, Se ter in the ermionic bacitor, f the capa displace ctricity, i sistance NTC, PT	ction, heat transfer, diffu I theorems of thermody s, working diagrams, eff and liquids, states of ma palescence), coexistence s, basic concepts: Elect ntence, related to Could s; divergence and GS in itential, working in the E surfaces; several import egner wheel; e E-field, charge in a hor emission, dipole in hor mirror charge, definition icitor; electrical polarisa ment; electrolytic capac introduction, current de and conductivity, resist C);	usion, convection, rad mamics, entropy, irrev ficiency, example: Stin tter (also solids), van ce region, Joule-Thom crical charge, forces; e omb's law, definition of differential form; E-box, electric. potenti ant examples: Sphere mogeneous field, Mill nogeneous and inhor n, capacity; plate and ttion, displacement an citor; Piezoelectric effen nsity, drift velocity, co ivity, temperature dep	liant heat; versibility, Maxwell's rling engine; der Waals, critical p son; electric field, reps. fie of "river"; Gaussian s al, potential differer e, hollow sphere, cap ikan experiment, Bra nogeneous field; inc spherical capacitor; nd orientation polari ect; onduction mechanism pendence; Ohm's lay	demon; point, phase transition eld concept, field line surface, divergence t nce, voltage; potentia pacitor plates, electric aun tube; electron: Fi luction, Faraday cage combination of capa sation, microscopic ms; w; realisations (resis	es, field of a heorem; spe al equation, ic dipole; ield emissi- e; acitors; me- image; diel- tive and non
 13. Circuits, electrical networks, Kirchhoff's rules (meshes, nodes); internal resistance of a voltage source, measuring instruments; Wheatstone bridge; 14. Power and energy in the circuit; Capacitor charge; galvanic element; thermovoltage; 15. Transfer mechanisms, conduction in solids: Band model, semiconductor; line in liquids and gases; 16. Magnetostatics, fundamental laws; permanent magnet, field properties, definitions and units; Earth's magnetic field; Amper's Law, analogous to e-box, magn. river, swirl; 						
 gnetic field; Amper's Law, analogous to e-box, magn. river, swirl; 17. Vector potential, formal derivation, analogous to electric scalar potential; calculation of fields, examples, Helmholtz coils; 18. Moving charge in the static magnetic field, current balance, Lorentz force, right-hand rule, electric motor; dipole field; movement paths, mass spectrometer, Wien filters, Hall effect; electron: e / m determination; 19. matter in the magnetic field, effects of the field on matter, relative permeability, susceptibility; para-, dia-, ferromagnetism; magn. moment of the electron, behaviour at interfaces; 20. induction, Faraday's law of induction, Lenz's rule, flux change, eddy electric field, Waltenhofen's pendulum; inductance, self-induction; applications: Transformer, generator; 21. Maxwell's displacement current, choice of integration area, displacement current; Maxwell's extension, wave equation; Maxwell equations; 22. AC: Fundamentals, sinusoidal vibrations, amplitude, period and phase; power and RMS value, ohmic resistance; Capacitive & inductive resistor, capacitor and coil, phase shift and frequency dependence; impedance: Complex resistance; performance of the AC; 						
pole fie 19. mat ferroma 20. ind inducta 21. Max equatio 22. AC: stance	eld; mov tter in th agnetisr luction, ance,sel xwell's c on; Max : Fundar ; Capaci	vement paths, mass spen ne magnetic field, effect n; magn. moment of the Faraday's law of inducti (f-induction; application displacement current, cl well equations; nentals, sinusoidal vibr tive & inductive resistor	ectrometer, Wien filter s of the field on matter e electron, behaviour on, Lenz's rule, flux c s: Transformer, gener noice of integration ar ations, amplitude, pe r, capacitor and coil, p	s, Hall effect; electro er, relative permeabi at interfaces; hange, eddy electric rator; rea, displacement cu riod and phase; pow	on: e / m determinati lity, susceptibility; p field, Waltenhofen's urrent; Maxwell's exte ver and RMS value, o	on; ara-, dia-, pendulum; ension, wave hmic resi-

23. Resonant circuits, combinations of RLC; series and parallel resonant circuit; forced vibration, damped harmonic oscillator (related to 11-E-M);

24: Hertz dipole, characteristics of irradiation, near field, far field; Rayleigh scattering; accelerated charge, synchrotron radiation, X-rays; 25. Electromagnetic waves: Principles, Maxwell's determination to electromagnetism, radiation pressure (Poynting vector, radiation pressure).

Intended learning outcomes

The students understand the basic principles and contexts of thermodynamics, science of electricity and magnetism. They know relevant experiments to observe and measure these principles and contexts. They are able to apply mathematical methods to the formulation of physical contexts and autonomously apply their knowledge to the solution of mathematical-physical tasks.

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

V (4) + Ü (2)

Module taught in: Ü: German or English

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) Language of assessment: German and/or English

Allocation of places

--

Additional information

Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.

Workload

210 h

Teaching cycle

--

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

Module appears in

Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Aerospace Computer Science (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major) Aerospace Computer Science (2017) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Mathematics (2023)

Module title					Abbreviation	
Labora	tory Co	ourse Physics for Studen	ts of Physics Related	l Disciplines	11-PNNF-152-m01	
Module	e coord	inator		Module offered b	y	
Manag	Managing Director of the Institute of Applied Physics			Faculty of Physics	s and Astronomy	
ECTS	Metho	od of grading	Only after succ. co	mpl. of module(s)		
3	(not) s	successfully completed				
Duratio	on	Module level	Other prerequisites	5		
1 seme	ster	undergraduate				
Conten	ts					
		ments in the fields of me , Atomic and Nuclear Phy			nics, optics, X-rays, nuclear magne	
Intende	ed lear	ning outcomes				
riments ning of cine.	s. They differe	have a basic understand	ling of physical phen ng methods as well a	omena and know t s their application	the implementation of own expe- he basic ideas and ways of functio s, especially in the field of Biomedi	
P (4)						
module is a) prac minute Each ex	s creditab tical as s). xperime	ele for bonus) signment with oral test (ent comprises preparatio	approx. 15 minutes,	during experiments	5) and b) written examination (90 well as performance of experi-	
Allocat		ch be repeated once.				
Allocal		places				
Additio	nalinf	ormation				
	matim					
Worklo	ad					
90 h						
Teachi	ng cvcl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progr	ammes)		
		e.a.a.initation regulation	teaching degree progr			
Module	appe	ars in				
		gree (1 major) Mathemat	ics (2015)			
		gree (1 major) Computati		.015)		
		gree (1 major) Functional	•	2.		
	ar's da					
Bachel	or s de	gree (1 major) Functional	Materials (2021)			
		gree (1 major) Functional gree (1 major) Mathemat				

Module title					Abbreviation		
Introdu	ction t	o the Physics of Function	al Materials		11-TMS-152-m01		
Module	coord	inator		Module offered by			
Managi	ng Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	nd Astronomy		
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	Contents						
	Theoretical and practical principles of physical material properties and semiconductor process technology, diel- ectrics, metals and oxides. Principles of structuring technology, growth and coating procedures.						
Intende	ed learr	ning outcomes					
		nave knowledge of the th terial synthesis.	eoretical and practica	al principles of physi	ical material properties and tech-		
		umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (3) + I		tin Common on English					
		t in: German or English					
		le for bonus)	ge — If other than German, e	examination offered — if no	it every semester, information on whether		
		nination (approx. 90 to 1					
		ation of one candidate e ation in groups (groups o			r		
		ort (approx. 8 to 10 pages					
		n/talk (approx. 30 minut					
				-	nged and assessment may in- mination in groups. If the method		
of asse	ssmen	t is changed, the lecturer			weeks prior to the original exami-		
		the latest. ssessment: German and,	or English				
-	-	ffered: Once a year, sum	•				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
150 h							
Teachir	ng cycl	e					
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)			
Module							
Bachelo	or's de	gree (1 major) Functional	Materials (2015)				



Chemistry (ECTS credits)

Module	title				Abbreviation	
Experin	nental	Chemistry			08-AC-ExChem-152	-m01
Module		inator		Module offered by	1	
		ture "Experimentalchem	ie" (Experimental	Institute of Inorgan		
Chemis			ie (Experimentat		ic chemistry	
ECTS	Metho	od of grading	Only after succ. co	mpl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisite	S		
1 seme	ster	undergraduate				
Conten	ts					
		rovides an overview of the level, metals, acid-base				
Intended learning outcomes						
cient in actions	basic using	nderstands the principle models of the structure typical chemical formula	of matter and can de a language and inter	scribe them properly. pret them by identifyi	. He/she can depict	chemical re-
	5 (type, r	number of weekly contact hours,	language — If other than G	erman)		
V (4)		.				
		sessment (type, scope, langu le for bonus)	age — If other than German	, examination offered — if no	ot every semester, informat	ion on whether
		nation (approx. 90 minu	tes)			
		ssessment: German and				
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachi	ıg cycl	e				
Teachir	ng cycle	e: every year, winter sem	ester			
Referre	d to in	LPO I (examination regulation	ns for teaching-degree prog	rammes)		
Module	appea	ars in				
Bachel	or's de	gree (1 major) Biology (2	011)			
		gree (1 major) Psycholog				
		gree (1 major, 1 minor) P				
		gree (1 major, 1 minor) P				
		gree (1 major, 1 minor) R		d Culture (2008)		
		gree (2 majors) Special I	-			
-		logiae Catholic Theology	-			
		gree (2 majors) English a gree (2 majors) German		-		
		gree (2 majors) Geograph		Luie (2013)		
		gree (1 major) Mathemat				
		gree (1 major) Musicolog				
		gree (1 major) Physics (2	-			
Bachelor's	with 1 maj	jor Functional Materials (2015)	JMU Würzburg	• generated 18-Apr-2025 • ex	am. reg. da-	page 22 / 106
			-	elor (180 ECTS) Funktionswerk	-	

Bachelor's degree (1 major) Psychology (2015) Bachelor's degree (1 major) Business Management and Economics (2015) Bachelor's degree (1 major) Nanostructure Technology (2015) Bachelor's degree (1 major) Music Education (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Political and Social Studies (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major) Academic Speech Therapy (2015) Bachelor's degree (1 major) Indology/South Asian Studies (2015) Bachelor's degree (1 major, 1 minor) Egyptology (2015) Bachelor's degree (1 major, 1 minor) Pedagogy (2015) Bachelor's degree (1 major, 1 minor) History (2015) Bachelor's degree (1 major, 1 minor) Musicology (2015) Bachelor's degree (1 major, 1 minor) Philosophy (2015) Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015) Bachelor's degree (1 major, 1 minor) Ancient World (2015) Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015) Bachelor's degree (1 major, 1 minor) Theological Studies (2015) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015) Bachelor's degree (1 major, 1 minor) German Language and Literature (2015) Bachelor's degree (2 majors) Egyptology (2015) Bachelor's degree (2 majors) Pedagogy (2015) Bachelor's degree (2 majors) Protestant Theology (2015) Bachelor's degree (2 majors) Musicology (2015) Bachelor's degree (2 majors) Philosophy (2015) Bachelor's degree (2 majors) Special Education (2015) Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015) Bachelor's degree (2 majors) Latin Philology (2015) Bachelor's degree (2 majors) Music Education (2015) Bachelor's degree (2 majors) Philosophy and Religion (2015) Bachelor's degree (2 majors) Theological Studies (2015) Bachelor's degree (2 majors) Political and Social Studies (2015) Bachelor's degree (2 majors) Russian Language and Culture (2015) Bachelor's degree (2 majors) Greek Philology (2015) Bachelor's degree (2 majors) European Ethnology (2015) Bachelor's degree (2 majors) Indology/South Asian Studies (2015) Bachelor's degree (2 majors) Geography (2015) Bachelor's degree (2 majors) French Studies (2015) Bachelor's degree (2 majors) History (2015) Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015) Bachelor's degree (2 majors) German Language and Literature (2015) Bachelor's degree (1 major) Mathematical Physics (2016) Bachelor's degree (1 major, 1 minor) French Studies (2016) Bachelor's degree (2 majors) French Studies (2016) Bachelor's degree (1 major, 1 minor) Italian Studies (2016) Bachelor's degree (2 majors) Italian Studies (2016) Bachelor's degree (1 major, 1 minor) Spanish Studies (2016) Bachelor's degree (2 majors) Spanish Studies (2016) Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016) Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016) Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016) Bachelor's degree (1 major) Business Information Systems (2016) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. dapage 23 / 106 ta record Bachelor (180 ECTS) Funktionswerkstoffe - 2015

page 24 / 106

Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major, 1 minor) English and American Studies (2016) Bachelor's degree (2 majors) English and American Studies (2016) Bachelor's degree (1 major) Media Communication (2016) Bachelor's degree (1 major, 1 minor) Digital Humanities (2016) Bachelor's degree (1 major) Biology (2017) Bachelor's degree (1 major, 1 minor) Geography (2017) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017) Bachelor's degree (1 major) Aerospace Computer Science (2017) Bachelor's degree (1 major, 1 minor) Museology and material culture (2017) Bachelor's degree (1 major) Economathematics (2017) Bachelor's degree (1 major) Games Engineering (2017) Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Media Communication (2018) Bachelor's degree (1 major) Biomedicine (2018) Bachelor's degree (1 major) Human-Computer Systems (2018) Bachelor's degree (2 majors) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Digital Humanities (2018) Bachelor's degree (2 majors) Digital Humanities (2018) Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major, 1 minor) English and American Studies (2019) Bachelor's degree (1 major) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Information Systems (2019) Bachelor's degree (2 majors) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Management and Economics (2019) Bachelor's degree (1 major) Modern China (2019) Bachelor's degree (1 major) Biomedicine (2020) Bachelor's degree (1 major) Pedagogy (2020) Bachelor's degree (1 major) Political and Social Studies (2020) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020) Bachelor's degree (2 majors) European Ethnology (2020) Bachelor's degree (2 majors) Political and Social Studies (2020) Bachelor's degree (2 majors) Special Education (2020) Bachelor's degree (1 major) Physics (2020) Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major, 1 minor) Museology and material culture (2020) Bachelor's degree (1 major, 1 minor) Pedagogy (2020) Bachelor's degree (2 majors) Pedagogy (2020) Bachelor's degree (1 major) Psychology (2020) Bachelor's degree (1 major) Biology (2021) Magister Theologiae Catholic Theology (2021) Bachelor's degree (2 majors) History (2021) Bachelor's degree (1 major, 1 minor) History (2021) Bachelor's degree (1 major) Media Communication (2021) Bachelor's degree (2 majors) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) English and American Studies (2021) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. data record Bachelor (180 ECTS) Funktionswerkstoffe - 2015

Bachelor's degree (2 majors) English and American Studies (2021) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Computer Science und Sustainability (2021) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (2 majors) Special Education (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major) Human-Computer Systems (2022) Bachelor's degree (1 major, 1 minor) Museology and material culture (2022) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022) Bachelor's degree (1 major, 1 minor) Ancient World (2022) Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022) Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022) Bachelor's degree (1 major) European Law (2023) Bachelor's degree (1 major, 1 minor) English and American Studies (2023) Bachelor's degree (2 majors) English and American Studies (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) Special Education (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's degree (2 majors) Geography (2023) Bachelor's degree (1 major, 1 minor) Geography (2023) Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (2 majors) German Language and Literature (2024) Bachelor's degree (1 major, 1 minor) German Language and Literature (2024) Bachelor's degree (1 major) Music Education (2024) Bachelor's degree (2 majors) Music Education (2024) Bachelor's degree (1 major, 1 minor) Music Education (2024) Bachelor's degree (1 major) Indology/South Asian Studies (2024) Bachelor's degree (2 majors) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Ancient World (2024) Bachelor's degree (2 majors) Digital Humanities (2024) Bachelor's degree (1 major, 1 minor) Digital Humanities (2024) Bachelor's degree (1 major) Midwifery (2024) Bachelor's degree (2 majors) Greek Philology (2024) Bachelor's degree (2 majors) Latin Philology (2024) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Business Management and Economics (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. dapage 25 / 106

ta record Bachelor (180 ECTS) Funktionswerkstoffe - 2015

Bachelor's degree (1 major) Human-Computer-Interaction (2024) Bachelor's degree (2 majors) Art Education (2024) Bachelor's degree (1 major) Digital Business & Data Science (2024) Bachelor's degree (1 major) Classics (2024) Bachelor's degree (1 major) Diversity, Ethics and Religions (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) (2025) Bachelor's degree (1 major) 2025) Bachelor's degree (1 major) Pedagogy (2025) Bachelor's degree (2 majors) Pedagogy (2025) Bachelor's degree (1 major) Economathematics (2025) Bachelor's degree (1 major) Academic Speech Therapy (2025) Bachelor's degree (1 major, 1 minor) Pedagogy (2025) Bachelor's degree (1 major, 1 minor) Pedagogy (2025) Bachelor's degree (1 major) Academic Speech Therapy (2025) Bachelor's degree (1 major, 1 minor) Pedagogy (2025) Bachelor's degree (1 major, 1 minor) Pedagogy (2025)

UNIVERSITÄT

WÜRZBURG

Module	e title				Abbreviation
Genera	al and a	nalytical Chemistry Lab	for engineering stude	ents	08-ACP1-FU-152-m01
Modul	e coord	inator		Module offered b	y
holder	ofthe	Chair of Anorganic Chemi	stry	Institute of Inorga	anic Chemistry
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	(not)	successfully completed	o8-AC-ExChem		
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
lated le course	ecture(focuse	s). After a safety briefing,	the students autono	mously conduct e	e they have gained through the re- operiments in the laboratory. The simple substances and analyses of
Intend	ed lear	ning outcomes			
have d	evelop		he necessary stoichi	ometric calculatio	experiments to solve them. They ns and describe the chemical pro-
Course	S (type, 1	number of weekly contact hours, l	anguage — if other than Ger	rman)	
P (5)					
		s essment (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — if	not every semester, information on whether
pages Langua	each) a age of a	achtestate (pre and post- and assessment of practic assessment: German and, affered: Once a year, sum	al performance (2 to /or English		5 minutes each, log approx. 5 to 10 ations)
Allocat		· · · · ·			
Additio	onal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	e appea	ars in			
Bachel	or's de	gree (1 major) Functional	Materials (2015)		
		gree (1 major) Functional			
Bachel	or's de	gree (1 major) Functional	Materials (2025)		

Organic Chemistry 1 ost-OC1-152-mo1 Module continuation Module offered by Institute of Organic Chemistry Institute of Organic Chemistry ECTS Method of grading Only after succ. compl. of module(s) semestral grade Duration Module level Other prerequisites is emester undergraduate This module provides students with an overview of the fundamental principles of organic chemistry, the xamines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, ad dition and elimination reactions as well as synthesis planning. Interded Learning outcomes Students know important categories of substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. They are able to describe and formulate some of the most important reactions in organic chemistry. They are able to assent the reaction in organic chemistry. They are able to describe and formulate some of the most important reactions in organic chemistry. They are able to describe and formulate some of the most important reactions in organic chemistry. They are able to use different systems of the	Module title Abbreviation						
holder of the Professorship of Organic Chemistry Institute of Organic Chemistry ECTS Method of grading Only after succ. compl. of module(s) 5 numerical grade Duration Module level Other prerequisites 1 semester undergraduate This module provides students with an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, addition and elimination reactions as well as synthesis planning. Intended learning outcomes Students know important categories of substances in organic chemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (upe, number of weekly contact hours, language — if other than German) V (3) + 0 (1) Method of assessment (type, scope, language — if other than German, examination offered — if not every senester, information on whether module is creditable for brans) a) written examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 parge) or d) b) oral examination o	Organi	c Chem	istry 1			08-0C1-152-m01	
ECTS Method of grading Only after succ. compl. of module(s) 5 numerical grade	Module	e coord	inator		Module offered by		
5 numerical grade Duration Module level Other prerequisites 1 semester undergraduate Contents This module provides students with an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex corganic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, addition and elimination reactions as well as synthesis planning. Intended learning outcomes Students know important categories of substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (type, number of weekly contact hours, language – if other than German) V (3) + 0 (1) Method of assessment (type, scope, language – if other than German) V (3) + 0 (1) Method of assessment (type, scope, language – if other than German, examination offered – if not every senseter, information on whether module is coefficiable for banus) a) written examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) a candidate (act (02 to 30 minutes)) or e) b) cal examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) p	holder	of the l	Professorship of Organic	: Chemistry	Institute of Organic	Chemistry	
Duration Module level Other prerequisites 1 semester undergraduate Contents This module provides students with an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, addition and elimination reactions as well as of sicusses the fundamental principles of stereochemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (type, number of weekly contact hours, language – if other than German) V (3) + 0 (1) 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) withen examination of approx. go to 180 minutes) or a) a warnitation (approx, go to 180 minutes) or b) or al examination of parces	ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
1 semester undergraduate Contents This module provides students with an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, addition and elimination reactions as well as synthesis planning. Intended learning outcomes Students know important categories of substance names. Students are able to analyse the stereochemistry of mo- reculse. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (yee, number of weekly contact hours, language – if other than German) V (3) + Û (1) 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 of one candidate each (20 to 30 minutes) or b) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: Germa and/or English Allocation of places Additional information ApoLmCh in conjunction with No. I 2nd letter b) of	5	nume	rical grade				
Contents This module provides students with an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, addition and elimination reactions as well as synthesis planning. Intended learning outcomes Students know important categories of substances in organic chemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categories the characteristic reaction conditions and can use them for simple syntheses. Courses (type, number of weekly contact hours, language – if other than German) V (3) + 0 (1) Method of assessment (type, scope, language – if other than German) V (3) + 0 (2) W (3) + 0 (1) Method fassessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for honux) a) written examination (approx. go to 180 minutes) or or b) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) (a (approx. 20 pages) or e) presentation (approx. 30 minutes) e Additional information according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I and letter b) of annex 1 to the APOLmCh and N	Duratio	on in the second	Module level	Other prerequisites	;		
This module provides students with an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, ad dition and elimination reactions as well as synthesis planning. Intendel learning outcomes Students know important categories of substance names. Students are able to analyse the stereochemistry of mo-lecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (type, number of weekly contact hours, language – if other than German) V (3) ± 0 (1) Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is cellable for bonus) a) written examination (approx. yo to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) or al examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) or candidate each (20 to 30 minutes) or e) oral examination (approx. 30 minutes) according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh is conjung degree programmes) § 62 IN . 2 Method of segree (1 major) Biology (2011) Bachelor's degree (1 major) Approxed degree programmes) § 52	1 seme	ster	undergraduate				
the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, ad- dition and elimination reactions as well as synthesis planning. Intended learning outcomes Students know important categories of substances in organic chemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of mo- lecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (type, number of weekly contact hours, language – if other than German) V (3) + Ü (1) Method of assessment (type, scope, language – if other than German) V (3) + Ü (1) Method of assessment (type, scope, language – if other than German, examination offered – if not every senester, information on whether module is creditable for bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination for ecandidate each (20 to 30 minutes) or c) oral examination (approx. 30 minutes) anguage of assessment: German and/or English Allocation of places	Conten	ts					
Students know important categories of substances in organic chemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of mo- lecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (type, number of weekly contact hours, language – if other than German) V (3) + U (1) 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 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination of one candidate each (20 to 30 minutes) or c) oral examination ingroups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: German and/or English Aldication of places 	the bor organic	nding s comp	ituation of carbon and i ounds. The module also	ntroduces students to discusses the fundar	the nomenclature of nental principles of s	simple and modera	tely complex
of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses. Courses (type, number of weekly contact hours, language – if other than German) V (3 + 0 (1) Method of assessment (type, scope, language – if other than German) a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: German and/or English Allocation of places	Intende	ed lear	ning outcomes				
V (3) + Û (1) 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 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: German and/or English Allocation of places Additional information according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Refered to in LPO 1 (examination regulations for teaching-degree programmes) § 62 I Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Pusican Language and Culture (2008) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)	of nom lecules that pu synthes	enclatu . They a rpose, ses.	ure to determine simple are able to describe and they can analyse and ca	substance names. Stu formulate some of th ategorise the characte	udents are able to an e most important rea ristic reaction condit	alyse the stereochen ctions in organic ch	mistry of mo- emistry. For
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 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or b) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: German and/or English Allocation of places			number of weekly contact hours	, language — if other than Ge	rman)		
module is creditable for bonus) a) written examination (approx. 90 to 180 minutes) or b) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: German and/or English Allocation of places Additional information according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh Workload I50 h Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 I Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Publical and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major functional Materials (2015) MUWurzbug • generated 18-Apr.2025 • exam, reg. da- Page 28 / 106 Page	V (3) +	Ü (1)		_			
b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes) Language of assessment: German and/or English Allocation of places Additional information according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh and No. 2 of annex 2 to the APOLmCh Morkload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 l Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Psychology (2013) Bachelor's degree (1 major) Psychology (2013) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)				age — if other than German,	examination offered — if no	t every semester, informati	on on whether
Additional information according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 l Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major) Psychology (2013) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) MU Würzburg • generated 18-Apr-2025 • exam. reg. da- page 28 / 106	b) oral c) oral d) log (e) pres	examir examin approx entatio	nation of one candidate nation in groups of up to 20 pages) or n (approx. 30 minutes)	each (20 to 30 minute 3 candidates (approx	-	didate) or	
according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 l Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2013) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2013) IMU Würzburg • generated 18-Apr-2025 • exam. reg. da- page 28 / 106	Allocat	ion of _l	places				
according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter b) of annex 1 to the APOLmCh and No. 2 of annex 2 to the APOLmCh Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 l Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2013) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2013) IMU Würzburg • generated 18-Apr-2025 • exam. reg. da- page 28 / 106							
and No. 2 of annex 2 to the APOLmCh Workload 150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 l Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2013) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) MU Würzburg • generated 18-Apr-2025 • exam. reg. da- page 28 / 106	Additio	nal inf	ormation				
150 h Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 l Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2013) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) page 28 / 106				POLmCh in conjunctio	n with No. I 2nd lette	r b) of annex 1 to the	APOLmCh
Teaching cycle Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015)	Worklo	ad					
Teaching cycle: every year, summer semester Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. da-	150 h						
Referred to in LPO I (examination regulations for teaching-degree programmes) § 62 Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. da-	Teachir	ng cycl	e				
§ 62 Nr. 2 Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. da-	Teachir	ng cycle	e: every year, summer se	emester			
Module appears in Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. da-	Referre	d to in	LPO I (examination regulatio	ns for teaching-degree progra	ammes)		
Bachelor's degree (1 major) Biology (2011) Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. da- page 28 / 106	§621N	lr. 2					
Bachelor's degree (1 major) Chemistry (2010) Bachelor's degree (1 major) Psychology (2010) Bachelor's degree (1 major, 1 minor) Pedagogy (2013) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. da- page 28 / 106	Module	e appea	ars in				
	Bachelo Bachelo Bachelo Bachelo	or's de or's de or's de or's de	gree (1 major) Chemistry gree (1 major) Psycholog gree (1 major, 1 minor) F gree (1 major, 1 minor) F	r (2010) gy (2010) Pedagogy (2013) Political and Social Stu			
	Bachelor's	with 1 ma	jor Functional Materials (2015)	-		-	page 28 / 106

Bachelor's degree (2 majors) Special Education (2009) Magister Theologiae Catholic Theology (2013) Bachelor's degree (2 majors) English and American Studies (2009) Bachelor's degree (2 majors) German Language and Literature (2013) Bachelor's degree (1 major) Biochemistry (2015) Bachelor's degree (1 major) Chemistry (2015) Bachelor's degree (1 major) Geography (2015) Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Musicology (2015) Bachelor's degree (1 major) Physics (2015) Bachelor's degree (1 major) Psychology (2015) Bachelor's degree (1 major) Business Management and Economics (2015) Bachelor's degree (1 major) Nanostructure Technology (2015) Bachelor's degree (1 major) Music Education (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Political and Social Studies (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major) Academic Speech Therapy (2015) Bachelor's degree (1 major) Indology/South Asian Studies (2015) Bachelor's degree (1 major, 1 minor) Egyptology (2015) Bachelor's degree (1 major, 1 minor) Pedagogy (2015) Bachelor's degree (1 major, 1 minor) History (2015) Bachelor's degree (1 major, 1 minor) Musicology (2015) Bachelor's degree (1 major, 1 minor) Philosophy (2015) Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015) Bachelor's degree (1 major, 1 minor) Ancient World (2015) Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015) Bachelor's degree (1 major, 1 minor) Theological Studies (2015) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015) Bachelor's degree (1 major, 1 minor) German Language and Literature (2015) Bachelor's degree (2 majors) Egyptology (2015) Bachelor's degree (2 majors) Pedagogy (2015) Bachelor's degree (2 majors) Protestant Theology (2015) Bachelor's degree (2 majors) Musicology (2015) Bachelor's degree (2 majors) Philosophy (2015) Bachelor's degree (2 majors) Special Education (2015) Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015) Bachelor's degree (2 majors) Latin Philology (2015) Bachelor's degree (2 majors) Music Education (2015) Bachelor's degree (2 majors) Philosophy and Religion (2015) Bachelor's degree (2 majors) Theological Studies (2015) Bachelor's degree (2 majors) Political and Social Studies (2015) Bachelor's degree (2 majors) Russian Language and Culture (2015) Bachelor's degree (2 majors) Greek Philology (2015) Bachelor's degree (2 majors) European Ethnology (2015) Bachelor's degree (2 majors) Indology/South Asian Studies (2015) First state examination for the teaching degree Gymnasium Chemistry (2015) Bachelor's degree (2 majors) Geography (2015) Bachelor's degree (2 majors) French Studies (2015) Bachelor's degree (2 majors) History (2015) Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015) Bachelor's degree (2 majors) German Language and Literature (2015) Bachelor's with 1 major Functional Materials (2015) IMU Würzburg • generated 18-Apr-2025 • exam. reg. dapage 29 / 106 ta record Bachelor (180 ECTS) Funktionswerkstoffe - 2015

Bachelor's degree (1 major) Mathematical Physics (2016) Bachelor's degree (1 major, 1 minor) French Studies (2016) Bachelor's degree (2 majors) French Studies (2016) Bachelor's degree (1 major, 1 minor) Italian Studies (2016) Bachelor's degree (2 majors) Italian Studies (2016) Bachelor's degree (1 major, 1 minor) Spanish Studies (2016) Bachelor's degree (2 majors) Spanish Studies (2016) Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016) Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016) Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016) Bachelor's degree (1 major) Business Information Systems (2016) Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major, 1 minor) English and American Studies (2016) Bachelor's degree (2 majors) English and American Studies (2016) Bachelor's degree (1 major) Media Communication (2016) Bachelor's degree (1 major) Food Chemistry (2016) Bachelor's degree (1 major, 1 minor) Digital Humanities (2016) Bachelor's degree (1 major) Biology (2017) Bachelor's degree (1 major, 1 minor) Geography (2017) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017) Bachelor's degree (1 major) Aerospace Computer Science (2017) Bachelor's degree (1 major) Biochemistry (2017) Bachelor's degree (1 major) Chemistry (2017) Bachelor's degree (1 major, 1 minor) Museology and material culture (2017) Bachelor's degree (1 major) Economathematics (2017) Bachelor's degree (1 major) Games Engineering (2017) Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Media Communication (2018) Bachelor's degree (1 major) Biomedicine (2018) Bachelor's degree (1 major) Human-Computer Systems (2018) Bachelor's degree (2 majors) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Digital Humanities (2018) Bachelor's degree (2 majors) Digital Humanities (2018) Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major, 1 minor) English and American Studies (2019) Bachelor's degree (1 major) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Information Systems (2019) Bachelor's degree (2 majors) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Management and Economics (2019) Bachelor's degree (1 major) Modern China (2019) Module studies (Bachelor) Orientierungsstudien (2020) Bachelor's degree (1 major) Biomedicine (2020) Bachelor's degree (1 major) Pedagogy (2020) Bachelor's degree (1 major) Political and Social Studies (2020) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020) Bachelor's degree (2 majors) European Ethnology (2020) Bachelor's degree (2 majors) Political and Social Studies (2020) Bachelor's degree (2 majors) Special Education (2020) Bachelor's degree (1 major) Physics (2020) Bachelor's with 1 major Functional Materials (2015) JMU Würzburg • generated 18-Apr-2025 • exam. reg. data record Bachelor (180 ECTS) Funktionswerkstoffe - 2015

Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major, 1 minor) Museology and material culture (2020) Bachelor's degree (1 major, 1 minor) Pedagogy (2020) Bachelor's degree (2 majors) Pedagogy (2020) Bachelor's degree (1 major) Psychology (2020) Bachelor's degree (1 major) Biology (2021) Magister Theologiae Catholic Theology (2021) Bachelor's degree (2 majors) History (2021) Bachelor's degree (1 major, 1 minor) History (2021) Bachelor's degree (1 major) Media Communication (2021) Bachelor's degree (2 majors) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) English and American Studies (2021) Bachelor's degree (2 majors) English and American Studies (2021) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Computer Science und Sustainability (2021) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021) Bachelor's degree (1 major) Food Chemistry (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (2 majors) Special Education (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major) Human-Computer Systems (2022) Bachelor's degree (1 major, 1 minor) Museology and material culture (2022) Bachelor's degree (1 major) Biochemistry (2022) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022) Bachelor's degree (1 major, 1 minor) Ancient World (2022) Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022) Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022) Bachelor's degree (1 major) European Law (2023) Bachelor's degree (1 major, 1 minor) English and American Studies (2023) Bachelor's degree (2 majors) English and American Studies (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) Special Education (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's degree (2 majors) Geography (2023) Bachelor's degree (1 major, 1 minor) Geography (2023) Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (2 majors) German Language and Literature (2024) Bachelor's with 1 major Functional Materials (2015) IMU Würzburg • generated 18-Apr-2025 • exam. reg. dapage 31 / 106 ta record Bachelor (180 ECTS) Funktionswerkstoffe - 2015

Bachelor's degree (1 major, 1 minor) German Language and Literature (2024) Bachelor's degree (1 major) Music Education (2024) Bachelor's degree (2 majors) Music Education (2024) Bachelor's degree (1 major, 1 minor) Music Education (2024) Bachelor's degree (1 major) Indology/South Asian Studies (2024) Bachelor's degree (2 majors) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Ancient World (2024) Bachelor's degree (2 majors) Digital Humanities (2024) Bachelor's degree (1 major, 1 minor) Digital Humanities (2024) Bachelor's degree (1 major) Midwifery (2024) Bachelor's degree (2 majors) Greek Philology (2024) Bachelor's degree (2 majors) Latin Philology (2024) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Business Management and Economics (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Human-Computer-Interaction (2024) Bachelor's degree (2 majors) Art Education (2024) Bachelor's degree (1 major) Digital Business & Data Science (2024) Bachelor's degree (1 major) Classics (2024) Bachelor's degree (1 major) Diversity, Ethics and Religions (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) (2025) Bachelor's degree (1 major) Food Chemistry (2025) Bachelor's degree (1 major, 1 minor) European Ethnology/Empiric Cultural Studies (2025) Bachelor's degree (1 major) Pedagogy (2025) Bachelor's degree (2 majors) Pedagogy (2025) Bachelor's degree (1 major) Economathematics (2025) Bachelor's degree (1 major) Academic Speech Therapy (2025) Bachelor's degree (1 major, 1 minor) Pedagogy (2025) Bachelor's degree (1 major) Games Engineering (2025)

Module title Abbreviation					
Organi	c Cherr	istry 2			08-0C2-VL-152-m01
Module	e coord	inator		Module offered by	
holder	ofthe	Chair of Physically Organi	c Chemistry	Institute of Organic	Chemistry
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
the exa on reac	mple c tions t	of carbonyl compounds, i	t extends the student	s' knowledge of sub	fic reactions of aromatics. Using stitution, elimination and additi- ation and reduction reactions as
Intende	ed lear	ning outcomes			
bonyl c	ompoı n plan	inds. They are able to des and formulate multi-stag	scribe specific reaction	ons of carbonyls and	e the varying reactivity of car- aromatics. For that purpose, anisms and can transfer them to
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V (3) +	Ü (1)				
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	t every semester, information on whether
b) oral c) oral e d) log (a e) prese	examir examin approx entatio	mination (approx. 90 to 1 nation of one candidate e lation in groups of up to 3 . 20 pages) or n (approx. 30 minutes) ssessment: German and	ach (20 to 30 minute 3 candidates (approx	-	didate) or
Allocat	-				
Additio	nal inf	ormation			
	•	2 para. 2 sentence 2 AP nnex 2 to the APOLmCh	OLmCh in conjunction	n with No. I 2nd lette	r b) of annex 1 to the APOLmCh
Worklo	ad				
180 h					
Teachir	ıg cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
	lr. 2 an	d § 22 Nr. 1 h)			
Module		ars in			
		gree (1 major) Functional	Materials (2015)		
		mination for the teaching	_	e Chemistry (2015)	
		-	-		stry (Primary School) (2015)
		mination for the teaching	-		
		mination for the teaching	- ,	• •	
			- ,		nemistry (Middle School) (2015)
Bachelor's	with 1 ma	jor Functional Materials (2015)		generated 18-Apr-2025 • exa or (180 ECTS) Funktionswerks	



First state examination for the teaching degree Mittelschule Chemistry (2015)

First state examination for the teaching degree Mittelschule Didactics in Chemistry (Middle School) (2015) First state examination for the teaching degree Mittelschule Chemistry (2020 (Prüfungsordnungsversion 2015)) First state examination for the teaching degree Mittelschule Didactics in Chemistry (Middle School) (2020 (Prüfungsordnungsversion 2015))

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2020 (Prüfungsordnungsversion 2015))

Bachelor's degree (1 major) Food Chemistry (2021) Bachelor's degree (1 major) Food Chemistry (2025)

Module	e title				Abbreviation
Organi	c Chem	istry for engineering stu	dents (practical cour	se)	08-0CP1-FU-152-m01
Module	e coord	inator		Module offered	by
holder	of the (Chair of Organic Chemisti	γII	Institute of Orga	anic Chemistry
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
2	(not) s	successfully completed	08-0C1		
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
dition t their kr	o those nowled	e experiments, students v	will be expected to ta n the safe handling o	ke oral tests and f hazardous sub	experiments in the laboratory. In ad- d write lab reports to demonstrate stances, simple experimental unit alysis of the products.
Intende	ed lear	ning outcomes			
rations	of orga ources.	anic chemistry. They are a They are able to connect	able to analyse the yi	eld and purity of	o conduct simple experimental ope- the products and identify possible e lecture with practical experiments
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
P (4)					
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered –	- if not every semester, information on whether
pages e Langua	each) a ge of a	chtestate (pre and post- nd assessment of practic ssessment: German and ffered: Once a year, wint	al performance (2 to /or English		. 15 minutes each, log approx. 5 to 10 inations)
Allocat	ion of _l	olaces			
Additio	nal inf	ormation			
Worklo	ad				
60 h					
Teachir	ıg cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
		gree (1 major) Functional	-		
		gree (1 major) Functional			
Bachel	or's de	gree (1 major) Functional	Materials (2025)		

would	e title				Abbreviation	
Thermo	odynan	nics, Kinetics, Electroc	hemistry		08-PC-TKE-152-mo:	L
Module	e coord	linator		Module offered by		
		ture "Thermodynamik,	Kinetik, Elektroche-	-	l and Theoretical Ch	emistry
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)		
9	1	rical grade				
Duratio		Module level	Other prerequisites	5		
1 seme	-	undergraduate		.		
Conten						
chemic dynam	cal equ ic proc	ilibria, ideal and real g esses, it discusses the	the principles of therm asses/solutions/mixec fundamental principle	d phases and electroe		
Intend	ed lear	ning outcomes				
solutio	ons, gas		s of thermodynamics. electrochemical reacti			
Course	S (type, I	number of weekly contact hou	rs, language — if other than Ge	erman)		
V (4) +	Ü (2)					
module is	s creditat	sessment (type, scope, lan ble for bonus) mination (approx. 90 t	guage — if other than German, 0 180 minutes) or	examination offered — if no	ot every semester, informat	ion on whether
c) oral d) log (e) pres Langua	examir (approx entatic age of a	nation in groups of up t c. 20 pages) or on (approx. 30 minutes assessment: German a		-	didate) or	
credita						
Allocat	tion of	places				
	_					
Additio	onal inf	ormation				
Worklo	ad					
WOIKIO						
270 h						
	ng cycl	e				
270 h	ng cycl	e				
270 h Teachi 			ions for teaching-degree progr	ammes)		
270 h Teachi Referre	ed to in		ions for teaching-degree progr	ammes)		
270 h Teachi Referre § 62 N	ed to in Nr. 1	LPO I (examination regulat	ions for teaching-degree progr	ammes)		
270 h Teachin Referre § 62 N Module	ed to in Nr. 1 e appea	LPO I (examination regulat		ammes)		
270 h Teachin Referre § 62 N Module Bachel	ed to in Nr. 1 e appea	LPO I (examination regulat	nistry (2015)	ammes)		
270 h Teachin § 62 N Module Bachel Bachel	ed to in Nr. 1 e appea lor's de lor's de	LPO I (examination regulat ars in gree (1 major) Biochen	nistry (2015) ry (2015)	rammes)		
270 h Teachi § 62 N Module Bachel Bachel Bachel Bachel Bachel	ed to in Nr. 1 e appea or's de or's de or's de or's de	LPO I (examination regulat ars in gree (1 major) Biochen gree (1 major) Chemist gree (1 major) Mathem gree (1 major) Comput	nistry (2015) ry (2015) atics (2015) ational Mathematics (2			
270 h Teachi § 62 N Modula Bachel Bachel Bachel Bachel Bachel Bachel	ed to in Nr. 1 e appea or's de or's de or's de or's de or's de	LPO I (examination regulat ars in gree (1 major) Biochen gree (1 major) Chemist gree (1 major) Mathem gree (1 major) Comput gree (1 major) Functior	nistry (2015) ry (2015) atics (2015) ational Mathematics (2 nal Materials (2015)	:015)		
270 h Teachin § 62 N Bachel Bachel Bachel Bachel Bachel Bachel First st	ed to in Nr. 1 e appea or's de or's de or's de or's de or's de or's de	LPO I (examination regulat ars in gree (1 major) Biochen gree (1 major) Chemist gree (1 major) Mathem gree (1 major) Comput gree (1 major) Functior mination for the teach	nistry (2015) ry (2015) atics (2015) ational Mathematics (2 nal Materials (2015) ing degree Gymnasium	:015)		
270 h Teachin § 62 I N Module Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel Bachel	ed to in Nr. 1 e appea or's de or's de or's de or's de or's de or's de or's de or's de	LPO I (examination regulat ars in gree (1 major) Biochen gree (1 major) Chemist gree (1 major) Mathem gree (1 major) Comput gree (1 major) Function imination for the teach gree (1 major) Biochen	nistry (2015) ry (2015) atics (2015) ational Mathematics (2 nal Materials (2015) ing degree Gymnasium nistry (2017)	:015)		
270 h Teachi Teachi Referre § 62 N Module Bachel Bachel Bachel Bachel Bachel First st Bachel Bachel Bachel Bachel	ed to in Nr. 1 e appea or's de or's de or's de or's de ate exa or's de or's de or's de	LPO I (examination regulat ars in gree (1 major) Biochen gree (1 major) Chemist gree (1 major) Mathem gree (1 major) Comput gree (1 major) Functior mination for the teach	nistry (2015) ry (2015) atics (2015) ational Mathematics (2 nal Materials (2015) ing degree Gymnasium nistry (2017) ry (2017)	:015)	am reg da-	page 36 / 106

Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Biochemistry (2022) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Functional Materials (2025)

Module title				Abbreviation
Principles of quantum mechanics and spectroscopy for eng			gineering students	08-PC-QMS-FU-152-m01
Module coordinator			Module offered by	1
lecturer of le	ecture "Grundlagen der Qu bie" (Principles of Quantur		- · · ·	l and Theoretical Chemistry
ECTS Met	hod of grading	Only after succ. con	npl. of module(s)	
8 num	nerical grade		•	
Duration	Module level	Other prerequisites	i	
1 semester	undergraduate			
Contents	- i	•		
the basis of the module UV-VIS spec	the following models: par focuses on vibrational spe troscopy. In addition, the	ticle in a box, harmon ectroscopy, angular m module discusses lin	ic oscillator and rigio omentum quantisati ear operators, eigenv	chanics. It analyses molecules or d rotor. As regards spectroscopy, on, microwave spectroscopy and value problems, matrix represen- thematical bases of the topics li-
Intended lea	arning outcomes			
	different spectroscopic me	•		em to molecules. They are able apply the mathematical bases o
Courses (type	e, number of weekly contact hours,	language — if other than Ge	rman)	
V (4) + Ü (2)				
Method of a	ssessment (type, scope, langu	age — if other than German,	examination offered — if no	ot every semester, information on whether
module is credit	able for bonus)			
b) oral examc) oral examd) log (approe) presentat	amination (approx. 90 to ination of one candidate ination in groups of up to ox. 20 pages) or ion (approx. 30 minutes) assessment: German and or bonus	each (20 to 30 minute 3 candidates (approx		didate) or
Allocation o	f places			
Additional i	nformation			
Workload				
240 h				
Teaching cy	cle			
Referred to	in LPO I (examination regulation	ns for teaching-degree progra	ammes)	
Module app	ears in			
Bachelor's o Bachelor's o	legree (1 major) Mathemat legree (1 major) Computat legree (1 major) Functiona legree (1 major) Functiona	ional Mathematics (20 l Materials (2015)	015)	
Bachelor's with 1 r	najor Functional Materials (2015)	-	generated 18-Apr-2025 • exa	
		ta record Bache	lor (180 ECTS) Funktionswerk	STOTTE - 2015



Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Functional Materials (2025)

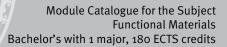
Module title Abbreviation					
Physic	al Chen	nistry (lab) for engineerii	ng students		08-PCP-FU-152-m01
Module	e coord	inator		Module offered by	
lecture mie"	r of lect	ure "Thermodynamik, Ki	netik, Elektroche-	Institute of Physica	ll and Theoretical Chemistry
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	(not) s	successfully completed	o8-PC-QMS-FU or o8	3-PC-TKE	
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	Its				
lated le dition t their kr	ecture(s to those nowledg	 After a safety briefing, e experiments, students y ge. 	the students autono	mously conduct exp	they have gained through the re- eriments in the laboratory. In ad- ite lab reports to demonstrate
Intend	ed learr	ning outcomes			
		able to connect the theor practical laboratory expe			etics, electrochemistry and spec- ulting measurements.
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)	
P (4)					
		s essment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
pages Langua	each) a age of a	chtestate (pre and post- nd assessment of practic ssessment: German and ffered: Once a year, sum	al performance (2 to /or English		minutes each, log approx. 5 to 10 ions)
	ion of p	*			
Additio	onal info	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	e appea	irs in			
Bachel	or's deg	gree (1 major) Functional	Materials (2015)		
		gree (1 major) Functional			
Bachel	or's de	gree (1 major) Functional	Materials (2025)		

Module title					Abbreviation	
Molecular Materials (Lecture)				08-FU-MoMaV-152-	m01	
Module coordinator				Module offered by	1	
	progra	mme coordinator Funktion	onswerkstoffe (Func-		echnology of Materi	al Synthesis
ECTS		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	Its	κ.				
Chemic ticles, t		ds and molecular interac ns.	tions, supramolecula	ar chemistry, molecu	lar materials, colloid	ls, nanopar-
Intend	ed lear	ning outcomes				
themse feedba	elves w ick.	d how they determine the ith a topic in the field, de number of weekly contact hours,	eliver a presentation of	on that topic, discus		
V (3) +	S (1)					
Metho	d of as	sessment (type, scope, langua	age — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
		amination (approx. 90 to examination in groups o				
tes) or 20 pag	c) oral es) or e age of a	examination in groups of e) presentation (approx. ssessment: German and	f up to 3 candidates (30 minutes)] as well a	approx. 15 minutes	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat	c) oral (es) or e age of a	examination in groups o e) presentation (approx. ssessment: German and places	f up to 3 candidates (30 minutes)] as well a	approx. 15 minutes	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat	c) oral (es) or e age of a	examination in groups of e) presentation (approx. ssessment: German and	f up to 3 candidates (30 minutes)] as well a	approx. 15 minutes	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic	c) oral (es) or e age of a cion of (examination in groups o e) presentation (approx. ssessment: German and places	f up to 3 candidates (30 minutes)] as well a	approx. 15 minutes	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic Worklo	c) oral (es) or e age of a cion of (examination in groups o e) presentation (approx. ssessment: German and places	f up to 3 candidates (30 minutes)] as well a	approx. 15 minutes	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic Worklo 150 h	c) oral res) or e age of a tion of p onal inf	examination in groups of e) presentation (approx. issessment: German and places formation	f up to 3 candidates (30 minutes)] as well a	approx. 15 minutes	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic Worklo	c) oral res) or e age of a tion of p onal inf	examination in groups of e) presentation (approx. issessment: German and places formation	f up to 3 candidates (30 minutes)] as well a	approx. 15 minutes	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic Worklo 150 h Teachin 	c) oral res) or e age of a tion of p onal inf pad	examination in groups of e) presentation (approx. issessment: German and places formation	f up to 3 candidates (30 minutes)] as well a /or English	approx. 15 minutes as talk (approx. 30 m	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic Worklo 150 h Teachin 	c) oral res) or e age of a tion of p onal inf pad	examination in groups of e) presentation (approx.) issessment: German and places formation	f up to 3 candidates (30 minutes)] as well a /or English	approx. 15 minutes as talk (approx. 30 m	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic Worklo 150 h Teachin 	c) oral ees) or e age of a tion of p onal inf onal inf onal of p onal inf onal inf onal inf	examination in groups of e) presentation (approx.) issessment: German and places formation e LPOI (examination regulation	f up to 3 candidates (30 minutes)] as well a /or English	approx. 15 minutes as talk (approx. 30 m	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additic Worklo 150 h Teachin Referre Bachel	c) oral es) or a age of a ion of p onal inf onal inf oad ng cycl ed to in e appea or's de	examination in groups of e) presentation (approx.) issessment: German and places formation e LPO I (examination regulation ars in gree (1 major) Nanostruc	f up to 3 candidates (30 minutes)] as well a /or English s for teaching-degree progra	approx. 15 minutes as talk (approx. 30 m	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additio 150 h Teachi Referre Bachel Bachel	c) oral ees) or e age of a cion of p onal inf onal inf oad ng cycl ed to in e appea or's de or's de	examination in groups of e) presentation (approx.) issessment: German and places formation e LPO I (examination regulation ars in gree (1 major) Nanostruc gree (1 major) Functional	f up to 3 candidates (30 minutes)] as well a /or English s for teaching-degree progra ture Technology (201 Materials (2015)	approx. 15 minutes as talk (approx. 30 m	oer candidate) or d) l	og (approx.
tes) or 20 pag Langua Allocat Additio 150 h Teachin Referre Bachel Bachel Master	c) oral ees) or e age of a tion of onal inf onal inf oad ed to in e appea or's de or's de r's degr	examination in groups of e) presentation (approx.) issessment: German and places formation e LPOI (examination regulation ars in gree (1 major) Nanostruc gree (1 major) Functional ee (1 major) Chemistry (2	f up to 3 candidates (30 minutes)] as well a /or English s for teaching-degree progra ture Technology (201 Materials (2015) :016)	approx. 15 minutes as talk (approx. 30 m ammes) 5)	per candidate) or d) l hinutes), weighted 3:	og (approx. 1
tes) or 20 pag Langua Allocat Additic Worklo 150 h Teachin Referre Bachel Bachel Bachel Master Master	c) oral ees) or e age of a tion of p onal inf oad ad ad ad ad ad ad ad ad ad ad ad ad a	examination in groups of e) presentation (approx.) issessment: German and places formation e LPOI (examination regulation ars in gree (1 major) Nanostruc gree (1 major) Functional ee (1 major) Chemistry (2 hing degree Gymnasium	f up to 3 candidates (30 minutes)] as well a /or English s for teaching-degree progra ture Technology (201 Materials (2015) :016) MINT Teacher Educat	approx. 15 minutes p as talk (approx. 30 m ammes) 5)	oer candidate) or d) l ninutes), weighted 3:	og (approx. 1
tes) or 20 pag Langua Allocat Modulic 150 h Teachin Referre Bachel Bachel Bachel Master Master Supple	c) oral ees) or e age of a ion of p onal inf onal inf oad ad ad ad ad ad ad ad ad ad ad ad ad a	examination in groups of e) presentation (approx.) issessment: German and places formation e LPO I (examination regulation ars in gree (1 major) Nanostruc gree (1 major) Functional ee (1 major) Chemistry (2 hing degree Gymnasium ry course MINT Teacher E	f up to 3 candidates (30 minutes)] as well a /or English s for teaching-degree progra ture Technology (201 Materials (2015) :016) MINT Teacher Educat ducation PLUS, Elite	approx. 15 minutes p as talk (approx. 30 m ammes) 5)	oer candidate) or d) l ninutes), weighted 3:	og (approx. 1
tes) or 20 pag Langua Allocat Additic Teachin Referre Bachel Bachel Bachel Bachel Master Supple Master	c) oral ees) or e age of a tion of onal inf onal inf oad ed to in e appea or's de or's de or's degr 's teac ementa 's degr	examination in groups of e) presentation (approx.) issessment: German and places formation e LPOI (examination regulation ars in gree (1 major) Nanostruc gree (1 major) Functional ee (1 major) Chemistry (2 hing degree Gymnasium	f up to 3 candidates (30 minutes)] as well a /or English s for teaching-degree progra ture Technology (201 Materials (2015) :016) MINT Teacher Educat ducation PLUS, Elite :018)	approx. 15 minutes p as talk (approx. 30 m ammes) 5) ion PLUS, Elite Netw Network Bavaria (EN	ork Bavaria (ENB) (2016)	og (approx. 1
tes) or 20 pag Langua Allocat Modulic 150 h Teachin Referre Bachel Bachel Bachel Bachel Master Master Supple Master Supple	c) oral es) or a age of a ion of p onal inf onal inf oad ad ad ad ad ad ad ad ad ad ad ad ad a	examination in groups of e) presentation (approx.) issessment: German and places formation e LPO I (examination regulation ars in gree (1 major) Nanostruc gree (1 major) Functional ee (1 major) Chemistry (2 hing degree Gymnasium ry course MINT Teacher E ee (1 major) Chemistry (2	f up to 3 candidates (30 minutes)] as well a /or English 	approx. 15 minutes (as talk (approx. 30 m ammes) 5) ion PLUS, Elite Netw Network Bavaria (EN ion PLUS, Elite Netw Network Bavaria (EN	ork Bavaria (ENB) (20 B) (2016) ork Bavaria (ENB) (20	og (approx. 1

Bachelor's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Chemistry (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title					Abbreviation
Molecular Materials (Practical Course)					08-FU-MoMaP-152-m01
Module coordinator				Module offered by	
degree tional <i>I</i>		mme coordinator Funktic als)	onswerkstoffe (Func-	Chair of Chemical T	echnology of Material Synthesis
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	(not) s	successfully completed	o8-FU-MoMa-V		
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
zoelect coating perime	ric and g) inclu ntal da	electrochromic material ding chemical synthesis, ta and scientific docume	s, polymer-based sup chemical and physic	erabsorbers and na	aterials (e.g. mesoporous, pie- noparticle-based anti-reflective nethods as well as analysis of ex-
Intend	ed lear	ning outcomes			
data ar unders	nalysis tanding		mentation. Having po e structure and funct	erformed experimention of molecular ma	sis, characterisation methods, ts, they have developed a deeper terials.
P (5)	3 (type, i			inanj	
Metho		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
pages	each) a	chtestate (pre and post- nd assessment of practions ssessment: German and	cal performance (2 to		minutes each, log approx. 5 to 10 ions)
Allocat	ion of j	olaces			
Additio	onal inf	ormation			
Worklo	ad				
150 h	1				
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	e appea	urs in			
		gree (1 major) Functional	Materials (2015)		





Engineering (ECTS credits)

Module title Abbreviation					Abbreviation
Basics of Electronics 1					99-EL1-152-m01
Module coordinator				Module offered by	<u> </u>
		aculty of Electrical Engine Sciences Würzburg-Schw		University of Applie 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	undergraduate			
Conten	ts				
Theore tors.	tical an	d practical principles of	science of electricity,	passive linear netw	orks, principles of semiconduc-
Intende	ed lear	ning outcomes			
		have basic knowledge of semiconductors.	theoretical and pract	ical science of elect	ricity, especially of passive linear
Course	S (type, r	number of weekly contact hours,	anguage — if other than Gei	man)	
V (3) +	Ü (1)				
		Sessment (type, scope, langua Ile for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
b) oral c) oral d) log (e) pres	examir examin approx entatio	mination (approx. 90 to 1 nation of one candidate e ation in groups of up to 3 . 20 pages) or n (approx. 30 minutes) ssessment: German and	ach (20 to 30 minute 3 candidates (approx		didate) or
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	e appea	ars in			
Bachel	or's de	gree (1 major) Functional	Materials (2015)		

Module	title				Abbreviation
Basics of Electronics 2					99-EL2-152-m01
Module	coord	inator		Module offered by	l
		aculty of Electrical Engine Sciences Würzburg-Schwo		University of Applie furt (FHWS)	ed Sciences Würzburg- Schwein-
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
		ld practical principles of t logy, combinatorial circu			, basic circuits, basic elements of
Intende	d lear	ning outcomes			
		have theoretical and prac ements of digital technol			ectrical engineering, basic cir- al circuits.
Courses	5 (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V (3) + ĺ	Ü (1)				
		Sessment (type, scope, langua ile for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
b) oral e c) oral e d) log (a e) prese	examir examin approx entatio	mination (approx. 90 to 1 nation of one candidate e ation in groups of up to 3 . 20 pages) or n (approx. 30 minutes) ssessment: German and,	ach (20 to 30 minute 3 candidates (approx.		didate) or
Allocati	-				
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ıg cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	appea	ars in			
Bachelo	or's de	gree (1 major) Functional	Materials (2015)		



Biology / Medicine

(ECTS credits)

Module title					Abbreviation
Principles of Cell Biology and Tissue Regeneration			egeneration		03-FU-Zell-152-m01
Module coordinator				Module offered by	
holder	ofthe	Chair of Orthopaedics (Ja	kob/Ebert)	Faculty of Medicine	2
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	undergraduate			
Conter	nts				
		of cell biology (cell structu polism, stem cells, viruse			biosynthesis, signal transducti-
Intend	ed lear	ning outcomes			
Studer	nts acqu	uire fundamental knowled	dge in cell and molec	ular biology.	
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V (4)					
		Sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
c) oral d) log e) pres	examin (approx sentatio	nation of one candidate e ation in groups of up to 3 . 20 pages) or n (approx. 30 minutes) ssessment: German and,	3 candidates (approx	-	didate) or
Allocat	tion of _l	olaces			
Additio	onal inf	ormation			
Worklo	oad				
150 h					
Teachi	ing cycl	e			
Referre	ed to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Modul	e appea	ars in			
		gree (1 major) Functional	Materials (2015)		
Bachel	lor's de	gree (1 major) Functional	Materials (2021)		
		gree (1 major) Functional			
Master	r's degr	ee (1 major) Biofabricatio	n (2025)		

Modul	e title				Abbreviation
Bioma	terials	(Lecture and Practical (Course / Seminar)		03-FU-BM-152-m01
Module coordinator Module					<u></u>
holder Dentis		Chair of Functional Mat	erials in Medicine and	Faculty of Medicine	2
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
7	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts	a			
proach tissue Intend Studer	nes in b engine ed lear nts acqu	iomaterial research inc ering will also be discu ning outcomes uire fundamental know	luding hydrogels, addi ssed.	tive manufacturing,	will be addressed. Modern ap- 3D cell scaffolds and materials for
-		brication.			
		number of weekly contact hour	s, language — if other than Ge	rman)	
V (4) +					
		Sessment (type, scope, lang ole for bonus)	guage — if other than German,	examination offered — if no	ot every semester, information on whether
each, l Langua Assess	og app age of a	rox. 5 to 10 pages each ssessment: German ar ffered: Once a year, su) and assessment of pr nd/or English		ation talks approx. 15 minutes (2 to 4 random examinations)
Alloca	tion of	places			
Additio	onal inf	ormation			
Worklo	bad				
210 h					
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)	
Modul	e appea	ars in			
Bache	lor's de	gree (1 major) Function	al Materials (2015)		
		gree (1 major) Function			
Bache	lor's de	gree (1 major) Function	al Materials (2025)		



Advanced Laboratory Course

(ECTS credits)

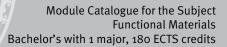
Module title					Abbreviation
Advanced Laboratory Course of Functional Materials					08-FU-VP-152-m01
Module coordinator				Module offered by	1
	e progra Matrier	mme coordinator Funktio	onswerkstoffe (Func-	Chair of Chemical	Technology of Material Synthesis
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
3	(not)	successfully completed			
Durati	on	Module level	Other prerequisites	i	
1 seme	ester	undergraduate			
Conte	nts		• •		
Practio	al work	in preparation for the st	udents' Bachelor's th	iesis.	
Intend	ed lear	ning outcomes			
Stude	nts are f	amiliar with research me	thods and procedure	25.	
Course	es (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
P (3)					
		s essment (type, scope, langua Ile for bonus)	ge — if other than German,	examination offered — if n	ot every semester, information on whether
		15 minutes) ssessment: German and	/or English		
Alloca	tion of	olaces			
Additi	onal inf	ormation			
Workl	oad				
90 h					
Teachi	ing cycl	e			
Referr	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)	
			· · ·		
Modul	e appea	ars in			
		gree (1 major) Functional	Materials (2015)		
		gree (1 major) Functional			
Bache	lor's de	gree (1 major) Functional	Materials (2025)		



Compulsory Electives

(20 ECTS credits)





Engineering (ECTS credits)

Module	e title				Abbreviation
Basics of Applied Mechanics99-TM-152-m01					99-TM-152-m01
Module	Module coordinator M				
		iculty of Mechanical Engi lied Sciences Würzburg-S	0	University of Applie 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	undergraduate			
Conten	ts				
Basics	of stati	stics, strength of materia	lls and dynamics.		
Intende	ed lear	ning outcomes			
		gain methodological com mations and in dimensio		ng forces and stress	resultants, in calculating tensi-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Gei	rman)	
V (3) +	Ü (1)				
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
c) oral d) log (e) pres Langua	examin approx entatio ge of a	ation of one candidate e ation in groups of up to 3 . 20 pages) or n (approx. 30 minutes) ssessment: German and, ffered: Once a year, winte	3 candidates (approx /or English		didate) or
Allocat		·			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	immes)	
Module	e appea	ars in			
Bachel	or's de	gree (1 major) Functional gree (1 major) Functional	Materials (2021)		
Dachel	or s de	gree (1 major) Functional	materials (2025)		

Module title					Abbreviation
Laboratory Course of Mechanical and Electrical Engineerin				g	99-IP-152-m01
Module	e coord	inator		Module offered by	1
chanic	al Engir	aculties of Electrical Eng neering at the University weinfurt		University of Applie furt (FHWS)	ed Sciences Würzburg- Schwein-
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	(not) s	successfully completed	99-EL1 and 99-EL2		
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			omplete module 99-TM prior to complete modules 99-CA and 99-
Conten	Its				
Engine	ering la	boratory and internship	experiments.		
Intend	ed lear	ning outcomes			
The stu ring.	ıdents l	have practical experience	es in applying engine	ering methods in ele	ectrical and mechanical enginee-
Course	S (type, r	number of weekly contact hours,	anguage — if other than Ge	rman)	
P (5)			-		
		eessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
Langua	age of a	oort (15 to 30 pages) ssessment: German and ffered: Once a year, sum	-		
Allocat	ion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ammes)	
Module	e appea	urs in			
		gree (1 major) Functional	Materials (2015)		

Modul	e title				Abbreviation
Constr	uction,	Calculation and Assen	nbly of Technical Produ	ucts	99-CA-152-m01
Module coordinator Module				Module offered by	y
		aculty of Mechanical Er lied Sciences Würzburg		University of Appl furt (FHWS)	ied Sciences Würzburg- Schwein-
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites	6	
1 seme	ster	undergraduate			
Conter	Its	~			
		ve view of the process of the contract of the	of product developmen	it, including the cor	responding specialist subjects ba
Intend	ed lear	ning outcomes			
					lopment of products with a focus otyping and product validation.
Course	S (type, r	number of weekly contact hour	rs, language — if other than Ge	rman)	
V (2) +	Ü (2)				
		s essment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if	not every semester, information on whether
c) oral d) log (e) pres Langua	examin (approx entatio age of a sment o	ation in groups of up t . 20 pages) or n (approx. 30 minutes) ssessment: German ar ffered: Once a year, su	nd/or English		ndidate) or
Allocat	ion of _l	places			
Additio	onal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
	ed to in	LPO I (examination regulation	ions for teaching-degree progra	ammes)	
Modul	e appea	ars in			
Bachel	or's de	gree (1 major) Function gree (1 major) Function gree (1 major) Function	al Materials (2021)		



Physics (ECTS credits)

Module	title				Abbreviation	
Introduction to Nanoscience 11-N-EIN-152-m01					11-N-EIN-152-m01	
Module	e coord	inator		Module offered by		
Managi	ng Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
7	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
2 seme	ster	undergraduate	Admission prerequis 85% of sessions).	site to assessment: r	regular attendance (minimum	
Conten	Contents					
Introdu	ction to	o the principles of produc	ing, characterising a	nd applying nanostr	uctures.	
Intende	ed leari	ning outcomes				
		nave knowledge of the fu ructures.	ndamental properties	s, technologies, chai	racterising methods and functi-	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (2) + 1 Module	• •	t in: German or English				
		e essment (type, scope, langua; le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
	-	5 minutes) with discussi ssessment: German and/		mination (approx. 1	20 minutes)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
this wil 3 Sente find tha gistration ly registration sessme	Registration: If a student registers for the exercises and obtains the qualification for admission to assessment, this will be considered a declaration of will to seek admission to assessment pursuant to Section 20 Subsection 3 Sentence 4 ASPO (general academic and examination regulations). If the module coordinators subsequently find that the student has obtained the qualification for admission to assessment, they will put the student's registration for assessment into effect. Only those students that meet the respective prerequisites can successfully register for an assessment. Students who did not register for an assessment or whose registration for an assessment was not put into effect will not be admitted to the respective assessment. If a student takes an assessment to which he/she has not been admitted, the grade achieved in this assessment will not be considered.					
Worklo			, 0			
210 h						
Teachir	ng cycl	9				
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Module appears in						
Bachelor's degree (1 major) Nanostructure Technology (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2015) Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2020) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2020) Bachelor's degree (1 major) Functional Materials (2021)						
Dachell	or s ueg	sice (I major) i unchoridi	materials (2021)			

Module	title				Abbreviation
Laborat	tory Co	urse Physical Technolog	y of Material Synthe	sis	11-PPT-152-m01
Module	e coord	inator		Module offered by	
Managi	ing Dire	ector of the Institute of Ap	plied Physics	Faculty of Physics a	ind Astronomy
ECTS		od of grading	Only after succ. com	pl. of module(s)	·
8	(not) s	successfully completed		-	
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate	Students of Funktion recommended to tal		onal Materials, Bachelor's) are
Conten	ts				
Physica nologie		rial properties, growth ar	nd coating procedures	s, methods of charac	cterisation and structuring tech-
Intende	ed lear	ning outcomes			
The stu terial sy			actical basics of mat	erial characterisatio	n and physical technology for ma-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
P (5) Module	e taugh	t in: German or English			
		Sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
if a Test sessme en succ ted. Langua	tat (exa ent can cessful ge of a	am) is passed. An experir be repeated once in the	nent log (approx. 8 p. respective semester. semester will the mo /or English	ages) must be prepa Only if both compor	red successfully completed if a need. Each component of the as- nents of the assessment have be- considered successfully comple-
Allocat					
		10003			
Additio	nal inf	ormation			
Worklo	ad				
240 h					
Teachir	ıg cycl	е			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module					
		gree (1 major) Nanostruct		5)	
		gree (1 major) Functional			
bachel	ur s ae	gree (1 major) Nanostruct	ure rechnology (202	U)	

Module	e title			Abbreviation				
Data ar	nd Erro	r Analysis			11-P-FR1-152-m01			
Module	e coord	inator		Module offered by				
Manag	ing Dire	ector of the Institute of A	Applied Physics	Faculty of Physics a	nd Astronomy			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)				
2	(not) s	successfully completed						
Duratio	on	Module level	Other prerequisites	i				
1 semester undergraduate			13 exercise sheets p approx. 50% of exer	Admission prerequisite to assessment: completion of exercises (approx. 13 exercise sheets per semester). Students who successfully completed approx. 50% of exercises will qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the semester.				
Conten	ts							
		s, error approximation a deviation.	and propagation, graph	nic representations, l	inear regression, me	ean values		
Intende	ed lear	ning outcomes						
		are able to evaluate me to draw, present and di	-		gation and of the prin	nciples of		
Course	S (type, r	number of weekly contact hours	, language — if other than Ge	rman)				
V (1) + I Module		t in: Ü: German or Engli	sh					
		sessment (type, scope, lang		examination offered — if no	t every semester, informati	ion on whether		
		le for bonus)						
		nation (approx. 120 min ssessment: German an						
Allocat	ion of _l	olaces						
Additio	onal inf	ormation						
this wil 3 Sente find tha gistrati ly regis sessme	l be co ence 47 at the s on for a ter for a ent was	f a student registers for nsidered a declaration ASPO (general academi tudent has obtained th assessment into effect. an assessment. Studen a not put into effect will which he/she has not be	of will to seek admissi c and examination reg e qualification for adm Only those students th ts who did not register not be admitted to the	on to assessment pu ulations). If the mod lission to assessmen nat meet the respection for an assessment of respective assessment	rsuant to Section 20 ule coordinators sub it, they will put the s ve prerequisites car or whose registration ent. If a student take	o Subsection osequently tudent's re- n successful- n for an as- es an as-		
Worklo	ad							
60 h								
Teachi	ng cycl	e						
Referre	d to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)				
	§ 53 Nr. 1 c) § 77 Nr. 1 d)							
Module	Module appears in							
Bachel	or's de	gree (1 major) Mathema gree (1 major) Physics (gree (1 major) Nanostru	2015)	5)				
Bachelor's	with 1 ma	jor Functional Materials (2015)	-	• generated 18-Apr-2025 • exa lor (180 ECTS) Funktionswerks	-	page 60 / 106		

UNIVERSITÄT WÜRZBURG

Bachelor's degree (1 major) Mathematical Physics (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Aerospace Computer Science (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2015) First state examination for the teaching degree Grundschule Physics (2015) First state examination for the teaching degree Realschule Physics (2015) First state examination for the teaching degree Gymnasium Physics (2015) First state examination for the teaching degree Mittelschule Physics (2015) Bachelor's degree (1 major) Mathematical Physics (2016) Bachelor's degree (1 major) Aerospace Computer Science (2017) First state examination for the teaching degree Grundschule Physics (2018) First state examination for the teaching degree Realschule Physics (2018) First state examination for the teaching degree Gymnasium Physics (2018) First state examination for the teaching degree Mittelschule Physics (2018) Bachelor's degree (1 major) Physics (2020) Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major, 1 minor) Physics (Minor, 2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) First state examination for the teaching degree Grundschule Physics (2020) First state examination for the teaching degree Gymnasium Physics (2020) First state examination for the teaching degree Realschule Physics (2020) First state examination for the teaching degree Mittelschule Physics (2020) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (1 major) Mathematics (2023) exchange program Physics (2023) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (1 major) Functional Materials (2025)



Mathematics and Computer Science

(ECTS credits)

Module title Abbreviation								
Compu	tationa	al Mathematics			10-M-COM-152-m01			
Module	e coord	inator		Module offered by				
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics			
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)				
4	(not) s	successfully completed						
Duratio	n	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts		ļ					
merical and 10-	Introduction to modern mathematical software for symbolic computation (e. g. Mathematica or Maple) and nu- merical computation (e. g. Matlab) to supplement the basic modules in analysis and linear algebra (10-M-ANA-G and 10-M-LNA-G). Computer-based solution of problems in linear algebra, geometry, analysis, in particular diffe- rential and integral calculus; visualisation of functions.							
Intende	ed lear	ning outcomes						
		earns the use of advanced cation to solve mathema		cal software package	es, and is able to ass	sess their		
Course	S (type, r	number of weekly contact hours, l	language — if other than Ger	man)				
V (1) + l	Ü (2)							
		Sessment (type, scope, langua vle for bonus)	ge — if other than German, e	examination offered — if no	t every semester, informati	on on whether		
Langua	ige of a	form of programming exe ssessment: German and ffered: Once a year, wint	/or English	25 hours)				
Allocat	ion of _l	places						
Additio	nal inf	ormation						
Worklo	ad							
120 h								
Teachi	ng cycl	e	-					
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	mmes)				
§ 22								
Module		ars in						
-		gree (1 major) Mathemati	ics (2015)					
		gree (1 major) Physics (20						
		gree (1 major) Nanostruci	-	5)				
Bachel	or's de	gree (1 major) Economatł	nematics (2015)					
Bachel	or's de	gree (1 major) Mathemati	ical Physics (2015)					
		gree (1 major) Computati		015)				
		gree (1 major) Functional	-					
	First state examination for the teaching degree Gymnasium Mathematics (2015)							
		gree (1 major) Mathemati	-					
		gree (1 major) Economath		Mathamatics ()				
		mination for the teaching	,	wathematics (2019)				
Dachel	oi s de	gree (1 major) Physics (20	020)					
Bachelor's	with 1 ma	jor Functional Materials (2015)		generated 18-Apr-2025 • exa or (180 ECTS) Funktionswerk		page 63 / 106		

UNIVERSITÄT WÜRZBURG

Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Fucntional Materials (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Economathematics (2025)

Module	e title				Abbreviation	
Ordina	ry Diffe	rential Equations for stu	dents of other subjec	ts	10-M-DGLaf-152-mc	01
Module	e coord	inator		Module offered by		
Dean o	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	natics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	its	0	<u>I</u>			
		uniqueness theorem; co	ntinuous dependenc	e of solutions on ini	tial values: systems	of linear dif-
		tions; matrix exponential				or thread an
Intend	ed learı	ning outcomes	·			
The stu	dent is	acquainted with the fun	damental concepts a	nd methods of the t	heory of ordinary dif	ferential
		/she is able to apply the	•			
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) +	Ü (2)					
Metho	d of ass	essment (type, scope, langua	ge — if other than German, e	examination offered — if no	ot every semester, informat	ion on whether
module is	s creditab	le for bonus)				
		mination (approx. 90 to 1				
		ation of one candidate e				
		ation in groups (groups of sessment: German and,		per candidate)		
	ble for		OI EIIglISII			
	ion of p					
Allocal		hates				
Additio	nalinf	ormation				
Additio	onat ini	ormation				
Worklo	ad					
300 h						
Teachi	ng cycl	9				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module	e appea	nrs in				
Bachel	or's de	gree (1 major) Computer S	Science (2015)			
		gree (1 major) Aerospace		.015)		
		gree (1 major) Functional				
		gree (1 major) Aerospace		.017)		
		gree (1 major) Computer S				
		gree (1 major) Computer S	-			
		gree (1 major) Aerospace gree (1 major) Functional		020)		
		gree (1 major) Functional		hility (2021)		
		gree (1 major) Artificial In				
		gree (1 major) Artificial In	-			
		gree (1 major) Artificial In	-			
		, ,	-			
Pachelore	with a mai	or Functional Materials (2015)	IALL Mürzh	generated 18-Apr-2025 • example 1	am rag da	page 65 / 106



Bachelor's degree (1 major) Functional Materials (2025)

Module	Module title Abbreviation					
Introdu	uction t	o Functional Analysis for	Students of other Su	ıbjects	10-M-FANaf-152-m01	
Module	e coord	inator		Module offere	d by	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Ma	thematics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s	5)	
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester undergraduate						
Conten	Its					
Banach	n space	s and Hilbert spaces, bo	unded operators, prir	nciples of functi	onal analysis.	
Intend	ed lear	ning outcomes				
metho	ds, is a		n linear algebra and	analysis to func	nalysis as well as the pertinent proof tional analysis, and realises the	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V (4) +	Ü (2)					
module is a) writt b) oral c) oral	s creditab en exa examir examin age of a	le for bonus) mination (approx. 90 to 1 nation of one candidate e ation in groups (groups o ssessment: German and	80 minutes, usually ach (15 to 30 minutes of 2, 10 to 15 minutes	chosen) or s) or	— if not every semester, information on whether	
Allocat						
Additio	onal inf	ormation				
Worklo	ad					
300 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module appears in						
		gree (1 major) Functional	-			
		gree (1 major) Functional				
Bachel	or's de	gree (1 major) Functional	Materials (2025)			

Module	e title			Abbreviation		
Numer	ical Ma	thematics 1 for students	s of other subjects		10-M-NUM1af-152-n	101
Module	e coord	inator		Module offered by		
Dean o	of Studi	es Mathematik (Mathem	atics)	Institute of Mathem	natics	
ECTS	1	od of grading	Only after succ. con	pl. of module(s)		
10	1	rical grade				
Duratio		Module level	Other prerequisites			
1 seme	-	undergraduate				
Conten			1			
		stems of linear equation	s and curve fitting pro	blems nonlinear eo	mations and system	s of equati-
		tion with polynomials, s				o or equali
Intend	ed lear	ning outcomes	<u>.</u>			
The stu	udent is	acquainted with the fur	ndamental concepts a	nd methods in nume	erical mathematics, a	applies them
		oblems and knows abou				
Course	S (type, r	number of weekly contact hours,	language — if other than Ger	man)		
V (4) +	Ü (2)					
Metho	d of ass	Sessment (type, scope, langu	age — if other than German, o	examination offered — if no	ot every semester, informati	on on whether
module is	s creditab	le for bonus)				
a) written examination (approx. 90 to 180 minutes, usually chosen) or						
		nation of one candidate		-		
		ation in groups (groups ssessment: German and		per candidate)		
	ble for					
	tion of p					
Additic	onal inf	ormation	_			
			_			
Worklo	ad					
300 h						
	ng cycl	e				
	3-)					
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
	<u></u>					
Modul	e appea	ars in				
		gree (1 major) Computer	Science (2015)			
		gree (1 major) Physics (2				
		gree (1 major) Nanostruc	-	5)		
		gree (1 major) Aerospace				
Bachel	or's de	gree (1 major) Functiona	l Materials (2015)			
		gree (1 major) Aerospace	•	.017)		
		gree (1 major) Computer				
		gree (1 major) Computer	•			
		gree (1 major) Physics (2		`		
		gree (1 major) Nanostruc				
		gree (1 major) Aerospace gree (1 major) Functiona	•	.020)		
bachel	or s ue	gree (1 major) runctiona	i materiais (2021)			
Bachelor's	with 1 ma	jor Functional Materials (2015)	-	generated 18-Apr-2025 • exa or (180 ECTS) Funktionswerk	-	page 68 / 106
				or (100 LCT3) Funktionswerk	2015	

Bachelor's degree (1 major) Computer Science und Sustainability (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Functional Materials (2025)

Module	e title				Abbreviation		
Numeri	ical Ma	thematics 2 for students	of other subjects		10-M-NUM2af-152-1	m01	
Module	e coord	inator		Module offered by			
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
10		rical grade					
Duratio		Module level	Other prerequisites				
1 seme		undergraduate					
Conten							
		oblems, linear programm Ie problems.	ing, methods for initi	al value problems fo	or ordinary differenti	al equation:	
Intend	ed lear	ning outcomes					
about t	heir ad	able to draw a distinctio vantages and limitations ng sciences and econom	concerning the poss	•			
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (4) +	Ü (2)						
Metho	d of ass	sessment (type, scope, langua	ge — if other than German, e	examination offered — if no	ot every semester, informat	ion on whether	
		le for bonus)	•		· ·		
Langua credita	ge of a ble for						
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
300 h							
Teachi	ng cycl	e					
	<u> </u>						
Poforro	d to in	LPOI (examination regulations	for toaching dograe progra	mmoc)			
Kererre				inites)			
	e appea						
		gree (1 major) Physics (20 gree (1 major) Nanostruct		-)			
		gree (1 major) Aerospace					
		gree (1 major) Functional	•	····)			
		gree (1 major) Aerospace		.017)			
		gree (1 major) Physics (20	•	17			
		gree (1 major) Nanostruct		o)			
		gree (1 major) Aerospace					
		gree (1 major) Functional	•				
		gree (1 major) Quantum T					
Bachel	or's de	gree (1 major) Functional	Materials (2025)				
achelor's	with 1 ma	jor Functional Materials (2015)	JMU Würzburg •	generated 18-Apr-2025 • exa	am. reg. da-	page 70 / 10	
				or (180 ECTS) Funktionswerk		, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	

Modul	e title				Abbreviation	
Progra	mming	course for students of M	lathematics and othe	r subjects	10-M-PRG-152-m01	
Module	e coord	inator		Module offered by	<u> </u>	
		es Mathematik (Mathema	atics)	Institute of Mathematics		
ECTS	1	od of grading	Only after succ. com			
		successfully completed				
3 Duratio		Module level	Other prerequisites			
1 seme		undergraduate				
		unuergrauuale				
Conten						
		odern programming lang	uage (e.g.C).			
Intend	ed learı	ning outcomes				
The stu in math		able to work independe s.	ntly on small program	nming exercises and	standard programm	ing problems
Course	S (type, n	umber of weekly contact hours,	language — if other than Ger	man)		
P (2)						
	d of ass	Sessment (type, scope, langua	age — if other than German.	examination offered — if no	ot every semester. informati	ion on whether
		le for bonus)				
project	in the	form of programming exe	ercises (approx. 20 to	25 hours)		
-	-	ssessment: German and	· •			
Assess	ment o	ffered: Once a year, sum	mer semester			
Allocat	ion of p	olaces				
			_			
Additio	onal inf	ormation				
Worklo	ad					
90 h						
Teachi	ng cycl	e				
Roforra	ad to in	LPO I (examination regulation	s for toaching dogroo progra	mmoc)		
§ 22				inites)		
_						
Modul			· · · (- · · -)			
		gree (1 major) Mathemat				
		gree (1 major) Physics (20 gree (1 major) Nanostruc	-	-)		
		gree (1 major) Economati)		
		gree (1 major) Mathemat				
		gree (1 major) Computati	• -	015)		
		gree (1 major) Functional				
First st	ate exa	mination for the teaching	g degree Gymnasium	Mathematics (2015)		
		gree (1 major) Mathemat	•			
		gree (1 major) Economati				
		mination for the teaching	,	Mathematics (2019))	
		gree (1 major) Physics (2)				
		gree (1 major) Nanostruc gree (1 major) Mathemat		0)		
		gree (1 major) Mathemati gree (1 major) Functional	•			
		or Functional Materials (2015)		generated 18-Apr-2025 • ex	am, reg. da-	page 71 / 106
			-	or (180 ECTS) Funktionswerk	-	P430 / 1 / 100

Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) exchange program Mathematics (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Economathematics (2025)

Module	Module title Abbreviation					
Databa	ses				10-I-DB-152-m01	
Module	e coord	inator		Module offered by		
Dean of	f Studi	es Informatik (Computer	Science)	Institute of Comput	er Science	
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	undergraduate				
Conten	ts		,			
Relation ment.	Relational algebra and complex SQL statements; database planning and normal forms; transaction manage- ment.					
Intende	ed lear	ning outcomes				
		oossess knowledge abou	ut database modellin	g and queries in SOL	as well as transaction	ons.
		number of weekly contact hours,		- ,		
V (2) +						
Method	d of ass	sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	t every semester, informati	on on whether
lf annoi examin prox. 15 Langua	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus					
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachir	ng cycl	e				
Referre	d to in	LPOI (examination regulation	s for teaching-degree progra	ummes)		
§ 49 N § 69 N	lr. 1 b)					
Module		ars in				
Bachel	or's de	gree (1 major) Computer	-			
		gree (1 major) Mathemat gree (1 major) Business I		(2015)		
		gree (1 major) Computati	•	-		
		gree (1 major) Aerospace		-		
		gree (1 major) Functional	•	2		
		mination for the teaching		•	-	
		mination for the teaching	,	Computer Science (2	2015)	
	-	ee (1 major) Physics (201 groo (1 major) Businoss I		(2016)		
		gree (1 major) Business I gree (1 major) Aerospace	•			
Bachelor's	with 1 ma	jor Functional Materials (2015)	-	e generated 18-Apr-2025 • exa or (180 ECTS) Funktionswerks	_	page 73 / 106

UNIVERSITÄT WÜRZBURG

Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major) Business Information Systems (2019) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Computer Science und Sustainability (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Games Engineering (2025)

Module	e title				Abbreviation	
Introdu	uction t	o Computer Science for	Students of all Facult	ies	10-I-EIN-152-m01	
Module	e coord	inator		Module offered by	<u> </u>	
Dean o	fStudi	es Informatik (Compute	r Science)	Institute of Computer Science		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	1	rical grade		• • • •		
Duratio		Module level	Other prerequisites			
1 seme		undergraduate				
		undergraduate				
Conten		· · · · ·		<u> </u>	1 1. (1 .	
		f computer science inc hms and data structure			ebsites (HTML, XML	, EBNF), data
			s, programming (Java).			
		ning outcomes				
		are familiar with the fun				
		ebsites (HTML, XML, EB			ures, programming	in Java.
		umber of weekly contact hours	, language — if other than Ger	rman)		
V (4) +	Ü (2)					
Metho	d of ass	essment (type, scope, lange	uage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
module is	s creditab	le for bonus)				
		nation (approx. 60 to 12				
Langua	ige of a	ssessment: German an	d/or English			
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
300 h						
-		•				
Teachi		e				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	immes)		
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Geograpł	ıy (2015)			
Bachel	or's deg	gree (1 major) Physics (2015)			
Bachel	or's deg	gree (1 major) Functiona	al Materials (2015)			
	-	ee (1 major) Psychology	-			
		gree (1 major, 1 minor) F			,	
		gree (1 major, 1 minor) F			2015)	
		gree (2 majors) Pre- and				
		gree (1 major, 1 minor) [gree (1 major, 1 minor) [-			
		gree (1 major, 1 minor) [gree (2 majors) Digital ŀ		101, 2010)		
		gree (2 majors) Digital r gree (1 major) Functiona				
		ee (1 major) Psychology				
	-	gram Psychology (2023)				
		gree (1 major) Geograph				
		gree (1 major) Functiona				
		or Functional Materials (2015)		generated 18-Apr-2025 • example	am. reg. da-	page 75 / 106
				or (180 ECTS) Funktionswerk		



Chemistry (ECTS credits)

Module title					Abbreviation	
Progra	mming	and numerical methods			08-PKC-152-m01	
Module	e coord	inator		Module offered by		
lecture	r of lec	ture "Programmierkurs fü	ir Chemiker"	Institute of Physical and Theoretical Chemistry		
ECTS	Meth	od of grading	Only after succ. con	c. compl. of module(s)		
5	(not)	successfully completed				
Duratio		Module level	Other prerequisites			
1 seme	ester undergraduate					
Conten						
		provides an introduction t d to problems in chemist		of a programming la	nguage and discusses how they	
Intend	ed lear	ning outcomes				
Studen chemis		able to describe the fund	amentals of the prog	ramming language a	nd to apply them to problems ir	
Course	S (type, 1	number of weekly contact hours,	language — if other than Ge	rman)		
S (2) +	Ü (2)					
a) writt b) oral c) oral	en exa examir	nle for bonus) mination (approx. 90 to 1 nation of one candidate e		es) or		
e) pres Langua Assess Allocat	(approx entation age of a sment of tion of	. 20 pages) or n (approx. 30 minutes) ssessment: German and ffered: Once a year, sum	-	-	didate) or	
e) pres Langua Assess Allocat	(approx entation age of a sment of tion of	a. 20 pages) or n (approx. 30 minutes) ssessment: German and ffered: Once a year, sum places	/or English	-	didate) or	
e) pres Langua Assess Allocat	(approx sentation age of a sment of tion of p onal inf	a. 20 pages) or n (approx. 30 minutes) ssessment: German and ffered: Once a year, sum places	/or English	-	didate) or	
e) pres Langua Assess Allocat Additic	(approx sentation age of a sment of tion of p onal inf	a. 20 pages) or n (approx. 30 minutes) ssessment: German and ffered: Once a year, sum places	/or English	-	didate) or	
e) pres Langua Assess Allocat Additic Worklo	(approx eentatic age of a sment o tion of p onal inf	. 20 pages) or n (approx. 30 minutes) ssessment: German and ffered: Once a year, sum places ormation	/or English	-	didate) or	
e) pres Langua Assess Allocat Additic Worklo 150 h	(approx eentatic age of a sment o tion of p onal inf	. 20 pages) or n (approx. 30 minutes) ssessment: German and ffered: Once a year, sum places ormation	/or English	-	didate) or	
e) pres Langua Assess Allocat Additic Worklo 150 h Teachin	(approx eentatic age of a sment o tion of p onal inf pad	e	/or English mer semester	. 15 minutes per can	didate) or	
e) pres Langua Assess Allocat Additic Worklo 150 h Teachin	(approx eentatic age of a sment o tion of p onal inf pad	. 20 pages) or n (approx. 30 minutes) ssessment: German and ffered: Once a year, sum places ormation	/or English mer semester	. 15 minutes per can	didate) or	
e) pres Langua Assess Allocat Additic 150 h Teachi Referre 	(approx eentatic age of a sment o tion of p onal inf pad	. 20 pages) or in (approx. 30 minutes) issessment: German and iffered: Once a year, sum places ormation e LPOI (examination regulation	/or English mer semester	. 15 minutes per can	didate) or	
e) pres Langua Assess Allocat Morklo 150 h Teachin Referre Bachel Bachel Bachel Bachel	(approx entation age of a sment of tion of p onal inf onal inf oad ad ad ad ad ad ad ad ad ad ad ad ad a	. 20 pages) or in (approx. 30 minutes) issessment: German and iffered: Once a year, sum places ormation e LPOI (examination regulation	/or English mer semester s for teaching-degree progra (2015) Materials (2015) (2017)	. 15 minutes per can	didate) or	

Module	Module title Abbreviation					
Bioche		1			08-BC1-152-m01	
Module				Module offered by		
-	1	Chair of Biochemistry		Chair of Biochemist	try	
ECTS		od of grading	Only after succ. com	pl. of module(s)		
5		rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
mistry. tertiary sis, glu tion, fa discuss	Comprising lectures and exercises, this module acquaints students with the fundamental principles of bioche- mistry. A particular focus is on the biochemistry of proteins (amino acids, peptide bonds, primary, secondary, tertiary and quaternary structures), catalytic strategies and enzyme kinetics, carbohydrate metabolism (glycoly- sis, gluconeogenesis, citric acid cycle, cellular respiration, photosynthesis), fatty acid metabolism (beta oxida- tion, fatty acid synthesis), nucleotide metabolism, the urea cycle and amino acid metabolism. The module also discusses the structure of the DNA and the central dogma of molecular biology.					econdary, sm (glycoly- beta oxida-
	-	ning outcomes				
		e become familiar with th dule. They are able to de				ere discus-
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
V (2) +	Ü (1)					
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, informat	ion on whether
written	exami	nation (approx. 60 to 90	minutes)			
Allocat	ion of _l	olaces				
Additio	nal inf	ormation				
		2 para. 2 sentence 2 AP POLmCh and No. 3 of ann			er e) and No. II 1st le	tter c) of an-
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
§ 42 N § 62 N						
Module	e appea	urs in				
Bachel	or's de	gree (1 major) Biochemis	try (2015)			
		gree (1 major) Biology (20	-			
		gree (1 major) Chemistry				
		gree (1 major) Food Cherr				
		gree (1 major) Functional mination for the teaching		Chemistry (2015)		
		mination for the teaching		• -		
		mination for the teaching				
		mination for the teaching		Chemistry (2015)		
Bachel	or's de	gree (1 major) Food Cherr	nistry (2016)			
Bachelor's	with 1 ma	ior Functional Materials (2015)		generated 18-Apr-2025 • exa		page 78 / 106

Bachelor's degree (1 major) Biology (2017) Bachelor's degree (1 major) Biochemistry (2017) Bachelor's degree (1 major) Chemistry (2019) Module studies (Bachelor) Chemistry (2019) Module studies (Bachelor) Orientierungsstudien (2020) First state examination for the teaching degree Mittelschule Chemistry (2020 (Prüfungsordnungsversion 2015)) Bachelor's degree (1 major) Biology (2021) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Food Chemistry (2021) Bachelor's degree (1 major) Food Chemistry (2021) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Functional Materials (2025)

Julius-Maxi

UNIVERSITÄT

WÜRZBURG

Module	title				Abbreviation	
Quantu	m Che	mistry			08-TC-152-m01	
Module				Module offered by		
lecture		ture "Quantenchemie"		· · · · ·	l and Theoretical Ch	emistry
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
3	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
This module provides students with deeper insights into advanced topics in quantum chemistry. It focuses on spin, the Pauli principle, Slater determinants, the Hartree-Fock method, correlation energy, configuration interaction and excited states, the Born-Oppenheimer approximation and bonding models of H2+.						
Intende	ed leari	ning outcomes				
Studen	ts are a	able to describe excited	states of molecules w	ith the help of key co	oncepts and models	•
Course	S (type, n	umber of weekly contact hours	language — if other than Ger	man)		
V (2) +	Ü (1)					
		s essment (type, scope, langu le for bonus)	age — if other than German, e	examination offered — if no	t every semester, informat	ion on whether
d) log (e) pres	approx entatio ge of a	ation in groups of up to . 20 pages) or n (approx. 30 minutes) ssessment: German and bonus				
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
90 h						
Teachi	ng cycl	e				
	0 -) - (
Referre	d to in	LPO I (examination regulatio	ns for teaching dogree progre	mmec)		
§ 22						
§ 22 § 22 § 22	Nr. 2 f)					
Module	e appea	irs in				
		gree (1 major) Chemistry	(2015)			
		gree (1 major) Mathema	-			
		gree (1 major) Computat		015)		
		gree (1 major) Functiona				
		mination for the teachir		• -		
		mination for the teachir		• -		
		mination for the teachir	,	• -		
		mination for the teachir		• -	ork Dovoria (END) (-	016)
		ning degree Gymnasium		generated 18-Apr-2025 • exa		016) page 80 / 106
				or (180 ECTS) Funktionswerks		

Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Bachelor's degree (1 major) Biochemistry (2017) Bachelor's degree (1 major) Chemistry (2017) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) First state examination for the teaching degree Mittelschule Chemistry (2020 (Prüfungsordnungsversion 2015)) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Biochemistry (2022) Bachelor's degree (1 major) Mathematics (2023) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Functional Materials (2025)

Module title					Abbreviation
Applie	d Spect	roscopy 3			08-PS3-152-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	Meth	od of grading	Only after succ. con	c. compl. of module(s)	
5	nume	rical grade			
Duratio	ation Module level Other prerequisites				
1 seme	mester undergraduate				
Conten			1		
practic	e and t		raphs. We will record		e of spectroscopic methods in fluorescence and vibration spec
Intende	ed lear	ning outcomes			
		able to work with differer discussions.	nt spectrometers and	to interpret the resu	lting spectra. They are able to
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
V (3)					
b) oral c) oral d) log (e) pres	examir examin approx entatio age of a	mination (approx. 90 to a nation of one candidate e ation in groups of up to . 20 pages) or n (approx. 30 minutes) ssessment: German and	each (20 to 30 minute 3 candidates (approx		didate) or
		ormation			
 Worklo					
 Worklo 150 h	ad	ormation			
 Worklo	ad	ormation			
 Worklo 150 h Teachin	oad ng cycl	ormation e	IS for teaching-degree progra	nmmes)	
 Worklo 150 h Teachin	oad ng cycl	ormation	s for teaching-degree progra	ammes)	
 Worklo 150 h Teachin	ng cycl ed to in	ormation e LPOI (examination regulation	is for teaching-degree progra	ammes)	

Module	e title				Abbreviation	
Practic	al spec	troscopy 1			08-0C-Spec-152-m01	
Module	e coord	inator		Module offered by		
lecture	r of lec	ture "Organische Chemie	2"	Institute of Organic	Chemistry	
ECTS	Metho	od of grading	Only after succ. con	succ. compl. of module(s)		
3		rical grade				
Duratio		Module level	Other prerequisites	isites		
1 seme	ster	undergraduate				
Conten			I			
	odule i		e spectroscopic meth	ods of infrared spec	troscopy, mass spectrometry and	
Intend	ed lear	ning outcomes				
		able to describe importa molecular structure.	nt spectroscopic meth	nods, to evaluate a s	pectrum and to draw conclusions	
		number of weekly contact hours,	anguaga if ather there (man)		
V (2)	s (type, r	fumber of weekly contact hours,	language — II other than Ger	llidil)		
		· · · · · · · · · · · · · · · · · · ·				
		Gessment (type, scope, langua ele for bonus)	age — if other than German, o	examination offered — if no	ot every semester, information on whether	
d) log (e) pres	approx entatio	ation in groups of up to 20 pages) or n (approx. 30 minutes) ssessment: German and				
Allocat	ion of _l	places				
Additio	nal inf	ormation	-			
Worklo	ad					
90 h						
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
§ 22 § 22 § 62 N	Nr. 2 f)					
Module		ars in				
		gree (1 major) Functional	Materials (2016)			
		mination for the teaching		e Chemistry (2015)		
11151 50	ata ava	initiation for the teaching	g degree Realschule (Chemistry (2015)		
First sta	First state examination for the teaching degree Gymnasium Chemistry (2015) First state examination for the teaching degree Mittelschule Chemistry (2015)					
First sta First sta	ate exa	mination for the teaching mination for the teaching	g degree Gymnasium g degree Mittelschule	Chemistry (2015) Chemistry (2015)	rüfungsordnungsversion 2015))	

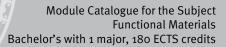
Module	e title				Abbreviation	
Chemic	cally an	d bio-inspired Nanoted	chnology for Material S	Synthesis	08-FU-NT-152-m01	
Module	e coord	inator		Module offered by	/	
degree tional <i>N</i>		mme coordinator Funkt als)	tionswerkstoffe (Func-	Chair of Chemical	Technology of Materi	al Synthesis
ECTS	Metho	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						
ted ma	terials.	hods and parameters i Fundamental principle al synthesis.				
Intende	ed lear	ning outcomes				
Studen	its have	e developed a sound kr	nowledge of sol-gel che	mistry and biomin	eralisation.	
Course	S (type, r	number of weekly contact hours	s, language — if other than Ge	rman)		
V (4)						
	d of as	sessment (type, scope, lang	uage — if other than German	examination offered — if	not every semester informati	ion on whether
		le for bonus)				
	ige of a	n (approx. 30 minutes) ssessment: German an blaces				
 Additio	nalinf	ormation				
Auditio	mat mi					
Worklo	ad					
150 h		-				
Teachi		•				
reactill	is cycl					
Doferre						
Reieffe		LPO I (examination regulation	ons for teaching-degree progra	ammes)		
		•				
Module			Table 1	-)		
		gree (1 major) Nanostru gree (1 major) Function		5)		
		ee (1 major) Chemistry				
	-	ning degree Gymnasiun		ion PLUS. Elite Net	work Bavaria (ENB) (20	016)
		y course MINT Teacher				- /
		ee (1 major) Chemistry		· ·	-	
		ning degree Gymnasiun				020)
		y course MINT Teacher			NB) (2020)	
		gree (1 major) Nanostru		o)		
Bachel	or's de	gree (1 major) Quantur	1 IECNNOLOGY (2021)			
Bachelor's	with 1 ma	or Functional Materials (2015)	JMU Würzburg •	generated 18-Apr-2025 • 6	yam rog da	
acheior 5				or (180 ECTS) Funktionswe	-	page 84 / 106



Master's degree (1 major) Chemistry (2024)

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)





Medicine

(ECTS credits)

Module	e title				Abbreviation
Physic	al Tech	nology of Material Synth	nesis (Lecture and Pra	actical Course)	03-FU-TV-152-m01
Module	e coord	inator		Module offered b	y
holder Dentist		Chair of Functional Mater	ials in Medicine and	Faculty of Medici	ne
ECTS	Metho	od of grading	Only after succ. compl. of module(s)		
5	nume	rical grade			
Duratio	on	Module level	vel Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Theore sandwi		-	knowledge of the fab	prication and evalu	ation of composite respectively
Intend	ed lear	ning outcomes			
Studen	its gain	fundamental knowledge	about the fabricatio	n and evaluation o	f composite materials.
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
V (2) +	P (2)				
a) asse each, le Langua	essmen og app Ige of a ment o	rox. 5 to 10 pages each) a ssessment: German and ffered: Once a year, sum	and assessment of pr /or English		ination talks approx. 15 minutes ts (2 to 4 random examinations)
Allocat	ion of _l	olaces			
			-		
Additio	onal inf	ormation			
Worklo	ad				
150 h			-		
Teachi	ng cycl	e			
			_		
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module	e appea	ars in			
		gree (1 major) Functional			
		gree (1 major) Functional gree (1 major) Functional			
Daciiel		gree (1 major) runchollat	materiais (2025)		

	e title				Abbreviation	
Polymer Chemistry 1 (Lecture and Practical Course)			actical Course)		03-FU-PM1-152-m01	1
Module	e coord	inator		Module offered by		
holder Dentist		Chair of Functional Mate	erials in Medicine and	Faculty of Medicine		
ECTS	ŕ	od of grading	Only after succ. con	npl. of module(s)		
5	1	rical grade		•		
Duratio	on .	Module level	Other prerequisites			
1 seme	ster	undergraduate	 			
Conten						
radical	polym	s of polymerisation: free erisations; characterisa lysis, mass spectromet	tion of polymers and p			
Intende	ed lear	ning outcomes				
The stu	dents	acquire fundamentals o	f polymer chemistry ar	nd the related metho	ds for their characte	risation.
		number of weekly contact hours				
V (2) +						
		Sessment (type, scope, lang	lage — if other than German	examination offered — if po	t every semester informati	ion on whether
		le for bonus)	aage in other than definally		e every semester, monnati	
Assess credita	ment o ble for					
Allocat	ion of j	DIACES				
Additio	nalinf	ormation				
Additio	nat m	ormation				
Worklo	ad					
150 h	-					
	ng cycl	0				
Teachir		e				
Teachiı		e				
	ed to in	LPOI (examination regulation	ons for teaching-degree progra	ımmes)		
	ed to in		ons for teaching-degree progra	ummes)		
		LPOI (examination regulation	ons for teaching-degree progra	ummes)		
 Referre Module Bachelo	e appe a or's de	LPOI (examination regulation regu	al Materials (2015)	ummes)		
 Referre Module Bachelo Master	e appea or's de 's degr	LPO I (examination regulation ars in gree (1 major) Functiona ee (1 major) Chemistry (al Materials (2015) (2016)			
 Referre Module Bachelo Master Master	e appea or's de 's degr 's teacl	LPO I (examination regulation ars in gree (1 major) Functiona ee (1 major) Chemistry (hing degree Gymnasium	al Materials (2015) (2016) 1 MINT Teacher Educat	ion PLUS, Elite Netwo		016)
 Referre Bachele Master' Master' Supple	e appea or's de 's degr 's teacl menta	LPO I (examination regulation ars in gree (1 major) Functiona ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher	al Materials (2015) (2016) n MINT Teacher Educat Education PLUS, Elite	ion PLUS, Elite Netwo		016)
 Referre Bachelo Master Master Supple Master	e appea or's de 's degr 's teacl menta 's degr	LPO I (examination regulation ars in gree (1 major) Functiona ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher ee (1 major) Chemistry (al Materials (2015) (2016) n MINT Teacher Educat Education PLUS, Elite ((2018)	ion PLUS, Elite Netwo Network Bavaria (EN	B) (2016)	
 Referre Bachelo Master' Master' Supple Master' Master'	e appea or's de 's degr 's teacl menta 's degr 's teacl	LPO I (examination regulation ars in gree (1 major) Functionate ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher ee (1 major) Chemistry (hing degree Gymnasium	al Materials (2015) (2016) n MINT Teacher Educat Education PLUS, Elite (2018) n MINT Teacher Educat	ion PLUS, Elite Netwo Network Bavaria (EN ion PLUS, Elite Netwo	B) (2016) ork Bavaria (ENB) (20	
 Referre Bachele Master' Master' Supple Master' Supple	e appea or's de 's degr 's teacl menta 's degr 's teacl menta	LPO I (examination regulation ars in gree (1 major) Functiona ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher	al Materials (2015) (2016) n MINT Teacher Educat Education PLUS, Elite (2018) n MINT Teacher Educat Education PLUS, Elite	ion PLUS, Elite Netwo Network Bavaria (EN ion PLUS, Elite Netwo	B) (2016) ork Bavaria (ENB) (20	
 Referre Bachelo Master Master Supple Master Supple Bachelo	e appea or's de 's degr 's teacl menta 's degr 's teacl menta or's de	LPO I (examination regulation ars in gree (1 major) Functionate ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher ee (1 major) Chemistry (hing degree Gymnasium	al Materials (2015) (2016) n MINT Teacher Educat Education PLUS, Elite (2018) n MINT Teacher Educat Education PLUS, Elite al Materials (2021)	ion PLUS, Elite Netwo Network Bavaria (EN ion PLUS, Elite Netwo	B) (2016) ork Bavaria (ENB) (20	
 Referre Bachelo Master' Master' Supple Master' Supple Bachelo Master' Master'	e appea or's de 's degr 's teacl menta 's teacl menta or's de 's degr 's teacl	LPO I (examination regulation ars in gree (1 major) Functiona ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher ee (1 major) Chemistry (hing degree Gymnasium ry course MINT Teacher gree (1 major) Functiona	al Materials (2015) (2016) n MINT Teacher Educat Education PLUS, Elite (2018) n MINT Teacher Educat Education PLUS, Elite al Materials (2021) (2024) n MINT Teacher Educat	ion PLUS, Elite Netwo Network Bavaria (EN ion PLUS, Elite Netwo Network Bavaria (EN ion PLUS, Elite Netwo	B) (2016) ork Bavaria (ENB) (20 B) (2020) ork Bavaria (ENB) (20	020)



Bachelor's degree (1 major) Functional Materials (2025)

Module	Module title Abbreviation				
Princip	les of T	issue Engineering			03-FU-TE-152-m01
Module	coord	inator		Module offered by	
holder	of the C	hair of Regenerative Mee	dicine	Faculty of Medicine	
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	undergraduate			
Conten	Contents				
		ations of organ and tissu of tissue engineering, 2D			olantation, cell culture technolo- ogy.
Intende	ed learr	ning outcomes			
	planta			-	ue damage, medical implants, xe- and 3D tissue models, stem cell
Courses	5 (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (4)					
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
b) oral (c) oral (d) log (a e) prese Langua	examin examin approx entatio ge of a	nination (approx. 90 to 1 ation of one candidate e ation in groups of up to 3 . 20 pages) or n (approx. 30 minutes) ssessment: German and/ ffered: Once a year, sum	ach (20 to 30 minute candidates (approx. ′or English		didate) or
Allocati	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
150 h					
Teachir	ng cycl	9			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module					
	-	gree (1 major) Functional gree (1 major) Functional			
	-	gree (1 major) Functional			



Additional Qualifications

(ECTS credits)

Modul	e title				Abbreviation
Indust	rial Inte	ernship (Short)			08-FU-IP1-152-m01
Modul	e coord	inator		Module offered by	
	e progra Matrier	mme coordinator Funktio	onswerkstoffe (Func-	Chair of Chemical T	echnology of Material Synthesis
ECTS	ECTS Method of grading Only after succ. compl		npl. of module(s)		
5	5 (not) successfully completed				
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate	Please consult with	course advisory serv	vice in advance.
Conter	nts				
Work p	laceme	ent in the functional mate	erials industry.		
Intend	ed lear	ning outcomes			
Studer	nts are f	familiar with procedures	and processes used i	n industry.	
Course	es (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
P (4)					
		s essment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
•		pages) ssessment: German and	/or English		
Allocat	tion of _l	places			
Additio	onal inf	ormation			
Worklo	oad				
150 h					
Teachi	ng cycl	e			
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	ammes)	
				_	
Modul	e appea	ars in			
Bachel	lor's de	gree (1 major) Functional	Materials (2015)		

Module title Abbreviation								
Foreign Studies (Short)08-FU-AP1-152-m01								
Modul	Module coordinator Module offered by							
	progra Matrier	mme coordinator Funktio	onswerkstoffe (Func-	Chair of Chemical T	echnology of Material Synthesis			
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	Please consult with	course advisory serv	vice in advance.			
Conter	nts							
Work p	laceme	ent in the functional mate	rials industry abroad					
Intend	ed lear	ning outcomes						
		able to put into practice v and have gained an insig			ped skills in the language of their			
Course	S (type, 1	number of weekly contact hours,	anguage — if other than Gei	rman)				
P (4)								
		S essment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	t every semester, information on whether			
		k. 2 pages); proof of havin ssessment: German and			respective country			
Allocat	tion of	places						
 Additio	onal inf	ormation						
Worklo	ad							
150 h								
Teachi	ng cycl	e						
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)				
Modul	e appea	ars in						
Bachel	or's de	gree (1 major) Functional	Materials (2015)					

Module title Abbreviation						
Course	s Relat	ed to Functional Materia	ls outside of the Nati	ural Sciences	08-FU-WP1-152-m01	
Module	e coord	inator		Module offered b	ру ру	
degree tional I		mme coordinator Funktic	onswerkstoffe (Func-	Chair of Chemica	al Technology of Material Synthesis	
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	ster	undergraduate	Please consult with	course advisory s	ervice in advance.	
Conten	Its					
	•	of knowledge and skills i gramme.	n fields other than th	e natural science	s that are relevant to the Functional	
Intend	ed lear	ning outcomes				
Studer	its have	e developed knowledge a	nd skills in fields oth	er than the natura	al sciences.	
Course	S (type, 1	number of weekly contact hours, l	anguage — if other than Ger	rman)		
Ü (o)						
		sessment (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — i	f not every semester, information on whether	
b) oral c) oral d) log (e) pres Langua	examir examir approx entatio age of a	mination (approx. 90 to 1 nation of one candidate e nation in groups of up to 3 . 20 pages) or n (approx. 30 minutes) ssessment: German and	ach (20 to 30 minute 3 candidates (approx	•	andidate) or	
Allocat		places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPOI (examination regulation	s for teaching-degree progra	immes)		
Modul	e appea	ars in				
		gree (1 major) Functional				
		gree (1 major) Functional				
Bachel	or's de	gree (1 major) Functional	Materials (2025)			

Module title Abbreviation						
Courses Related to Functional Materials inside of the Natural Sciences 08-FU-WP2-152-m01						
Module	e coord	inator		Module offered	by	
degree tional I		mme coordinator Funktic	onswerkstoffe (Func-	Chair of Chemic	cal Technology of Material Synthesis	
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s))	
5	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate	Please consult with	course advisory	service in advance.	
Conten	its					
Develo terials	•	-	n a field within the n	atural sciences t	hat is relevant to the Functional Ma-	
Intend	ed lear	ning outcomes				
Studer	its have	e developed knowledge a	nd skills in a field wi	thin the natural s	sciences.	
Course	S (type, 1	number of weekly contact hours, l	anguage — if other than Ger	man)		
Ü (o)						
		s essment (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered –	- if not every semester, information on whether	
b) oral c) oral d) log (e) pres Langua	examir examir approx entatic age of a	mination (approx. 90 to 1 nation of one candidate e nation in groups of up to 3 s. 20 pages) or on (approx. 30 minutes) assessment: German and	ach (20 to 30 minute 3 candidates (approx		candidate) or	
Allocat	ion of	places				
 Additic	nal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Functional	Materials (2015)			
		gree (1 major) Functional				
Bachel	or's de	gree (1 major) Functional	Materials (2025)			



Key Skills Area (20 ECTS credits)



General Key Skills (5 ECTS credits)

Students may select modules offered as part of the pool of general transferable skills (ASQ) of JMU.



Subject-specific Key Skills

(15 ECTS credits)

Module	title				Abbreviation		
Materia	al Scier	nce 1 (Basic introductio	n)		08-FU-MaWi1-152-r	no1	
Module	coord	inator		Module offered by	Module offered by		
		Chair of Chemical Techn	ology of Material Syn-		echnology of Materi	al Synthesis	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5		rical grade					
Duratio		Module level	Other prerequisites				
1 seme:		undergraduate					
Conten		undergraduate	1				
Uncerta Vacuun	inty ar n techn	nalysis, process engine ology, coating process		ution, agglomeratior	, separation, drying	, conveying.	
Intende	ed leari	ning outcomes					
ques ar in hand about r	nd can Iling of Iomeno	ess engineering. For a g suggest ways of fabrica measurement data as v clature, significance as	tion, processing and t well as statistical and s well as practically dete	reatment of material systematic errors an ermining characterist	s. Furthermore they d posess extensive l	areconfident <nowledge< th=""></nowledge<>	
			, language — Il other than Ger	llidi)			
V (3) +							
		s essment (type, scope, langu le for bonus)	uage — if other than German, o	examination offered — if no	t every semester, informat	ion on whether	
b) oral (c) oral (d) log (e) prese	examin examin approx entatio	nination (approx. 90 to ation of one candidate ation in groups of up to . 20 pages) or n (approx. 30 minutes) ssessment: German an	each (20 to 30 minute 3 candidates (approx	-	didate) or		
Allocat							
		Jaces					
Additio	nal Inf	ormation					
Worklo	ad						
150 h			_				
Teachir	ng cycl	e					
Referre	d to in	LPOI (examination regulation	ns for teaching-degree progra	mmes)			
Module							
		gree (1 major) Nanostru		5)			
		gree (1 major) Functiona					
Master' Supple	s teach mentar	ee (1 major) Chemistry (ning degree Gymnasium y course MINT Teacher	MINT Teacher Educat Education PLUS, Elite I			016)	
Master'	s teach	ee (1 major) Chemistry (ning degree Gymnasium	MINT Teacher Educat			020)	
		y course MINT Teacher					
3achelor's	with 1 maj	or Functional Materials (2015)		generated 18-Apr-2025 • exa or (180 ECTS) Funktionswerk		page 99 / 106	



Bachelor's degree (1 major) Nanostructure Technology (2020)

Module	e title				Abbreviation	
Materia	al Scier	nce 2 (The Material Grou			08-FU-MaWi2-152-1	m01
Module coordinator				Module offered by		
		Chair of Chemical Techno	ology of Material Syn-	Chair of Chemical T	echnology of Materi	al Synthesis
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten			1			
and pro loys. Ce mics; g	operties eramics lass. P	nd properties of the mair s; thermo-mechanical tro s: oxidic and non-oxidic olymer materials: thermo ning outcomes	eatment; Martensitic t structural ceramics; e	ransitions; ductility a lectric and magnetic	and strength; form r properties of functi	nemory al-
		e developed a knowledge	e of the fabrication an	d properties of the m	nain material groups	s and are abl
to appl	y that k	knowledge to research p	roblems.			
Course	S (type, r	number of weekly contact hours,	language — if other than Ger	rman)		
V (3) +	Ü (1)					
b) oral (c) oral (d) log (e) press Langua Allocat Additio Worklo	examir examin approx entatio ge of a ion of p nal inf	mination (approx. 90 to nation of one candidate of nation in groups of up to a 20 pages) or n (approx. 30 minutes) assessment: German and places ormation	each (20 to 30 minute 3 candidates (approx		didate) or	
150 h						
Teachi	ng cycl	e				
 Referre	d to in	LPO I (examination regulation	ns for teaching-degree progra	mmes)		
 Modul-		are in				
Module Bachele		gree (1 major) Nanostruc	ture Technology (2014	-)		
		gree (1 major) Nanostruc gree (1 major) Functiona		<i></i>		
		ee (1 major) Chemistry (2	-			
Master Supple	's teacl mentai 's degr	hing degree Gymnasium ry course MINT Teacher E ee (1 major) Chemistry (2	MINT Teacher Educat			016)
Master Supple	mentai	hing degree Gymnasium ry course MINT Teacher E	MINT Teacher Educat Education PLUS, Elite I	Network Bavaria (ENI		020)
Master Supple Bachel	mentaı or's de		MINT Teacher Educat Education PLUS, Elite I ture Technology (202	Network Bavaria (ENI	B) (2020)	020)

Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Quantum Technology (2021) Master's degree (1 major) Chemistry (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Functional Materials (2025)

Module title Abbreviation						
Modern Bio	Analytical Methods (Lect	ure and practical cour	se)	08-FU-MAM-152-m01		
Module coor	dinator		Module offered by	y		
degree progr tional Matrie	amme coordinator Funkt rials)	ionswerkstoffe (Func-	Chair of Chemical	Technology of Material Synthesis		
ECTS Metl	nod of grading	Only after succ. con	npl. of module(s)			
5 num	erical grade					
Duration	Module level	Other prerequisites				
1 semester	undergraduate					
Contents						
	l principles of spectrosco , bioanalytics, imaging m		IR, Raman, emissio	on, fluorescence, NMR, etc.), poly-		
Intended lea	rning outcomes					
Students are	familiar with modern an	alytical and bioanalyti	cal methods.			
Courses (type	, number of weekly contact hours	s, language — if other than Ge	rman)			
V (2) + P (2)						
 b) oral exam c) oral examination d) log (appropriation e) presentation Language of 	able for bonus) amination (approx. 90 to ination of one candidate nation in groups of up to ix. 20 pages) or on (approx. 30 minutes) assessment: German an offered: Once a year, sur	each (20 to 30 minute 3 candidates (approx d/or English	•	ndidate) or		
creditable fo						
Allocation of	places					
	6					
Additional in	rormation					
 Would						
Workload						
150 h						
Teaching cyo						
	n LPO I (examination regulation	no fortoophing desires a	mmas)			
Releffed to I	ILFUI (examination regulation)	ons for teaching-degree progra	mmes)			
 Module appe						



Thesis

(12 ECTS credits)

Module title Abbreviation							
Bachelor Thesis Functional Materials Research 08-FU-BT1-152-mo1							
Module coordinator Module offered by							
chairp fe	erson o	of examination committee	Funktionswerkstof-	Chair of Chemical	Technology of Material Synthesis		
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)			
10	nume	erical grade					
Durati	on	Module level	Other prerequisites				
1 seme	ester	undergraduate					
Conter	nts	•	<u>.</u>				
		be expected to research and scientific practice.	and write on a define	d topic in functiona	l materials, adhering to the prin-		
Intend	ed lear	rning outcomes					
		able to conduct research nt the results of their work		dhering to the princ	iples of good scientific practice,		
		number of weekly contact hours, I		rman)			
Νο cou	urses a	ssigned to module					
		sessment (type, scope, langua ble for bonus)	ge — if other than German,	examination offered — if n	ot every semester, information on whether		
		esis (20 to 40 pages) assessment: German and	/or English				
Alloca	tion of	places					
Additi	onal in	formation					
Time to	o comp	lete: 10 weeks.					
Worklo	oad						
300 h							
Teachi	ing cyc	le					
Referr	ed to ir	LPOI (examination regulation	s for teaching-degree progra	immes)			
Modul	e appe	ars in					
		egree (1 major) Functional					
		egree (1 major) Functional					
Bache	lor's de	egree (1 major) Functional	Materials (2025)				

Module title Abbreviation							
Bachelor Thesis Functional Materials Defense 08-FU-BT2-152-m01							
Modul	e coord	inator	Module offered by	, ,			
chairp fe	erson o	f examination commit	tee Funktionswerkstof-	Chair of Chemical	Technology of Material Synthesis		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
2	nume	rical grade					
Durati	on	Module level	Other prerequisites	i			
1 seme	ester	undergraduate					
Conte	nts						
Bache	lor's the	esis defence.					
Intend	led lear	ning outcomes					
Stude	nts are a	able to present and de	efend their thesis projec	ts.			
Course	es (type, 1	number of weekly contact hou	ırs, language — if other than Ge	rman)			
K (1)							
		Sessment (type, scope, lar ole for bonus)	nguage — if other than German,	examination offered — if n	ot every semester, information on whether		
		20 minutes) with discu ssessment: German a	ussion (approx. 20 minu nd/or English	tes)			
Alloca	tion of	places					
Additi	onal inf	ormation					
Workl	oad						
60 h							
Teachi	ing cycl	e					
Referr	ed to in	LPO I (examination regula	tions for teaching-degree progra	ammes)			
Modul	le appea	ars in					
		gree (1 major) Functio	-				
		gree (1 major) Functio					
Bache	lor's de	gree (1 major) Functio	nal Materials (2025)				