

Module Catalogue

for the Subject

Chemistry

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

Examination regulations version: 2017 Responsible: Faculty of Chemistry and Pharmacy



Contents

The subject is divided into		4			
Learning Outcomes		5			
Abbreviations used, Conven	tions, Notes, In accordance with	7			
Compulsory Courses		8			
Subfield General and Inorg	ganic Chemistry	9			
Principles of Inorganic Chemistry	•	10			
Inorganic Chemistry 1 (lab)		12			
Inorganic Chemistry of the Eleme	nts	13			
Analytical Chemistry (lab)		14			
Inorganic Chemistry 2 (lab)		15			
	opic Methods, Organoelement Chemistry	16			
Subfield Organic Chemistr	У	17			
Organic Chemistry 1		18			
Organic Chemistry 2 and analytic	al methods in organic chemistry	23			
Organic Chemistry - lab 1	avatani sauraa faristudanta af ahamistu.	25			
Organic Chemistry - advanced fac	oratory course for students of chemistry	26			
, , , ,	aratical Chamista	27			
Subfield Physical and The	•	28			
Principles of quantum mechanics	· · · · · · · · · · · · · · · · · · ·	29			
Thermodynamics, Kinetics, Electr Physical Chemistry (lab)	ochemistry	30 32			
Quantum Chemistry		32			
Symmetry, chemical bonding and	l light	35			
Subfield Basics of Natural	_	36			
Biochemistry 1		37			
Mathematics for students in Cher	mistry and Biochemistry	39			
Introduction to Physics for Stude		40			
Laboratory Course Physics for Stu	·	46			
Toxicology and legal studies		52			
Key Skills Area		54			
General Key Skills		55			
Subject-specific Key Skills		56			
Subject-specific Key Skills	Compulsory Courses	_			
Advanced laboratory course	s, computating courses	57			
ŕ	Compulsory Floatives	58			
Subject-specific Key Skills	s, compulsory Electives	59			
Biochemistry 2		60			
Practical course of Biochemistry Applied Spectroscopy 3		62 63			
Programming and numerical me	thods	64			
Advanced chemical practical co		65			
Thesis		66			
Bachelor Thesis		67			
Compulsory Electives, Appe	andix DA	68			
Subfield General and Inorganic Chemistry					
•	,	69			
Principles of Inorganic Chemistry Inorganic Chemistry 1 (lab)		70			
Inorganic Chemistry of the Eleme	nts	72 73			
Analytical Chemistry (lab)		73 74			
Solid State Chemistry, Spectroscopic Methods (DD)					
Subfield Organic Chemistr		75 76			
Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 2 / 114			
, , , , , ,	reg. data record Bachelor (180 ECTS) Chemie - 2017				



Organic Chemistry 1	77
Organic Chemistry 2 and analytical methods in organic chemistry	82
Organic Chemistry - lab 1	84
Organic Chemistry 3 (DD)	85
Subfield Physical and Theoretical Chemistry	86
Principles of quantum mechanics and spectroscopy	87
Thermodynamics, Kinetics, Electrochemistry	88
Physical Chemistry (lab)	90
Quantum Chemistry	91
Symmetry, chemical bonding and light (DD)	93
Subfield Basics of Natural Sciences	94
Biochemistry 1	95
Mathematics for students in Chemistry and Biochemistry	97
Introduction to Physics for Students of other Disciplines	98
Laboratory Course Physics for Students of other Disciplines	104
Subfield Competences from foreign university	110
Qualifications - Partner University 1	111
Qualifications - Partner University 2	112
Thesis	113
Bachelor Thesis	114



The subject is divided into

section / sub-section	ECTS credits	starting page
Compulsory Courses	150	8
Subfield General and Inorganic Chemistry	47	9
Subfield Organic Chemistry	40	17
Subfield Physical and Theoretical Chemistry	40	28
Subfield Basics of Natural Sciences	23	36
Key Skills Area	20	54
General Key Skills	5	55
Subject-specific Key Skills	15	56
Subject-specific Key Skills, Compulsory Courses	5	57
Subject-specific Key Skills, Compulsory Electives	10	59
Thesis	10	66
Compulsory Electives, Appendix DA	170	68
Subfield General and Inorganic Chemistry	35	69
Subfield Organic Chemistry	28	76
Subfield Physical and Theoretical Chemistry	37	86
Subfield Basics of Natural Sciences	20	94
Subfield Competences from foreign university	50	110
Thesis	10	113



Learning Outcomes

German contents and learning outcome available but not translated yet.

Wissenschaftliche Befähigung

- Die Absolvent/innen beherrschen die grundlegenden Kenntnisse der Basis-Wissenschaften, vor allem der Allgemeinen, Anorganischen, Organischen, Physikalischen und Theoretischen Chemie, der Biochemie sowie der Mathematik und Physik. Die Grundlagen hierfür werden in den entsprechenden Vorlesungen und Übungen der verschiedenen Fächer vermittelt und in Klausuren überprüft.
- Die Absolvent/innen können unter Anleitung Experimente durchführen, analysieren und die erhaltenen Ergebnisse darstellen und bewerten. Vermittelt werden diese Fähigkeiten im Rahmen von Laborpraktika während des Studiums. Das Erreichen der Ziele wird durch Kolloquien, die erfolgreiche Versuchsdurchführung und das Verfassen von Protokollen überprüft.
- Die Absolvent/innen setzten die erlernten theoretischen und experimentellen Methoden ein, um unter Anleitung neue Erkenntnisse zu erlangen. Die erlernten theoretischen und experimentellen Methoden werden im Rahmen der Bachelorarbeit angewendet.
- Die Absolvent/innen k\u00f6nnen sich mit Hilfe von Fachliteratur in neue Fragestellungen und Aufgabengebiete einarbeiten, konkrete experimentelle oder theoretische Aufgabenstellungen verstehen, L\u00f6sungswege nachvollziehen und die Ergebnisse interpretieren und bewerten. Sie besitzen die F\u00e4higkeit, eine thematisch und zeitlich eng umgrenzte chemische Fragestellung unter Anleitung mit den erlernten Methoden und unter wissenschaftlich-analytischer Vorgehensweise weitgehend eigenst\u00e4ndig zu bearbeiten, die gewonnenen Daten zu analysieren, zusammenzufassen und einem Fachpublikum zu pr\u00e4sentieren. Diese F\u00e4higkeiten werden in Seminaren w\u00e4hrend her Studiums und vor allem im Rahmen der Vorbereitung und Anfertigung der Bachelorarbeit sowie eines Seminarvortrags vermittelt und \u00fcberpt\u00fcrt.

Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die Absolvent/innen besitzen Abstraktionsvermögen, Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge in analytischer Herangehensweise zu strukturieren. Die Grundlagen hierfür werden in Vorlesungen und Übungen der Chemie vermittelt und durch Klausuren überprüft.
- Die Absolvent/innen sind in der Lage, ihr theoretisches Wissen in der Praxis anzuwenden und können mit den erlernten wissenschaftlichen Methoden auch unbekannte Probleme aus unterschiedlichen fachlichen Perspektiven analysieren und bearbeiten. Sie sind es dabei gewohnt, in einem Team aus Kommiliton/innen, Kolleg/innen und/oder Wissenschaftler/innen konstruktiv und zielorientiert zusammenzuarbeiten. Der Praxisbezug ist durch einen hohen Anteil an Laborpraktika sowohl Kurspraktika, als auch individuelle Forschungspraktika und nicht zuletzt der Bachelor-Arbeit gegeben, deren erfolgreiche Absolvierung durch Protokolle bzw. die Bachelor-Thesis überprüft wird.
- Die Absolvent/innen können unterschiedliche Aufgaben parallel und unter Zeit- und Erfolgsdruck auch unter schwierigen Rahmenbedingungen erfolgreich bearbeiten. Diese Fähigkeit wird durch die Prüfungsdichte am Ende der Vorlesungszeit erlernt und befähigt die Absolvent/innen auch im stressigen Berufsalltag Aufgaben erfolgreich zu bearbeiten.
- Die Absolvent/innen 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.
- Diese solide Wissensbasis und Methodenkompetenz sowie die eingeübte Teamfähigkeit können die Absolvent/innen gewinnbringend in ihrer Berufspraxis einsetzen.



Persönlichkeitsentwicklung

- Die Absolvent/innen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie. Die Lehrenden f\u00f6rdern zudem die Selbstverantwortung f\u00fcr den Wissenserwerb sowie ein an wissenschaftlichen Werten orientiertes Denken und Handeln. Dies beinhaltet das Streben nach Erkenntnis und Wahrheit, Eindeutigkeit, Transparenz, Objektivit\u00e4t, Wertefreiheit, \u00fcberpres\u00f6nliche G\u00fcltigkeit, \u00dcberpr\u00fcrbarkeit, Verl\u00e4sslichkeit, Offenheit, Selbstreflexion und Redlichkeit sowie Neuigkeit. Insbesondere die Laborarbeit und das Erstellen von Protokollen sowie deren anschlie\u00e4ende Korrektur stellt die Vermittlung guter wissenschaftlicher Praxis sicher.
- Die Absolvent/innen lernen, mit in der Forschung unvermeidbaren Rückschlägen umzugehen und ihre Zielsetzungen neu anzupassen.

Befähigung zum gesellschaftlichen Engagement

 Die Absolvent/innen haben ihr Wissen bezüglich naturwissenschaftlicher Fragen erweitert und erkennen deren wirtschaftliche, rechtliche und gesellschaftliche Implikationen und können begründet Position beziehen. Durch die Behandlung aktueller Forschungsthemen in den Lehrveranstaltungen und den Besuch von Vorlesungen zu Toxikologie und Rechtskunde werden Bezüge zu wirtschaftlichen, rechtlichen und gesellschaftlichen Fragestellungen hergestellt. Im Rahmen der Bachelorarbeit befassen sich die Studierenden ebenfalls mit aktuellen gesellschaftlich und wirtschaftlich relevanten chemischen Fragen.



Abbreviations used

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

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

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

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

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

Conventions

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

Notes

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

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

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

In accordance with

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

ASP02015

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

09-Aug-2017 (2017-48)

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

(150 ECTS credits)



Subfield General and Inorganic Chemistry

(47 ECTS credits)



Module title				Abbreviation	
Principles of Inorganic Chemistry					08-AC1-152-m01
Module coordinator				Module offered by	
lecturer of lecture "Experimentalchemic Chemistry)		e" (Experimental	Institute of Inorganic Chemistry		
ECTS	Meth	hod of grading Only after succ. co		npl. of module(s)	
8	nume	rical grade			
Duration Module level		Other prerequisites			
1 seme	ster	undergraduate	aduate		
_					

Contents

The module provides an overview of the fundamental knowledge of chemistry. Emphasis is placed on the material and particle level, metals, acid-base reactions, the periodic table, chemical equilibrium and complexometry. In addition, the module introduces fundamental concepts of chemistry and teaches the basics of inorganic chemistry.

Intended learning outcomes

The student understands the principles of the periodic table and can obtain information from it. He/she is proficient in basic models of the structure of matter and can describe them properly. He/she can depict chemical reactions using typical chemical formula language and interpret them by identifying the type of reaction. The students know how the most important quantitative and qualitative analytical methods work and their areas of application.

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

V(4) + V(2)

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

--

Workload

240 h

Teaching cycle

--

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

§ 42 | Nr. 1 and § 22 | Nr. 1 h)

§ 62 | Nr. 1

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

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

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2015)

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

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

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



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

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

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Module studies (Bachelor) Chemistry (2019)

Module studies (Bachelor) Orientierungsstudien (2020)

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' degree (1 major) Food Chemistry (2021)

Bachelor' degree (1 major) Biochemistry (2022)



Modul	e title				Abbreviation
Inorganic Chemistry 1 (lab)				08-ACP1-152-m01	
Modul	e coord	inator		Module offered by	
holder	holder of the Chair of Anorganic Chemi		stry	Institute of Inorganic Chemistry	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	(not)	successfully completed			
Duration Module level 0		Other prerequisites			
1 seme	ester	undergraduate			
C 4					

Contents

This module gives students the opportunity to apply in practice the knowledge they have gained through the related lecture(s). After a safety briefing, the students autonomously conduct experiments in the laboratory. The course focuses on laboratory safety, simple lab techniques, the synthesis of simple substances and analyses of unknown substances.

Intended learning outcomes

Students are able to identify fundamental problems in chemistry and perform experiments to solve them. They have developed the ability to perform the necessary stoichiometric calculations and describe the chemical processes in an appropriate manner, both in written and oral form.

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

P(12) + S(2)

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)] and Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical assignments (2 to 4 random examinations)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

--

Additional information

--

Workload

300 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Chemistry (2017)

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



Module	e title				Abbreviation
Inorga	Inorganic Chemistry of the Elements				08-AS1-152-m01
Module	e coord	inator		Module offered by	
1	lecturer of lecture "Chemie der Hauptgruppenelemente" (Chemistry of Main-group Elements)		Institute of Inorganic Chemistry		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
6	nume	rical grade			
Duratio	Duration Module level		Other prerequisites		

1 semester Contents

This module equips students with an advanced knowledge of the periodic table and selected elements. It focuses on bonding conditions, trends in the periodic table and the description and structure of elements. In addition, it introduces students to elementary organic chemistry, coordination chemistry and complex chemistry.

Intended learning outcomes

undergraduate

Students are able to characterise main group elements and transition metal elements in terms of their structure, reactivity and fabrication. They are able to identify the coordination of the atoms. In addition, they have learned how to use the periodic table, an essential tool for chemists.

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

V(2) + V(2)

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

--

Workload

180 h

Teaching cycle

--

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

§ 62 | Nr. 1

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

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

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Mathematics (2023)



Modul	e title				Abbreviation
Analytical Chemistry (lab)					08-ANP-152-m01
Modul	e coord	inator		Module offered by	
holder of the Chair of Anorganic Chemi		stry	Institute of Inorganic Chemistry		
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
6	(not)	successfully completed			
Duratio	tion Module level Other prerequisite		Other prerequisites		
1 seme	ster	undergraduate			
Conter	ıtc		•		

This module gives students the opportunity to apply in practice the knowledge they have gained through the related lecture(s). After a safety briefing, the students autonomously conduct experiments in the laboratory. These experiments focus on different methods for the analysis of unknown substances.

Intended learning outcomes

Students are able to use different methods to analyse unknown substances. In addition, they are able to separate and analyse mixtures.

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

P(12) + S(1)

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

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)

Assessment offered: Once a year, summer semester Language of assessment: German and/or English

Allocation of places

Additional information

Workload

180 h

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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

Bachelor' degree (1 major) Biochemistry (2022)



Module	title	'			Abbreviation
Inorganic Chemistry 2 (lab)				08-ACP2-172-m01	
Module	coord	inator		Module offered by	
holder of the Chair of Anorganic Chemi		stry	Institute of Inorganic Chemistry		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	(not)	successfully completed	(08-0CP1 or 08-0CP	1-BC) and 08-AS1	
Duratio	ion Module level Other prerequisites		i		
1 seme	ster	undergraduate			
Conten	Contents				

copical methods are used for the precise determination of the products. **Intended learning outcomes**

The student is able to experimentally solve complex issues after an individual research. He/She can describe the technical backrounds an explain them written and verbal using technical language. He/She can independently plan and carry out the synthesis of a chemical compound. Therefor he/she can apply advanced laboratory techniques.

The module provides the opportunity to plan and carry out complex syntheses after an individual research. Focuses are the handling of organometallic compounds, their synthesis and the work in inert atmospheres. Spectros-

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

P (12)

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

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)

Language of assessment: German and/or English

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2017)

Bachelor' degree (1 major) Biochemistry (2022)



Module appears in

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)

title				Abbreviation
ate Che	emistry, Spectroscopio	Methods, Organoele	ment Chemistry	08-AC-FSE-152-m01
Module coordinator Module of			Module offered by	1
ınd "Ele			Institute of Inorga	nic Chemistry
Method	d of grading	Only after succ. con	npl. of module(s)	
numeri	cal grade			
ı [1	Module level	Other prerequisites		
ter l	undergraduate			
5				
d learni	ing outcomes			
ı list sp propria	ectroscopic methods ite manner.	that can be used for th	e structural analysi	
(2) + V	′ (3) + Ü (1)			
		uage — if other than German,	examination offered — if r	not every semester, information on whether
oral ex s) or e)	xamination in groups of presentation (approx.	of up to 3 candidates (. 30 minutes)		
on of pl	laces			
al info	rmation			
d				
g cycle				
to in L	PO I (examination regulation	ons for teaching-degree progra	mmes)	
	coording of lection of	coordinator s of lecture "Festkörperchemiand "Elementorganische Chemistry) Method of grading numerical grade Module level ter undergraduate s dule equips students with an a focuses on their structures a delearning outcomes s are able to describe the struan appropriate manner. The on, they are able to develop and list spectroscopic methods propriate manner. (type, number of weekly contact hours (2) + V (3) + Ü (1) of assessment (type, scope, languate treditable for bonus) n examination (approx. 90 to onal examination in groups of so or e) presentation (approx. 20) or all examination (approx. 30) or e) presentation (approx. 30) or e) presentation (approx. 31) or of places all information d g cycle	ate Chemistry, Spectroscopic Methods, Organoeler coordinator s of lecture "Festkörperchemie" (Solid State Chend "Elementorganische Chemie" (Elemental Organistry) Method of grading numerical grade n Module level other prerequisites ter undergraduate s dule equips students with an advanced knowledge focuses on their structures and properties, special dearning outcomes s are able to describe the structure and properties on, they are able to develop and explain principles on, they are able to develop and explain principles on they are able to develop and e	coordinator so folecture "Festkörperchemie" (Solid State Chennid "Elementorganische Chemie" (Elemental Organistry) Method of grading numerical grade no Module level ter undergraduate solule equips students with an advanced knowledge of metals, alloys, so focuses on their structures and properties, special material classes, roughlest manner. They are able to systemise them and characte on, they are able to develop and explain principles for the synthesis of notifies meanner. (type, number of weekly contact hours, language — if other than German) (2) + V (3) + Ü (1) of assessment (type, scope, language — if other than German, examination of form of oral examination in groups of up to 3 candidates (approx. 15 minutes so) or e) presentation (approx. 30 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) presentation (approx. 30 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) oral examination (approx. 40 minutes) or b) oral examination of oral examination (approx. 30 minutes) or b) oral examination (approx. 40 minutes) or b) oral examination (approx. 40 minutes) or b) oral examination of oral examination (approx. 40 minutes) or b) oral examination of oral examination (approx. 40 minutes) or b) oral examination of oral examination (approx. 40 minutes) or b) oral examination of oral examination (approx. 40 minutes) or b) oral examination of oral examination (approx. 40 minutes) or b) oral examination of oral examination (approx. 40 minutes) or b) oral examination (ap



Subfield Organic Chemistry

(40 ECTS credits)

page 18 / 114



Modul	e title					Abbreviation
Organic Chemistry 1				08-0C1-152-m01		
Modul	e coord	inator		M	odule offered by	
holder	holder of the Professorship of Organic Chemistr		ic Chemistry	Ins	Institute of Organic Chemistry	
ECTS	Metho	od of grading	Only after succ. com		of module(s)	
5	nume	rical grade				
Duration Module level Other prerequisites		ites				
1 seme	ester	undergraduate				
Conter	nts					

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

 $V(3) + \ddot{U}(1)$

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

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

Workload

150 h

Teaching cycle

Teaching cycle: every year, summer semester

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

§ 62 | Nr. 2

Module appears in

Bachelor' degree (1 major) Biology (2011)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Psychology (2010)

Bachelor' degree (1 major) Economathematics (2012)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2013)

Bachelor's degree (1 major, 1 minor) Pedagogy (2011)

Bachelor's degree (1 major, 1 minor) Pedagogy (2013)

Bachelor's degree (1 major, 1 minor) French Studies (2013)

Bachelor's with 1 major Chemistry (2017) JMU Würzburg • generated 12-Feb-2024 • exam. reg. data record Bachelor (180 ECTS) Chemie - 2017



```
Bachelor's degree (1 major, 1 minor) History (2010)
Bachelor's degree (1 major, 1 minor) Philosophy (2013)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2012)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2010)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) English and American Studies (2010)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (1 major, 1 minor) Gallo-Roman philology (2010)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2013)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2010)
Bachelor's degree (1 major, 1 minor) Italian Studies (2010)
Bachelor's degree (2 majors) Classical Archaeology (2013)
Bachelor's degree (2 majors) Pedagogy (2013)
Bachelor's degree (2 majors) Philosophy (2013)
Bachelor's degree (2 majors) Special Education (2009)
Bachelor's degree (2 majors) Digital Humanities (2012)
Bachelor's degree (2 majors) Political and Social Studies (2011)
Bachelor's degree (2 majors) Russian Language and Culture (2012)
Bachelor's degree (2 majors) European Ethnology (2013)
Magister Theologiae Catholic Theology (2013)
Bachelor's degree (2 majors) Spanish Studies (2013)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) Gallo-Roman philology (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (2 majors) Italian Studies (2009)
Bachelor' degree (1 major) Biochemistry (2015)
Bachelor' degree (1 major) Chemistry (2015)
Bachelor' degree (1 major) Geography (2015)
Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Musicology (2015)
Bachelor' degree (1 major) Physics (2015)
Bachelor' degree (1 major) Psychology (2015)
Bachelor' degree (1 major) Business Management and Economics (2015)
Bachelor' degree (1 major) Nanostructure Technology (2015)
Bachelor' degree (1 major) Biomedicine (2015)
Bachelor' degree (1 major) Music Education (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Political and Social Studies (2015)
Bachelor' degree (1 major) Functional Materials (2015)
Bachelor' degree (1 major) Academic Speech Therapy (2015)
Bachelor' 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) Music Education (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) Classical Archaeology (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) Digital Humanities (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) Ancient Near Eastern 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' degree (1 major) Mathematical Physics (2016) Bachelor' degree (1 major) Human-Computer Systems (2016) Bachelor's degree (2 majors) Theological Studies (2011) 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' degree (1 major) Romanic Languages (French/Italian) (2016) Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2016) Bachelor' degree (1 major) Romanic Languages (Italian/Spanish) (2016) Bachelor' degree (1 major) Business Information Systems (2016) Bachelor' 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' degree (1 major) Media Communication (2016) Bachelor' degree (1 major) Food Chemistry (2016) Bachelor's degree (1 major, 1 minor) Digital Humanities (2016) Bachelor' 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' degree (1 major) Aerospace Computer Science (2017)

Bachelor' degree (1 major) Modern China (2017)



Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)

Bachelor' degree (1 major) Economathematics (2017)

Bachelor' degree (1 major) Games Engineering (2017)

Bachelor' degree (1 major) Computer Science (2017)

Bachelor' degree (1 major) Media Communication (2018)

Bachelor' degree (1 major) Biomedicine (2018)

Bachelor' 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' degree (1 major) Computer Science (2019)

Bachelor's degree (1 major, 1 minor) English and American Studies (2019)

Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Information Systems (2019)

Bachelor's degree (2 majors) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Management and Economics (2019)

Bachelor' degree (1 major) Modern China (2019)

Bachelor' degree (1 major) Food Chemistry (2019)

Bachelor' degree (1 major) Biomedicine (2020)

Bachelor' degree (1 major) Pedagogy (2020)

Bachelor' degree (1 major) Political and Social Studies (2020)

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

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

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

Bachelor' 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' degree (1 major) Psychology (2020)

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

Bachelor' degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)

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

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

Bachelor's degree (2 majors) Special Education (2021)



Bachelor' degree (1 major) Business Information Systems (2021)

Bachelor' degree (1 major) Economathematics (2021)

Bachelor' degree (1 major) Business Management and Economics (2021)

Bachelor' degree (1 major) Human-Computer Systems (2022)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)

Bachelor' degree (1 major) Economathematics (2022)

Bachelor' degree (1 major) Mathematical Data Science (2022)

Bachelor' 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' degree (1 major) Franco-German studies: language, culture, digital competence (2022)

Bachelor' degree (1 major) Midwifery (2022)

Bachelor' 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' degree (1 major) Artificial Intelligence and Data Science (2023)

Bachelor' degree (1 major) Mathematics (2023)

Bachelor' degree (1 major) Business Information Systems (2023)

Bachelor' 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' degree (1 major) Business Management and Economics (2023)

Bachelor' 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' 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' degree (1 major) Music Education (2024)

Bachelor's degree (2 majors) Music Education (2024)

Bachelor's degree (1 major, 1 minor) Music Education (2024)



Module title			Abbreviation		
Organic Chemistry 2 and analytical methods in organic chemistry			08-0C2-152-m01		
Modul	e coord	linator		Module offer	red by
holder of the Chair of Physically Organic Chemistry		ganic Chemistry	Institute of O	Institute of Organic Chemistry	
ECTS	Meth	od of grading	Only after succ.	compl. of module	e(s)
9	nume	rical grade			
Durati	on	Module level	Other prerequisi	tes	
1 seme	ester	undergraduate			
Conte	nts				

This module introduces students to the rules of aromaticity and discusses specific reactions of aromatics. Using the example of carbonyl compounds, it extends the students' knowledge of substitution, elimination and addition reactions to complex reaction mechanisms. The course also focuses on oxidation and reduction reactions as well as rearrangement. In addition, it introduces students to the spectroscopic methods of infrared spectroscopy, mass spectrometry and NMR spectroscopy.

Intended learning outcomes

Students have become familiar with the criteria for aromaticity. They can analyse the varying reactivity of carbonyl compounds. They are able to describe specific reactions of carbonyls and aromatics. For that purpose, they can plan and formulate multi-stage syntheses with complex reaction mechanisms and can transfer them to unknown reactions. Students are able to describe important spectroscopic methods, to evaluate a spectrum and to draw conclusions regarding the molecular structure.

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

 $V(3) + \ddot{U}(1) + V(2)$

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

Workload

270 h

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 23 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



Bachelor' degree (1 major) Mathematics (2023)



Module title Abbreviation					
Organic Chemistry - lab 1				08-OCP1-172-m01	
Module coordinator Module offered by			Module offered by		
holder of the Chair of Organic Chemistry II			ry II	Institute of Organic Chemistry	
ECTS	Metho	od of grading	Only after succ. compl. of module(s)		
8	(not)	successfully completed	o8-OC1 and (o8-ACP1 or o8-ANP)		
Duration Module level Other prerequisite			Other prerequisites	i.	
1 semester undergraduate					
Contents					
German contents available but not translated yet.					
Das Modul bietet die Möglichkeit, das Wissen der Grundvorlesung(en) praktisch anzuwenden. Die Studierenden experimentieren nach einer Sicherheitseinweisung selbstständig im Labor. Neben der Durchführung der Versuche wird das Wissen der Studierenden in Kolloquien und Protokollen geprüft. Schwerpunkte sind der sichere					

Intended learning outcomes

German intended learning outcomes available but not translated yet.

mehrstufige Synthesen sowie Analyse der Produkte.

Die Studierenden sind in der Lage, sicher mit Gefahrenstoffen umzugehen. Er/Sie kann experimentelle Grundoperationen der organischen Chemie durchführen. Er/Sie kann die Produkte in Bezug auf Ausbeute und Reinheit analysieren sowie mögliche Fehlerquellen identifizieren. Die Studierenden können die in der Vorlesung erarbeiteten theoretischen Inhalte mit den praktischen Experimenten im Labor vernetzen.

Umgang mit Gefahrenstoffen, einfache experimentelle Grundoperationen der organischen Chemie, einfache bis

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

P (14)

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

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)

Language of assessment: German and/or English

Allocation of places

--

Additional information

--

Workload

240 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2017)



Module title					Abbreviation	
Organic Chemistry - advanced laboratory course for students of chemistry					08-0CP2-152-m01	
Module coordinator				Module offered by		
holder of the Chair of Organic Chemistry II			ry II	Institute of Organic Chemistry		
ECTS	Meth	thod of grading Only after succ. con		npl. of module(s)		
5	(not)	ot) successfully completed 08-OC2 and (08-OCP1		P1 or OCP1-BC)		
Duratio	Duration Module level		Other prerequisites			
1 semester und		undergraduate				
Conter	Contents					

This module gives students the opportunity to enhance their experimental skills by working with special hazardous substances, using complex working and synthesis techniques as well as extensive purification methods and performing elaborate product analyses.

Intended learning outcomes

Students know how to safely and responsibly handle special hazardous substances. They are able to perform complex syntheses, purification methods and product analyses. They are able to use specialist literature to plan experiments.

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

P (11)

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

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)

Language of assessment: German and/or English

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor' degree (1 major) Biochemistry (2022)



Module title Abbreviation				Abbreviation		
Organic Chemistry 3 & 4					08-0C3+4-152-m01	
Modul	e coord	inator		Module offered by		
holder of the Professorship of Organic Chemistry			Chemistry	Institute of Organic Chemistry		
ECTS	Meth	od of grading	Only after succ. compl. of module(s)			
13	nume	rical grade				
Duration Module level Other prerequis			Other prerequisit	es		
2 seme	2 semester undergraduate					
Contents						
radical tallic c	This module focuses on polar rearrangements, olefination reactions, pericyclic reactions, carbenes, nitriles and radicals. It discusses the fundamental principles of stereoselective synthesis, asymmetric catalysis, organometallic chemistry and retrosynthesis. The module also explores heterocyclic compounds, dyes, naturally occurring substances, biopolymers and protecting group techniques.					

Intended learning outcomes

Students are able to formulate olefination reactions. They are able to develop stereoselective syntheses and asymmetric catalyses. Students are able to describe organometallic reactions. They are able to conduct retrosynthetic analyses of molecules. They are able to name important heteroaromatics and to formulate their reactions and syntheses. They are able to characterise and categorise dyes. Students are able to describe the structure and selective synthesis of proteins. In addition, they are able to describe the structure of the DNA, carbohydrates, fats, terpenes and steroids.

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

 $V(2) + \ddot{U}(2) + V(2) + \ddot{U}(2) + S(1)$

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

--

Workload

390 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Chemistry (2017)



Subfield Physical and Theoretical Chemistry

(40 ECTS credits)



Module appears in

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)

Module title					Abbreviation	
Principles of quantum mechanics and spectroscopy			spectroscopy		08-PC-QMS-152-m01	
Module coordinator				Module offered by	·	
lecturer of lecture "Grundlagen der Quantenmechanik and Spektroskopie" (Principles of Quantum Mechanics and Spectroscopy)			Institute of Physica	al and Theoretical Chemistry		
ECTS	Meth	od of grading	Only after succ. compl. of module(s)			
10	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate		-		
Conte	nts	,	•			
the basis of the following models: particle in a box, harmonic oscillator and rigid rotor. As regards spectroscopy, the module focuses on vibrational spectroscopy, angular momentum quantisation, microwave spectroscopy and UV-VIS spectroscopy. In addition, the module discusses linear operators, eigenvalue problems, matrix representation, differential equations, Fourier transform and orthogonal functions as mathematical bases of the topics listed above.						
Intended learning outcomes						
to des	cribe di				em to molecules. They are able apply the mathematical bases of	
Course	es (type,	number of weekly contact hours, I	anguage — if other than Ge	rman)		
V (4) +	Ü (2) +	V (2)				
		sessment (type, scope, langua	ge — if other than German,	examination offered — if n	ot every semester, information on whether	
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 creditable for bonus						
Alloca	tion of	places				
Addition	onal inf	ormation				
Workle	oad					
300 h						
Teachi	ing cycl	e				
Referr	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 29 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



Module title					Abbreviation
Therm	odynan	nics, Kinetics, Electroch	emistry		08-PC-TKE-152-m01
Modul	Module coordinator			Module offered by	
lecture mie"	lecturer of lecture "Thermodynamik, Kinetik, Elektrochemie" $$			Institute of Physical and Theoretical Chemistry	
ECTS	Metho	Method of grading Only after succ. co		npl. of module(s)	
9	nume	numerical grade			
Duratio	Duration Module level		Other prerequisites		
1 seme	1 semester undergraduate				
C 4	Contracts				

Contents

This module introduces students to the principles of thermodynamics. It focuses on the laws of thermodynamics, chemical equilibria, ideal and real gasses/solutions/mixed phases and electrochemistry. In addition to thermodynamic processes, it discusses the fundamental principles of kinetics.

Intended learning outcomes

Students are able to explain the laws of thermodynamics. They are able to describe thermodynamic aspects of solutions, gases, mixed phases and electrochemical reactions. Students are able to interpret the kinetic aspects of chemical reactions.

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

 $V(4) + \ddot{U}(2)$

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

creditable for bonus

Allocation of places

--

Additional information

--

Workload

270 h

Teaching cycle

--

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

§ 62 | Nr. 1

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

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

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

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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



Bachelor' degree (1 major) Biochemistry (2022) Bachelor' degree (1 major) Mathematics (2023)



roscopy with practical laboratory experiments. They are ab	TKE -TKE ice the knowledge they have gained through the renously conduct experiments in the laboratory. In a see oral tests and write lab reports to demonstrate				
recturer of lecture "Thermodynamik, Kinetik, Elektrochemie" Core Method of grading Only after succ. con on one of the prerequisites of the successfully completed of the prerequisites of the successful of the students of the successful of the successful of the students autono of the successful of the students autono of the successful of the students are able to connect the theoretical principles of the proscopy with practical laboratory experiments. They are able to connect the theoretical principles of the proscopy with practical laboratory experiments. They are able to courses (type, number of weekly contact hours, language — if other than German, module is creditable for bonus) Wortestate/Nachtestate (pre and post-experiment examination of the process of the process of the successful of the s	pl. of module(s) -TKE ice the knowledge they have gained through the renously conduct experiments in the laboratory. In a see oral tests and write lab reports to demonstrate				
Method of grading (not) successfully completed (not) successfull	pl. of module(s) -TKE ice the knowledge they have gained through the renously conduct experiments in the laboratory. In a see oral tests and write lab reports to demonstrate				
(not) successfully completed 08-PC-QMS or 08-PC Ouration Module level Other prerequisites a semester undergraduate Contents This module gives students the opportunity to apply in practical lecture(s). After a safety briefing, the students autono dition to those experiments, students will be expected to take their knowledge. Intended learning outcomes Students are able to connect the theoretical principles of the proscopy with practical laboratory experiments. They are able to courses (type, number of weekly contact hours, language — if other than German, module is creditable for bonus) Wortestate/Nachtestate (pre and post-experiment examinate pages each) and assessment of practical performance (2 to	TKE -TKE ice the knowledge they have gained through the renously conduct experiments in the laboratory. In a see oral tests and write lab reports to demonstrate				
Duration Module level Other prerequisites a semester undergraduate Contents This module gives students the opportunity to apply in practical lecture(s). After a safety briefing, the students autono dition to those experiments, students will be expected to take their knowledge. Intended learning outcomes Students are able to connect the theoretical principles of the croscopy with practical laboratory experiments. They are able to courses (type, number of weekly contact hours, language — if other than German, module is creditable for bonus) Wortestate/Nachtestate (pre and post-experiment examinationages each) and assessment of practical performance (2 to	ice the knowledge they have gained through the re nously conduct experiments in the laboratory. In a se oral tests and write lab reports to demonstrate				
Contents This module gives students the opportunity to apply in practated lecture(s). After a safety briefing, the students autono dition to those experiments, students will be expected to take their knowledge. Intended learning outcomes Students are able to connect the theoretical principles of the croscopy with practical laboratory experiments. They are able to consect the thouse, language—if other than German, module is creditable for bonus) Wortestate/Nachtestate (pre and post-experiment examinated pages each) and assessment of practical performance (2 to	nously conduct experiments in the laboratory. In a ke oral tests and write lab reports to demonstrate				
Contents This module gives students the opportunity to apply in practical lecture(s). After a safety briefing, the students autono dition to those experiments, students will be expected to take their knowledge. Intended learning outcomes Students are able to connect the theoretical principles of the croscopy with practical laboratory experiments. They are able to courses (type, number of weekly contact hours, language — if other than German, module is creditable for bonus) Wortestate/Nachtestate (pre and post-experiment examinationages each) and assessment of practical performance (2 to	nously conduct experiments in the laboratory. In a ke oral tests and write lab reports to demonstrate				
This module gives students the opportunity to apply in practated lecture(s). After a safety briefing, the students autono dition to those experiments, students will be expected to take their knowledge. Intended learning outcomes Students are able to connect the theoretical principles of the troscopy with practical laboratory experiments. They are ablectourses (type, number of weekly contact hours, language — if other than German, module is creditable for bonus) Wortestate/Nachtestate (pre and post-experiment examinationages each) and assessment of practical performance (2 to	nously conduct experiments in the laboratory. In a ke oral tests and write lab reports to demonstrate				
ated lecture(s). After a safety briefing, the students autono dition to those experiments, students will be expected to tak their knowledge. Intended learning outcomes Students are able to connect the theoretical principles of the croscopy with practical laboratory experiments. They are able to courses (type, number of weekly contact hours, language — if other than German, module is creditable for bonus) Wortestate/Nachtestate (pre and post-experiment examinationages each) and assessment of practical performance (2 to	nously conduct experiments in the laboratory. In a ke oral tests and write lab reports to demonstrate				
Students are able to connect the theoretical principles of the troscopy with practical laboratory experiments. They are able Courses (type, number of weekly contact hours, language — if other than Gere P (6) Method of assessment (type, scope, language — if other than German, module is creditable for bonus) Vortestate/Nachtestate (pre and post-experiment examination pages each) and assessment of practical performance (2 to	ermodynamics, kinetics, electrochemistry and spec				
Courses (type, number of weekly contact hours, language — if other than Gero (6) Method of assessment (type, scope, language — if other than German, module is creditable for bonus) Vortestate/Nachtestate (pre and post-experiment examinat pages each) and assessment of practical performance (2 to	ermodynamics, kinetics, electrochemistry and spe				
Method of assessment (type, scope, language — if other than German, module is creditable for bonus) Vortestate/Nachtestate (pre and post-experiment examinat pages each) and assessment of practical performance (2 to	Students are able to connect the theoretical principles of thermodynamics, kinetics, electrochemistry and spectroscopy with practical laboratory experiments. They are able to analyse the resulting measurements.				
Method of assessment (type, scope, language — if other than German, module is creditable for bonus) Vortestate/Nachtestate (pre and post-experiment examinat pages each) and assessment of practical performance (2 to	Courses (type, number of weekly contact hours, language — if other than German)				
nodule is creditable for bonus) Vortestate/Nachtestate (pre and post-experiment examinat pages each) and assessment of practical performance (2 to					
pages each) and assessment of practical performance (2 to	kamination offered $-$ if not every semester, information on whethe				
Allocation of places					
Additional information					
<u>-</u>					
Workload					
270 h					
Feaching cycle					
-					
Referred to in LPO I (examination regulations for teaching-degree progra					

Module appears in

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)



Module title					Abbreviation
Quantum Chemistry					08-TC-152-m01
Module coordinator				Module offered by	
lecturer of lecture "Quantenchemie"				Institute of Physical and Theoretical Chemistry	
ECTS	Metho	Method of grading Only after succ. cor		npl. of module(s)	
3	nume	numerical grade			
Duration Module level		Other prerequisites			
1 seme	ester	undergraduate			

Contents

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+.

Intended learning outcomes

Students are able to describe excited states of molecules with the help of key concepts and models.

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

 $V(2) + \ddot{U}(1)$

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 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

creditable for bonus

Allocation of places

--

Additional information

--

Workload

90 h

Teaching cycle

--

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

§ 22 | Nr. 1 h)

§ 22 II Nr. 2 f)

§ 22 II Nr. 3 f)

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

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

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

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

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

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

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Bachelor' degree (1 major) Biochemistry (2017)



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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Mathematics (2023)



Module title					Abbreviation
Symmetry, chemical bonding and light					08-PC-SBL-152-m01
Module coordinator				Module offered by	
lecturer of lecture "Symmetrie, chemische Bindung and Licht"			che Bindung and	Institute of Physical and Theoretical Chemistry	
ECTS	Meth	ethod of grading Only after succ. co		mpl. of module(s)	
9	nume	erical grade			
Duration Module level		Other prerequisites			
2 seme	ester	undergraduate			
Conten	Contents				

This module provides an introduction to the symmetry of molecules. It focuses on group theory, symmetry operations, point groups, character tables and selection rules. The module deals with the chemical bond based on the qualitative MO theory and gives an introduction to the fundamentals of computational chemistry. It also gives students the opportunity to analyse the interactions between symmetry, chemical bonding and light in detail.

Intended learning outcomes

Students are able to analyse the symmetry of molecules. They are able to draw conclusions about the spectroscopic properties of a particular molecule from the symmetry of that molecule.

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

 $V(3) + \ddot{U}(2) + V(2) + \ddot{U}(2)$

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

Workload

270 h

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Mathematics (2023)



Subfield Basics of Natural Sciences

(23 ECTS credits)



Module title					Abbreviation
Biochemistry 1					08-BC1-152-m01
Module coordinator				Module offered by	
holder of the Chair of Biochemistry				Chair of Biochemistry	
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
5	nume	rical grade			
Duration Module level		Other prerequisites			
1 seme	1 semester undergraduate				
Cantar					

Contents

Comprising lectures and exercises, this module acquaints students with the fundamental principles of biochemistry. 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 (glycolysis, gluconeogenesis, citric acid cycle, cellular respiration, photosynthesis), fatty acid metabolism (beta oxidation, 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.

Intended learning outcomes

Students have become familiar with the fundamental principles of the topics in biochemistry that were discussed in the module. They are able to describe the key biochemical processes in cellular systems.

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

 $V(2) + \ddot{U}(1)$

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

written examination (approx. 60 to 90 minutes)

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

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

§ 42 | Nr. 2

§ 62 I Nr. 2

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Biology (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Food Chemistry (2015)

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

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

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

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

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

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor' degree (1 major) Biology (2017)

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 37 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor' degree (1 major) Food Chemistry (2019)

First state examination for the teaching degree Mittelschule Chemistry (2020 (Prüfungsordnungsversion 2015))

Bachelor' degree (1 major) Biology (2021)

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

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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)



Module	e title				Abbreviation
Mathematics for students in Chemistry and Biochemistry					10-M-MCH-172-m01
Module coordinator				Module offered by	
Dean of Studies Mathematik (Mathematics)			atics)	Institute of Mathematics	
ECTS	Metho	thod of grading Only after succ. co		npl. of module(s)	
5	nume	numerical grade			
Duration Module level		Other prerequisites			
1 semester undergraduate					
Contents					

Functional relations, differentiation and integration of functions in one variable, curve sketching, differentiation and integration of functions in several variables, curve integrals, matrix calculus, power series.

Intended learning outcomes

The student is able to recognise and phrase questions from natural sciences as mathematical problems, apply basic mathematical methods to them and interpret the results.

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

 $V(3) + \ddot{U}(2)$

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

written examination (approx. 90 to 120 minutes) and written exercises (approx. 25)

Allocation of places

Additional information

Workload

150 h

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Module studies (Bachelor) Orientierungsstudien (2020)

Bachelor' degree (1 major) Biochemistry (2022)

exchange program Mathematics (2023)



Modul	e title			Abbreviation		
Introdu	Introduction to Physics for Students of other Disciplines				11-EFNF-152-m01	
Module coordinator				Module offered by		
Manag	ing Dir	ector of the Institute of A	Applied Physics	Faculty of Physics and Astronomy		
ECTS	Meth	od of grading	Only after succ. con	compl. of module(s)		
7	nume	rical grade				
Duratio	Duration Module level		Other prerequisites			
2 seme	2 semester undergraduate					
Conten	Contents					

Fundamentals of mechanics, vibration theory, thermodynamics, optics, science of electricity, atomic and nuclear physics.

Intended learning outcomes

The students are able to identify fundamental physical contexts. They are able to assign them to corresponding fields in physics. They are able to apply simple formulae in order to analyse and evaluate these contexts.

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

V(4) + V(3)

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 (60 to 120 minutes)

Allocation of places

Additional information

Workload

210 h

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Biology (2011)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Psychology (2010)

Bachelor' degree (1 major) Economathematics (2012)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2013)

Bachelor's degree (1 major, 1 minor) Pedagogy (2011)

Bachelor's degree (1 major, 1 minor) Pedagogy (2013)

Bachelor's degree (1 major, 1 minor) French Studies (2013)

Bachelor's degree (1 major, 1 minor) History (2010)

Bachelor's degree (1 major, 1 minor) Philosophy (2013)

Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2012)

Bachelor's degree (1 major, 1 minor) Spanish Studies (2010)

Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)

Bachelor's degree (1 major, 1 minor) English and American Studies (2010)

Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)



Bachelor's degree (1 major, 1 minor) Gallo-Roman philology (2010) Bachelor's degree (1 major, 1 minor) German Language and Literature (2013) Bachelor's degree (1 major, 1 minor) German Language and Literature (2010) Bachelor's degree (1 major, 1 minor) Italian Studies (2010) Bachelor's degree (2 majors) Classical Archaeology (2013) Bachelor's degree (2 majors) Pedagogy (2013) Bachelor's degree (2 majors) Philosophy (2013) Bachelor's degree (2 majors) Special Education (2009) Bachelor's degree (2 majors) Digital Humanities (2012) Bachelor's degree (2 majors) Political and Social Studies (2011) Bachelor's degree (2 majors) Russian Language and Culture (2012) Bachelor's degree (2 majors) European Ethnology (2013) Magister Theologiae Catholic Theology (2013) First state examination for the teaching degree Gymnasium English (2009) First state examination for the teaching degree Gymnasium Biology (2009) First state examination for the teaching degree Gymnasium Chemistry (2009) First state examination for the teaching degree Gymnasium Geography (2009) First state examination for the teaching degree Gymnasium French Studies (2009) First state examination for the teaching degree Gymnasium German (2009) First state examination for the teaching degree Gymnasium History (2009) First state examination for the teaching degree Gymnasium Greek Philology (2009) First state examination for the teaching degree Gymnasium Computer Science (2009) First state examination for the teaching degree Gymnasium Italian Studies (2009) First state examination for the teaching degree Gymnasium Catholic Theology (2009) First state examination for the teaching degree Gymnasium Latin Philology (2009) First state examination for the teaching degree Gymnasium Mathematics (2012) First state examination for the teaching degree Gymnasium Mathematics (2009) First state examination for the teaching degree Gymnasium Music (2009) First state examination for the teaching degree Gymnasium Physics (2009) First state examination for the teaching degree Gymnasium Russian (2009) First state examination for the teaching degree Gymnasium Social Science (2009) First state examination for the teaching degree Gymnasium Spanish Studies (2009) First state examination for the teaching degree Gymnasium Science of Sport (2009) First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009) Bachelor's degree (2 majors) Spanish Studies (2013) Bachelor's degree (2 majors) English and American Studies (2009) Bachelor's degree (2 majors) Gallo-Roman philology (2009) Bachelor's degree (2 majors) German Language and Literature (2013) Bachelor's degree (2 majors) Italian Studies (2009) Bachelor' degree (1 major) Biochemistry (2015) Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Geography (2015) Bachelor' degree (1 major) Computer Science (2015) Bachelor' degree (1 major) Food Chemistry (2015) Bachelor' degree (1 major) Mathematics (2015) Bachelor' degree (1 major) Musicology (2015) Bachelor' degree (1 major) Physics (2015) Bachelor' degree (1 major) Psychology (2015) Bachelor' degree (1 major) Business Management and Economics (2015) Bachelor' degree (1 major) Nanostructure Technology (2015) Bachelor' degree (1 major) Biomedicine (2015) Bachelor' degree (1 major) Music Education (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)



```
Bachelor' degree (1 major) Political and Social Studies (2015)
Bachelor' degree (1 major) Functional Materials (2015)
Bachelor' degree (1 major) Academic Speech Therapy (2015)
Bachelor' 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) Music Education (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) Classical Archaeology (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) Digital Humanities (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) Ancient Near Eastern Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
First state examination for the teaching degree Gymnasium Latin Philology (2015)
First state examination for the teaching degree Gymnasium Mathematics (2015)
First state examination for the teaching degree Gymnasium Physics (2015)
First state examination for the teaching degree Gymnasium Russian (2015)
First state examination for the teaching degree Gymnasium Social Science (2015)
First state examination for the teaching degree Gymnasium Spanish Studies (2015)
```



First state examination for the teaching degree Gymnasium Science of Sport (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' degree (1 major) Mathematical Physics (2016)

Bachelor' degree (1 major) Human-Computer Systems (2016)

Bachelor's degree (2 majors) Theological Studies (2011)

First state examination for the teaching degree Gymnasium Music (2015)

First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)

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' degree (1 major) Romanic Languages (French/Italian) (2016)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2016)

Bachelor' degree (1 major) Romanic Languages (Italian/Spanish) (2016)

Bachelor' degree (1 major) Business Information Systems (2016)

First state examination for the teaching degree Gymnasium French Studies (2016)

First state examination for the teaching degree Gymnasium Italian Studies (2016)

First state examination for the teaching degree Gymnasium Spanish Studies (2016)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2016)

Bachelor' degree (1 major) Media Communication (2016)

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)

Bachelor' 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' degree (1 major) Aerospace Computer Science (2017)

Bachelor' degree (1 major) Modern China (2017)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)

Bachelor' degree (1 major) Economathematics (2017)

Bachelor' degree (1 major) Games Engineering (2017)

Bachelor' degree (1 major) Computer Science (2017)

First state examination for the teaching degree Gymnasium Greek Philology (2018)

Bachelor' degree (1 major) Media Communication (2018)

Bachelor' degree (1 major) Biomedicine (2018)

Bachelor' 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)

First state examination for the teaching degree Gymnasium Physics (2018)



Bachelor' degree (1 major) Computer Science (2019)

First state examination for the teaching degree Gymnasium Mathematics (2019)

Bachelor's degree (1 major, 1 minor) English and American Studies (2019)

Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Information Systems (2019)

Bachelor's degree (2 majors) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Management and Economics (2019)

Bachelor' degree (1 major) Modern China (2019)

Bachelor' degree (1 major) Food Chemistry (2019)

Bachelor' degree (1 major) Biomedicine (2020)

Bachelor' degree (1 major) Pedagogy (2020)

Bachelor' degree (1 major) Political and Social Studies (2020)

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

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

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

Bachelor' degree (1 major) Aerospace Computer Science (2020)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)

First state examination for the teaching degree Gymnasium Physics (2020)

Bachelor's degree (1 major, 1 minor) Pedagogy (2020)

Bachelor's degree (2 majors) Pedagogy (2020)

First state examination for the teaching degree Gymnasium Political and Social Studies (2020)

Bachelor' degree (1 major) Psychology (2020)

Bachelor' 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)

First state examination for the teaching degree Gymnasium History (2021)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2021)

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

First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)

Bachelor' degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)

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

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

Bachelor's degree (2 majors) Special Education (2021)

Bachelor' degree (1 major) Business Information Systems (2021)

Bachelor' degree (1 major) Economathematics (2021)

Bachelor' degree (1 major) Business Management and Economics (2021)

Bachelor' degree (1 major) Human-Computer Systems (2022)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)



Bachelor' degree (1 major) Economathematics (2022)

Bachelor' degree (1 major) Mathematical Data Science (2022)

Bachelor' degree (1 major) Artificial Intelligence and Data Science (2022)

First state examination for the teaching degree Gymnasium Philosophy and Ethics (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' degree (1 major) Franco-German studies: language, culture, digital competence (2022)

Bachelor' degree (1 major) Midwifery (2022)

First state examination for the teaching degree Gymnasium Russian (2023)

First state examination for the teaching degree Gymnasium Mathematics (2023)

First state examination for the teaching degree Gymnasium English (2023)

First state examination for the teaching degree Gymnasium Geography (2023)

Bachelor' 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' degree (1 major) Artificial Intelligence and Data Science (2023)

Bachelor' degree (1 major) Mathematics (2023)

Bachelor' degree (1 major) Business Information Systems (2023)

Bachelor' 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' degree (1 major) Business Management and Economics (2023)

Bachelor' 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)

First state examination for the teaching degree Gymnasium German (2024)

Bachelor' 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' degree (1 major) Music Education (2024)

Bachelor's degree (2 majors) Music Education (2024)

Bachelor's degree (1 major, 1 minor) Music Education (2024)



Module title					Abbreviation
Laboratory Course Physics for Students of other Disciplines				es	11-PFNF-152-m01
Modul	e coord	inator		Module offered by	
Managing Director of the Institute of Ap			oplied Physics	Faculty of Physics and Astronomy	
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
3	(not)	successfully completed			
Duration Module level		Other prerequisites			
1 semester undergrad		undergraduate			
Cantar		-	•		

Contents

Simple experiments in the fields of mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance atomic and nuclear physics, imaging methods.

Intended learning outcomes

The students have recognised and understood physical contexts on the basis of the implementation of own experiments. They can conduct simple experiments in the laboratory. They are able to identify and assess sources of errors in experiments. They are able to compile a protocol for experimental procedures. They have a basic understanding of physical phenomena and know the basic ideas and ways of functioning of different measuring and imaging methods as well as their applications, especially in the field of biomedicine.

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

P (4)

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) practical assignment with oral test (approx. 15 minutes, during experiments) and b) written examination (90 minutes).

Each experiment comprises preparation, performance and evaluation. Test as well as performance of experiments can each be repeated once.

Allocation of places

Only as part of pool of general transferable skills (ASQ): 10 places (lottery)

Additional information

--

Workload

90 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biology (2011)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Psychology (2010)

Bachelor' degree (1 major) Economathematics (2012)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2013)

Bachelor's degree (1 major, 1 minor) Pedagogy (2011)

Bachelor's degree (1 major, 1 minor) Pedagogy (2013)

Bachelor's degree (1 major, 1 minor) French Studies (2013)

Bachelor's degree (1 major, 1 minor) History (2010)



```
Bachelor's degree (1 major, 1 minor) Philosophy (2013)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2012)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2010)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) English and American Studies (2010)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (1 major, 1 minor) Gallo-Roman philology (2010)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2013)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2010)
Bachelor's degree (1 major, 1 minor) Italian Studies (2010)
Bachelor's degree (2 majors) Classical Archaeology (2013)
Bachelor's degree (2 majors) Pedagogy (2013)
Bachelor's degree (2 majors) Philosophy (2013)
Bachelor's degree (2 majors) Special Education (2009)
Bachelor's degree (2 majors) Digital Humanities (2012)
Bachelor's degree (2 majors) Political and Social Studies (2011)
Bachelor's degree (2 majors) Russian Language and Culture (2012)
Bachelor's degree (2 majors) European Ethnology (2013)
Magister Theologiae Catholic Theology (2013)
First state examination for the teaching degree Gymnasium English (2009)
First state examination for the teaching degree Gymnasium Biology (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Gymnasium Geography (2009)
First state examination for the teaching degree Gymnasium French Studies (2009)
First state examination for the teaching degree Gymnasium German (2009)
First state examination for the teaching degree Gymnasium History (2009)
First state examination for the teaching degree Gymnasium Greek Philology (2009)
First state examination for the teaching degree Gymnasium Computer Science (2009)
First state examination for the teaching degree Gymnasium Italian Studies (2009)
First state examination for the teaching degree Gymnasium Catholic Theology (2009)
First state examination for the teaching degree Gymnasium Latin Philology (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Gymnasium Music (2009)
First state examination for the teaching degree Gymnasium Physics (2009)
First state examination for the teaching degree Gymnasium Russian (2009)
First state examination for the teaching degree Gymnasium Social Science (2009)
First state examination for the teaching degree Gymnasium Spanish Studies (2009)
First state examination for the teaching degree Gymnasium Science of Sport (2009)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009)
Bachelor's degree (2 majors) Spanish Studies (2013)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) Gallo-Roman philology (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (2 majors) Italian Studies (2009)
Bachelor' degree (1 major) Biochemistry (2015)
Bachelor' degree (1 major) Chemistry (2015)
Bachelor' degree (1 major) Geography (2015)
Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Food Chemistry (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Musicology (2015)
Bachelor' degree (1 major) Physics (2015)
```



```
Bachelor' degree (1 major) Psychology (2015)
Bachelor' degree (1 major) Business Management and Economics (2015)
Bachelor' degree (1 major) Nanostructure Technology (2015)
Bachelor' degree (1 major) Biomedicine (2015)
Bachelor' degree (1 major) Music Education (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Political and Social Studies (2015)
Bachelor' degree (1 major) Functional Materials (2015)
Bachelor' degree (1 major) Academic Speech Therapy (2015)
Bachelor' 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) Music Education (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) Classical Archaeology (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) Digital Humanities (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) Ancient Near Eastern Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
```



First state examination for the teaching degree Gymnasium Latin Philology (2015)

First state examination for the teaching degree Gymnasium Mathematics (2015)

First state examination for the teaching degree Gymnasium Physics (2015)

First state examination for the teaching degree Gymnasium Russian (2015)

First state examination for the teaching degree Gymnasium Social Science (2015)

First state examination for the teaching degree Gymnasium Spanish Studies (2015)

First state examination for the teaching degree Gymnasium Science of Sport (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' degree (1 major) Mathematical Physics (2016)

Bachelor' degree (1 major) Human-Computer Systems (2016)

Bachelor's degree (2 majors) Theological Studies (2011)

First state examination for the teaching degree Gymnasium Music (2015)

First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)

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' degree (1 major) Romanic Languages (French/Italian) (2016)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2016)

Bachelor' degree (1 major) Romanic Languages (Italian/Spanish) (2016)

Bachelor' degree (1 major) Business Information Systems (2016)

First state examination for the teaching degree Gymnasium French Studies (2016)

First state examination for the teaching degree Gymnasium Italian Studies (2016)

First state examination for the teaching degree Gymnasium Spanish Studies (2016)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2016)

Bachelor' degree (1 major) Media Communication (2016)

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)

Bachelor' 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' degree (1 major) Aerospace Computer Science (2017)

Bachelor' degree (1 major) Modern China (2017)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)

Bachelor' degree (1 major) Economathematics (2017)

Bachelor' degree (1 major) Games Engineering (2017)

Bachelor' degree (1 major) Computer Science (2017)

First state examination for the teaching degree Gymnasium Greek Philology (2018)

Bachelor' degree (1 major) Media Communication (2018)

Bachelor' degree (1 major) Biomedicine (2018)



Bachelor' 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)

First state examination for the teaching degree Gymnasium Physics (2018)

Bachelor' degree (1 major) Computer Science (2019)

First state examination for the teaching degree Gymnasium Mathematics (2019)

Bachelor's degree (1 major, 1 minor) English and American Studies (2019)

Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Information Systems (2019)

Bachelor's degree (2 majors) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Management and Economics (2019)

Bachelor' degree (1 major) Modern China (2019)

Bachelor' degree (1 major) Food Chemistry (2019)

Module studies (Bachelor) Orientierungsstudien (2020)

Bachelor' degree (1 major) Biomedicine (2020)

Bachelor' degree (1 major) Pedagogy (2020)

Bachelor' degree (1 major) Political and Social Studies (2020)

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

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

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

Bachelor' degree (1 major) Aerospace Computer Science (2020)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)

First state examination for the teaching degree Gymnasium Physics (2020)

Bachelor's degree (1 major, 1 minor) Pedagogy (2020)

Bachelor's degree (2 majors) Pedagogy (2020)

First state examination for the teaching degree Gymnasium Political and Social Studies (2020)

Bachelor' degree (1 major) Psychology (2020)

Bachelor' 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)

First state examination for the teaching degree Gymnasium History (2021)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2021)

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

First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)

Bachelor' degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)

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

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

Bachelor's degree (2 majors) Special Education (2021)



Bachelor' degree (1 major) Business Information Systems (2021)

Bachelor' degree (1 major) Economathematics (2021)

Bachelor' degree (1 major) Business Management and Economics (2021)

Bachelor' degree (1 major) Human-Computer Systems (2022)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)

Bachelor' degree (1 major) Economathematics (2022)

Bachelor' degree (1 major) Mathematical Data Science (2022)

Bachelor' degree (1 major) Artificial Intelligence and Data Science (2022)

First state examination for the teaching degree Gymnasium Philosophy and Ethics (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' degree (1 major) Franco-German studies: language, culture, digital competence (2022)

Bachelor' degree (1 major) Midwifery (2022)

First state examination for the teaching degree Gymnasium Russian (2023)

First state examination for the teaching degree Gymnasium Mathematics (2023)

First state examination for the teaching degree Gymnasium English (2023)

First state examination for the teaching degree Gymnasium Geography (2023)

Bachelor' 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' degree (1 major) Artificial Intelligence and Data Science (2023)

Bachelor' degree (1 major) Mathematics (2023)

Bachelor' degree (1 major) Business Information Systems (2023)

Bachelor' 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' degree (1 major) Business Management and Economics (2023)

Bachelor' 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)

First state examination for the teaching degree Gymnasium German (2024)

Bachelor' 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' degree (1 major) Music Education (2024)

Bachelor's degree (2 majors) Music Education (2024)

Bachelor's degree (1 major, 1 minor) Music Education (2024)



Module	e title		Abbreviation		
Toxicology and legal studies					03-TR-152-m01
Module	e coord	inator		Module offered by	
lecture	lecturer of lecture "Toxikologie und Rechtskunde"			Faculty of Medicine	
ECTS	Metho	od of grading	Only after succ. c	ompl. of module(s)	
3	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			

Contents

Basics of legal regulations for chemists (handling and transportation of hazardous materials), fundamentals of toxicology.

Intended learning outcomes

The students master the basics of legal regulations for chemists (handling and transport of hazardous substances) as well as the fundamentals of toxicology.

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

V(1) + V(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)

written examination (approx. 90 minutes)

Allocation of places

--

Additional information

--

Workload

90 h

Teaching cycle

--

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

§ 22 II Nr. 1 h)

§ 22 II Nr. 2 f)

§ 22 II Nr. 3 f)

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Food Chemistry (2015)

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

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2015)

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

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

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

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

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

Master's degree (1 major) Chemistry (2016)

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 52 / 114
	reg, data record Bachelor (180 ECTS) Chemie - 2017	



Master's degree (1 major) Chemistry (2018)

Bachelor' degree (1 major) Food Chemistry (2019)

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' degree (1 major) Food Chemistry (2021)

Bachelor' degree (1 major) Biochemistry (2022)



Key Skills Area

(20 ECTS credits)



General Key Skills

(5 ECTS credits)

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



Subject-specific Key Skills

(15 ECTS credits)



Subject-specific Key Skills, Compulsory Courses

(5 ECTS credits)



		_			I	
Module title					Abbreviation	
Advanced laboratory course					08-VP-152-m01	
Modul	e coord	inator		Module offered by		
head o	f the re	search group offering the	e module	Faculty of Chemistr	y and Pharmacy	
ECTS	Metho	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				
Conter	nts					
		ives students the opport ne in question.	unity to explore a res	earch topic and app	ly the methods commonly used	
Intend	ed lear	ning outcomes				
	nts are a esentat		research topic and p	resent the results of	their work in a written report or	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ge	rman)		
P (10)						
		sessment (type, scope, langua le for bonus)	${\sf ge-if}$ other than German,	examination offered — if no	ot every semester, information on whether	
	•	.5 minutes) ssessment: German and	or English			
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Additional information on module duration: block placement / block taught practical course with a duration of 20 days.						
Worklo	_					
150 h						
Teachi	ng cycl	е				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ammes)		

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Chemistry (2017)



Subject-specific Key Skills, Compulsory Electives

(10 ECTS credits)



Module title					Abbreviation
Biochemistry 2					08-BC2-152-m01
Module coordinator				Module offered by	
holder	of the	Chair of Biochemistry		Chair of Biochemistry	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Durati	Duration Module level		Other prerequisites		
1 seme	ester	undergraduate			

Contents

Comprising lectures and exercises, this module acquaints students with the fundamental principles of biochemistry. A particular focus is on replication, DNA repair, transcription, mRNA maturation, translation and translational regulation, protein targeting, nuclear transport and protein degradation. The module also discusses the fundamental principles of cellular signal transduction.

Intended learning outcomes

Students have become familiar with the fundamental principles of the topics in biochemistry that were discussed in the module. They are able to describe the key biochemical processes in cellular systems.

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

 $V(2) + \ddot{U}(1)$

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

written examination (approx. 60 to 90 minutes)

Allocation of places

--

Additional information

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. II 2. Letter e) and No. II 1. Letter c) of Annex 1 of APOLmCh and No. 3 of Annex 3 of APOLmCh.

Workload

150 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Biology (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Food Chemistry (2015)

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor' degree (1 major) Biology (2017)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor' degree (1 major) Food Chemistry (2019)

Bachelor' degree (1 major) Biology (2021)

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



Bachelor' degree (1 major) Biochemistry (2022) Bachelor' degree (1 major) Biology (2022)



Module title					Abbreviation	
Practical course of Biochemistry					08-BCP-152-m01	
Modul	e coord	inator		Module offered by		
holder of the Chair of Biochemistry				Chair of Biochemistry		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	(not)	successfully completed	08-BC1			
Duratio	Duration Module level		Other prerequisites			
1 seme	ester	undergraduate				

Contents

Practical exercises give students the opportunity to learn the fundamental principles of conducting biochemical experiments.

Intended learning outcomes

Students have become proficient in essential methods in biochemistry.

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

P (6)

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

Log (approx. 30 pages)

Assessment offered: Once a year, summer semester

Allocation of places

Students of the Bachelor's degree programme Biochemie (Biochemistry, 180 ECTS credits): no restrictions with regard to available places.

Students of the Bachelor's degree programme Chemie (Chemistry, 180 ECTS credits): no more than 6 places; places will be allocated according to the number of subject semesters, among applicants with the same number of subject semesters, places will be allocated by lot; a waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

--

Workload

150 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor' degree (1 major) Biochemistry (2022)



Module title					Abbreviation	
Applied Spectroscopy 3					08-PS3-152-m01	
Modul	e coord	linator		Module offered by		
lecturer of lecture "Praktische Spektros			ktroskopie 3"	Institute of Physical and Theoretical Chemistry		
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)		
5	nume	rical grade				
Duratio	Duration Module level		Other prerequisites	Other prerequisites		
1 semester undergraduate						
Conter	Contents					

This module gives students the opportunity to apply their theoretical knowledge of spectroscopic methods in practice and to interpret readings or graphs. We will record and analyse UV-VIS, fluorescence and vibration spectra and discuss modern mass spectrometry methods.

Intended learning outcomes

Students are able to work with different spectrometers and to interpret the resulting spectra. They are able to conduct error discussions.

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

V (3)

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

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

Workload

150 h

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

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

Master's degree (1 major) Functional Materials (2016)

Bachelor' degree (1 major) Chemistry (2017)

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



		(1/3/41	2 W 2 O ((VBIV)	0.5 V, \ / . / .	T.,
Module	e title		Abbreviation		
Progra	Programming and numerical methods				08-PKC-152-m01
Module	e coord	linator		Module offered by	
lecture	r of lec	ture "Programmierkurs fü	r Chemiker"	Institute of Physica	ll and Theoretical Chemistry
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
5	(not)	successfully completed			
Duratio	on	Module level	Other prerequisite	s	
1 seme	ster	undergraduate			
Conten	its				
		provides an introduction to d to problems in chemist		of a programming lar	nguage and discusses how they
Intend	ed lear	ning outcomes			
Studen chemis		able to describe the fund	amentals of the prog	gramming language a	and to apply them to problems in
Course	S (type, i	number of weekly contact hours,	anguage — if other than G	erman)	
S (2) +	Ü (2)				
		sessment (type, scope, langua	ge — if other than German	, examination offered $-$ if no	ot every semester, information on whether
tes) or 20 pag Assess	c) oral es) or e ment c		up to 3 candidates so minutes) mer semester		e candidate each (20 to 30 minu- per candidate) or d) log (approx.

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

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

Bachelor' degree (1 major) Chemistry (2017)

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



Module title					Abbreviation	
Advanced chemical practical course					08-0P-152-m01	
Module coordinator				Module offered by		
head of the research group offering the module			e module	Faculty of Chemistry and Pharmacy		
ECTS	Meth	od of grading	Only after succ. compl. of module(s)			
5	(not)	successfully completed				
Duration Module level		Other prerequisites				
1 semester		undergraduate				
Contents						
This me	odule g	gives students the opport	unity to explore a res	earch topic and app	ly the methods commonly used	

in the discipline in question. Intended learning outcomes

Students are able to explore a specific research topic and present the results of their work in a written report or oral presentation.

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

P (10)

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) talk (approx. 15 minutes) or b) log (approx. 10 to 20 pages)

Language of assessment: German and/or English

Allocation of places

--

Additional information

Additional information on module duration: block placement / block taught practical course with a duration of 20 days.

Workload

150 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Chemistry (2017)

Module studies (Bachelor) Chemistry (2019)



Thesis

(10 ECTS credits)



Module title					Abbreviation		
Bachelor Thesis					08-BA-152-m01		
Module coordinator				Module offered by			
head of the research group offering the module			the module	Faculty of Chemistry and Pharmacy			
ECTS	Meth	od of grading	Only after succ. compl. of module(s)				
10	nume	rical grade					
Duratio	ration Module level		Other prerequisite	Other prerequisites			
1 semester undergraduate The supervisor may make the successful complet les that are relevant for the respective topic a pre ment of the topic.							
Conten	ts						
			portunity to research and ney have learned during		problem within a given time frame		
Intende	ed lear	ning outcomes					
Students are able to conduct research on a defined problem/topic, adhering to the principles of good scientific practice, and to present the results of their work in written form.							
Course	S (type, i	number of weekly contact ho	urs, language — if other than Ge	erman)			
No cou	rses as	ssigned to module					
		sessment (type, scope, la ble for bonus)	nguage — if other than German,	examination offered $-$ if ι	not every semester, information on whether		
Bachelor's thesis (approx. 40 pages) Language of assessment: German and/or English							
Allocat	ion of	places					
Additional information							
Time to complete: 8 weeks.							
Worklo	ad	,					
300 h							
Teachi	ng cycl	e					
Referre	d to in	IPO I (examination regula	ations for teaching-degree progr	rammoc)			

Module appears in

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)



Compulsory Electives, Appendix DA

(170 ECTS credits)



Subfield General and Inorganic Chemistry

(35 ECTS credits)

page 70 / 114



Module title					Abbreviation
Principles of Inorganic Chemistry					08-AC1-152-m01
Module coordinator				Module offered by	
lecturer of lecture "Experimentalchemie" (Experimental Chemistry)			e" (Experimental	Institute of Inorganic Chemistry	
ECTS	CTS Method of grading		Only after succ. compl. of module(s)		
8	numerical grade				
Duration Mod		Module level	Other prerequisites		
1 semester		undergraduate			

Contents

The module provides an overview of the fundamental knowledge of chemistry. Emphasis is placed on the material and particle level, metals, acid-base reactions, the periodic table, chemical equilibrium and complexometry. In addition, the module introduces fundamental concepts of chemistry and teaches the basics of inorganic chemistry.

Intended learning outcomes

The student understands the principles of the periodic table and can obtain information from it. He/she is proficient in basic models of the structure of matter and can describe them properly. He/she can depict chemical reactions using typical chemical formula language and interpret them by identifying the type of reaction. The students know how the most important quantitative and qualitative analytical methods work and their areas of application.

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

V(4) + V(2)

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

--

Workload

240 h

Teaching cycle

--

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

§ 42 | Nr. 1 and § 22 | Nr. 1 h)

§ 62 | Nr. 1

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

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

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2015)

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

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

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



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

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

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Module studies (Bachelor) Chemistry (2019)

Module studies (Bachelor) Orientierungsstudien (2020)

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' degree (1 major) Food Chemistry (2021)

Bachelor' degree (1 major) Biochemistry (2022)



Module title					Abbreviation
Inorganic Chemistry 1 (lab)					08-ACP1-152-m01
Module coordinator				Module offered by	
holder of the Chair of Anorganic Chemistry			stry	Institute of Inorganic Chemistry	
ECTS	Meth	od of grading	Only after succ. compl. of module(s)		
10	(not)	not) successfully completed			
Duration Module level		Other prerequisites			
1 semester		undergraduate			
Contents					

Contents

This module gives students the opportunity to apply in practice the knowledge they have gained through the related lecture(s). After a safety briefing, the students autonomously conduct experiments in the laboratory. The course focuses on laboratory safety, simple lab techniques, the synthesis of simple substances and analyses of unknown substances.

Intended learning outcomes

Students are able to identify fundamental problems in chemistry and perform experiments to solve them. They have developed the ability to perform the necessary stoichiometric calculations and describe the chemical processes in an appropriate manner, both in written and oral form.

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

P(12) + S(2)

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)] and Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical assignments (2 to 4 random examinations)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

--

Additional information

--

Workload

300 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Chemistry (2017)

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



Module title				Abbreviation
Inorganic Chemistry of the Elements				08-AS1-152-m01
Module	e coordinator		Module offered by	
	r of lecture "Chemie der Hauptg emistry of Main-group Elements		Institute of Inorgan	ic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)		
	1			

ECTS Method of grading		od of grading	Only after succ. compl. of module(s)
6	6 numerical grade		-
Duratio	n	Module level	Other prerequisites
1 seme	ster	undergraduate	-

This module equips students with an advanced knowledge of the periodic table and selected elements. It focuses on bonding conditions, trends in the periodic table and the description and structure of elements. In addition, it introduces students to elementary organic chemistry, coordination chemistry and complex chemistry.

Intended learning outcomes

Students are able to characterise main group elements and transition metal elements in terms of their structure, reactivity and fabrication. They are able to identify the coordination of the atoms. In addition, they have learned how to use the periodic table, an essential tool for chemists.

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

V(2) + V(2)

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

--

Workload

180 h

Teaching cycle

--

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

§ 62 | Nr. 1

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

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

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Mathematics (2023)



Module title					Abbreviation	
Analytical Chemistry (lab)					08-ANP-152-m01	
Modul	e coord	inator		Module offered by		
holder of the Chair of Anorganic Chemis			stry	Institute of Inorganic Chemistry		
ECTS	Metho	od of grading	Only after succ. cor	ompl. of module(s)		
6	(not)	successfully completed				
Duration Module level		Other prerequisites				
1 seme	ester	undergraduate				
Contor	,tc	-	•			

This module gives students the opportunity to apply in practice the knowledge they have gained through the related lecture(s). After a safety briefing, the students autonomously conduct experiments in the laboratory. These experiments focus on different methods for the analysis of unknown substances.

Intended learning outcomes

Students are able to use different methods to analyse unknown substances. In addition, they are able to separate and analyse mixtures.

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

P(12) + S(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)

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)

Assessment offered: Once a year, summer semester Language of assessment: German and/or English

Allocation of places

--

Additional information

--

Workload

180 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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

Bachelor' degree (1 major) Biochemistry (2022)



Modul	e title				Abbreviation
Solid State Chemistry, Spectroscopic Methods (DD)					08-AC-FS-DA-152-m01
Modul	e coord	inator		Module offered by	
lecture mistry)		ture "Festkörperchemie"	(Solid State Che-	Institute of Inorgan	nic Chemistry
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conte	nts				
		equips students with an a tures and properties, spe			d saline compounds. It focuses nical processes.
Intend	ed lear	ning outcomes		·	·
priate trosco manne	manne pic met er.	r. They are able to system hods that can be used fo	nise them and charac or the structural analy -	terise their structure sis of solids and car	I saline compounds in an appro- e and reactivity. They can list spec n describe them in an appropriate
		number of weekly contact hours,	language — if other than Ge	rman)	
V (2) +					
		sessment (type, scope, langua ble for bonus)	age — if other than German,	examination offered — if n	ot every semester, information on whether
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					
tes) or 20 pag			/or English		
tes) or 20 pag Langua		ssessment: German and	/or English		
tes) or 20 pag Langua	age of a	ssessment: German and	/or English		

Workload

150 h

Teaching cycle

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)



Subfield Organic Chemistry

(28 ECTS credits)



Modul	Module title				Abbreviation	
Organic Chemistry 1					08-0C1-152-m01	
Module coordinator				Module offered by		
holder of the Professorship of Organic Cl			Chemistry	Institute of Organic Chemistry		
ECTS	Metho	od of grading	Only after succ. cor	mpl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisites				
1 seme	ester	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 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 (type, number of weekly contact hours, language — if other than German)

 $V(3) + \ddot{U}(1)$

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 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

--

Workload

150 h

Teaching cycle

Teaching cycle: every year, summer semester

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

§ 62 | Nr. 2

Module appears in

Bachelor' degree (1 major) Biology (2011)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Psychology (2010)

Bachelor' degree (1 major) Economathematics (2012)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2013)

Bachelor's degree (1 major, 1 minor) Pedagogy (2011)

Bachelor's degree (1 major, 1 minor) Pedagogy (2013)

Bachelor's degree (1 major, 1 minor) French Studies (2013)



```
Bachelor's degree (1 major, 1 minor) History (2010)
Bachelor's degree (1 major, 1 minor) Philosophy (2013)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2012)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2010)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) English and American Studies (2010)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (1 major, 1 minor) Gallo-Roman philology (2010)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2013)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2010)
Bachelor's degree (1 major, 1 minor) Italian Studies (2010)
Bachelor's degree (2 majors) Classical Archaeology (2013)
Bachelor's degree (2 majors) Pedagogy (2013)
Bachelor's degree (2 majors) Philosophy (2013)
Bachelor's degree (2 majors) Special Education (2009)
Bachelor's degree (2 majors) Digital Humanities (2012)
Bachelor's degree (2 majors) Political and Social Studies (2011)
Bachelor's degree (2 majors) Russian Language and Culture (2012)
Bachelor's degree (2 majors) European Ethnology (2013)
Magister Theologiae Catholic Theology (2013)
Bachelor's degree (2 majors) Spanish Studies (2013)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) Gallo-Roman philology (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (2 majors) Italian Studies (2009)
Bachelor' degree (1 major) Biochemistry (2015)
Bachelor' degree (1 major) Chemistry (2015)
Bachelor' degree (1 major) Geography (2015)
Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Musicology (2015)
Bachelor' degree (1 major) Physics (2015)
Bachelor' degree (1 major) Psychology (2015)
Bachelor' degree (1 major) Business Management and Economics (2015)
Bachelor' degree (1 major) Nanostructure Technology (2015)
Bachelor' degree (1 major) Biomedicine (2015)
Bachelor' degree (1 major) Music Education (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Political and Social Studies (2015)
Bachelor' degree (1 major) Functional Materials (2015)
Bachelor' degree (1 major) Academic Speech Therapy (2015)
Bachelor' 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) Music Education (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) Classical Archaeology (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) Digital Humanities (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) Ancient Near Eastern 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' degree (1 major) Mathematical Physics (2016) Bachelor' degree (1 major) Human-Computer Systems (2016) Bachelor's degree (2 majors) Theological Studies (2011) 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' degree (1 major) Romanic Languages (French/Italian) (2016) Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2016) Bachelor' degree (1 major) Romanic Languages (Italian/Spanish) (2016) Bachelor' degree (1 major) Business Information Systems (2016) Bachelor' 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' degree (1 major) Media Communication (2016) Bachelor' degree (1 major) Food Chemistry (2016) Bachelor's degree (1 major, 1 minor) Digital Humanities (2016) Bachelor' 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' degree (1 major) Aerospace Computer Science (2017)

Bachelor' degree (1 major) Modern China (2017)



Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)

Bachelor' degree (1 major) Economathematics (2017)

Bachelor' degree (1 major) Games Engineering (2017)

Bachelor' degree (1 major) Computer Science (2017)

Bachelor' degree (1 major) Media Communication (2018)

Bachelor' degree (1 major) Biomedicine (2018)

Bachelor' 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' degree (1 major) Computer Science (2019)

Bachelor's degree (1 major, 1 minor) English and American Studies (2019)

Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Information Systems (2019)

Bachelor's degree (2 majors) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Management and Economics (2019)

Bachelor' degree (1 major) Modern China (2019)

Bachelor' degree (1 major) Food Chemistry (2019)

Bachelor' degree (1 major) Biomedicine (2020)

Bachelor' degree (1 major) Pedagogy (2020)

Bachelor' degree (1 major) Political and Social Studies (2020)

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

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

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

Bachelor' 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' degree (1 major) Psychology (2020)

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

Bachelor' degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)

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

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

Bachelor's degree (2 majors) Special Education (2021)



Bachelor' degree (1 major) Business Information Systems (2021)

Bachelor' degree (1 major) Economathematics (2021)

Bachelor' degree (1 major) Business Management and Economics (2021)

Bachelor' degree (1 major) Human-Computer Systems (2022)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)

Bachelor' degree (1 major) Economathematics (2022)

Bachelor' degree (1 major) Mathematical Data Science (2022)

Bachelor' 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' degree (1 major) Franco-German studies: language, culture, digital competence (2022)

Bachelor' degree (1 major) Midwifery (2022)

Bachelor' 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' degree (1 major) Artificial Intelligence and Data Science (2023)

Bachelor' degree (1 major) Mathematics (2023)

Bachelor' degree (1 major) Business Information Systems (2023)

Bachelor' 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' degree (1 major) Business Management and Economics (2023)

Bachelor' 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' 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' degree (1 major) Music Education (2024)

Bachelor's degree (2 majors) Music Education (2024)

Bachelor's degree (1 major, 1 minor) Music Education (2024)



Modul	Module title				Abbreviation		
Organic Chemistry 2 and analytical methods in organic chemistry				chemistry	08-0C2-152-m01		
Module coordinator				Module offer	Module offered by		
holder of the Chair of Physically Organic Chemistry			ganic Chemistry	Institute of O	Institute of Organic Chemistry		
ECTS	Meth	od of grading	Only after succ.	compl. of module	mpl. of module(s)		
9	nume	rical grade					
Duration Module level		Other prerequis	Other prerequisites				
1 semester undergraduate							
Contai	ntc	•	•				

This module introduces students to the rules of aromaticity and discusses specific reactions of aromatics. Using the example of carbonyl compounds, it extends the students' knowledge of substitution, elimination and addition reactions to complex reaction mechanisms. The course also focuses on oxidation and reduction reactions as well as rearrangement. In addition, it introduces students to the spectroscopic methods of infrared spectroscopy, mass spectrometry and NMR spectroscopy.

Intended learning outcomes

Students have become familiar with the criteria for aromaticity. They can analyse the varying reactivity of carbonyl compounds. They are able to describe specific reactions of carbonyls and aromatics. For that purpose, they can plan and formulate multi-stage syntheses with complex reaction mechanisms and can transfer them to unknown reactions. Students are able to describe important spectroscopic methods, to evaluate a spectrum and to draw conclusions regarding the molecular structure.

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

 $V(3) + \ddot{U}(1) + V(2)$

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

Workload

270 h

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 82 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



Bachelor' degree (1 major) Mathematics (2023)



Module title				Abbreviation	
Organic Chemistry - lab 1			08-0CP1-172-m01		
Module coordinator			Module offered by		
holder of the Chair of Organic Chemistry II			Institute of Organic Chemistry		
CCTS Method of grading		Only after succ. con	ompl. of module(s)		
(not) successfully	completed	08-0C1 and (08-ACF	or o8-ANP)		
Ouration Module leve	el.	Other prerequisites			
1 semester undergraduate					
Contents					

German contents available but not translated yet.

Das Modul bietet die Möglichkeit, das Wissen der Grundvorlesung(en) praktisch anzuwenden. Die Studierenden experimentieren nach einer Sicherheitseinweisung selbstständig im Labor. Neben der Durchführung der Versuche wird das Wissen der Studierenden in Kolloquien und Protokollen geprüft. Schwerpunkte sind der sichere Umgang mit Gefahrenstoffen, einfache experimentelle Grundoperationen der organischen Chemie, einfache bis mehrstufige Synthesen sowie Analyse der Produkte.

Intended learning outcomes

German intended learning outcomes available but not translated yet.

Die Studierenden sind in der Lage, sicher mit Gefahrenstoffen umzugehen. Er/Sie kann experimentelle Grundoperationen der organischen Chemie durchführen. Er/Sie kann die Produkte in Bezug auf Ausbeute und Reinheit analysieren sowie mögliche Fehlerquellen identifizieren. Die Studierenden können die in der Vorlesung erarbeiteten theoretischen Inhalte mit den praktischen Experimenten im Labor vernetzen.

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

P (14)

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

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)

Language of assessment: German and/or English

Allocation of places

--

Additional information

--

Workload

240 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2017)



Module title					Abbreviation	
Organic Chemistry 3 (DD)					08-0C-0C3-DA-152-m01	
Module coordinator Module offered by					I.	
holder of the Professorship of Organic Chemistry			Chemistry	Institute of Organic Chemistry		
ECTS	Metho	od of grading	Only after succ. compl. of module(s)			
6	nume	rical grade				
Duratio	on	Module level	Other prerequisites	;		
1 seme	ster	undergraduate				
Contents						
This module focuses on polar rearrangements, olefination reactions, pericyclic reactions, carbenes, nitriles and radicals. It discusses the fundamental principles of stereoselective synthesis, asymmetric catalysis, organome-						

Intended learning outcomes

tallic chemistry and retrosynthesis.

Students are able to formulate olefination reactions. They are able to develop stereoselective syntheses and asymmetric catalyses. Students are able to describe organometallic reactions. They are able to conduct retrosynthetic analyses of molecules.

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

 $V(2) + \ddot{U}(2)$

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

--

Workload

180 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Chemistry (2017)



Subfield Physical and Theoretical Chemistry

(37 ECTS credits)



Module title					Abbreviation
Princip	oles of q	uantum mechanics a	nd spectroscopy		08-PC-QMS-152-m01
Module coordinator				Module offered by	'
lecturer of lecture "Grundlagen der Quantenmechan Spektroskopie" (Principles of Quantum Mechanics a Spectroscopy)				Institute of Physica	al and Theoretical Chemistry
ECTS	Metho	d of grading	Only after succ. con	npl. of module(s)	
10	nume	ical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conten	ıts		,		
UV-VIS tation, sted al	spectro differer bove.	oscopy. In addition, that is a secopy. In addition, the state of the second is a second in the second in the second is a second in the second in the second in the second is a second in the second in the second in the second in the second is a second in the sec	ne module discusses lin	ear operators, eigen	tion, microwave spectroscopy and ivalue problems, matrix represenathematical bases of the topics li-
Intend	ed learr	ing outcomes			
to desc		ferent spectroscopic	•		nem to molecules. They are able o apply the mathematical bases of
Course	es (type, n	umber of weekly contact ho	urs, language — if other than Ge	rman)	
V (4) +	Ü (2) +	V (2)			
		essment (type, scope, la e for bonus)	nguage — if other than German,	examination offered — if n	ot every semester, information on whether
tes) or 20 pag Langua	c) oral (ges) or e	examination in group) presentation (approssessment: German a	s of up to 3 candidates (ox. 30 minutes)		ne candidate each (20 to 30 minu- per candidate) or d) log (approx.
A 11	tion of p	laces			
Allocat					
Allocal					
	onal info	ormation			
	onal info	ormation			
 Additio		ormation			
 Additic		ormation			

								•
M	പ	ш	Δ.	a n	ne	121	·c	ın
141	vu	uι	┖ '	αv	שע	aı		

Bachelor' degree (1 major) Chemistry (2015)

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

Bachelor' degree (1 major) Chemistry (2017)



Module title					Abbreviation	
Thermodynamics, Kinetics, Electrochemistry					08-PC-TKE-152-m01	
Modul	e coord	inator		Module offered by		
lecture mie"	lecturer of lecture "Thermodynamik, Kinetik, Elektroch mie"			Institute of Physical and Theoretical Chemistry		
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)		
9	nume	rical grade				
Duratio	Duration Module level		Other prerequisites	Other prerequisites		
1 seme	ester	undergraduate				
Camban	Combonto					

This module introduces students to the principles of thermodynamics. It focuses on the laws of thermodynamics, chemical equilibria, ideal and real gasses/solutions/mixed phases and electrochemistry. In addition to thermodynamic processes, it discusses the fundamental principles of kinetics.

Intended learning outcomes

Students are able to explain the laws of thermodynamics. They are able to describe thermodynamic aspects of solutions, gases, mixed phases and electrochemical reactions. Students are able to interpret the kinetic aspects of chemical reactions.

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

 $V(4) + \ddot{U}(2)$

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

creditable for bonus

Allocation of places

--

Additional information

--

Workload

270 h

Teaching cycle

--

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

§ 62 | Nr. 1

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

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

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

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

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

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 88 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



Bachelor' degree (1 major) Biochemistry (2022) Bachelor' degree (1 major) Mathematics (2023)



Module title					Abbreviation
Physical Chemistry (lab)					08-PCP-152-m01
Modul	e coord	inator		Module offered by	
lecture mie"	r of lec	ture "Thermodynamik, Ki	netik, Elektroche-	Institute of Physica	l and Theoretical Chemistry
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
9	(not)	successfully completed	o8-PC-QMS or o8-P	C-TKE	
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conter	its				
dition		e experiments, students			eriments in the laboratory. In adite lab reports to demonstrate
Intend	ed lear	ning outcomes			
		able to connect the theor practical laboratory expe			etics, electrochemistry and speculting measurements.
Course	S (type, r	number of weekly contact hours, I	anguage — if other than Ge	rman)	
P (6)					
		sessment (type, scope, langua ole for bonus)	ge — if other than German,	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 p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
270 h					
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	

Module appears in

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)



Module title				Abbreviation	
Quantum Chemistry					08-TC-152-m01
Modul	e coord	inator		Module offered by	
lecturer of lecture "Quantenchemie"		Institute of Physical and Theoretical Chemistry			
ECTS	Meth	od of grading	Only after succ. co	npl. of module(s)	
3	nume	rical grade			
Duration Module level Other prerequisites		;			
1 seme	ster	undergraduate			
Cantar		•			

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+.

Intended learning outcomes

Students are able to describe excited states of molecules with the help of key concepts and models.

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

 $V(2) + \ddot{U}(1)$

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 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

creditable for bonus

Allocation of places

--

Additional information

--

Workload

90 h

Teaching cycle

--

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

§ 22 | Nr. 1 h)

§ 22 II Nr. 2 f)

§ 22 II Nr. 3 f)

Module appears in

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Mathematics (2015)

Bachelor' degree (1 major) Computational Mathematics (2015)

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

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

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

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

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

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 91 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Mathematics (2023)



Module title					Abbreviation
Symmetry, chemical bonding and light (DD)			ht (DD)		08-PC-SBL-DA-152-m01
Modul	e coord	inator		Module offered by	
lecture Licht"	er of lect	ture "Symmetrie, chemi	sche Bindung and	Institute of Physica	al and Theoretical Chemistry
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)	
6	nume	rical grade			
Duration	on	Module level	Other prerequisites	;	
1 seme	ester	undergraduate			
Conter	ıts				
tions,	point gr		and selection rules. Th	ne module deals witl	on group theory, symmetry opera h the chemical bond based on the tational chemistry.
Intend	ed lear	ning outcomes			
		able to analyse the symes of a particular molec			conclusions about the spectros-
Course	es (type, r	number of weekly contact hours	, language — if other than Ge	rman)	
V (3) +	Ü (2)				
		sessment (type, scope, langule for bonus)	uage — if other than German,	examination offered — if n	ot every semester, information on whether
tes) or 20 pag	c) oral ges) or e		of up to 3 candidates (30 minutes)		e candidate each (20 to 30 minu- per candidate) or d) log (approx.
Alloca	tion of p	olaces			
Additio	onal inf	ormation			
Worklo	oad				
180 h					
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)	
	_				

Module appears in

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)



Subfield Basics of Natural Sciences

(20 ECTS credits)



Module title			Abbreviation		
Biochemistry 1					08-BC1-152-m01
Module coordinator				Module offered by	
holder	holder of the Chair of Biochemistry			Chair of Biochemistry	
ECTS	TS Method of grading Only after succ. cor		Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duration Module level Other prerequisites					
1 seme	ester	undergraduate			
Contonts					

Comprising lectures and exercises, this module acquaints students with the fundamental principles of biochemistry. 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 (glycolysis, gluconeogenesis, citric acid cycle, cellular respiration, photosynthesis), fatty acid metabolism (beta oxidation, 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.

Intended learning outcomes

Students have become familiar with the fundamental principles of the topics in biochemistry that were discussed in the module. They are able to describe the key biochemical processes in cellular systems.

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

 $V(2) + \ddot{U}(1)$

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

written examination (approx. 60 to 90 minutes)

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

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

§ 42 | Nr. 2

§ 62 | Nr. 2

Module appears in

Bachelor' degree (1 major) Biochemistry (2015)

Bachelor' degree (1 major) Biology (2015)

Bachelor' degree (1 major) Chemistry (2015)

Bachelor' degree (1 major) Food Chemistry (2015)

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

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

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

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

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

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor' degree (1 major) Biology (2017)

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 95 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor' degree (1 major) Food Chemistry (2019)

First state examination for the teaching degree Mittelschule Chemistry (2020 (Prüfungsordnungsversion 2015))

Bachelor' degree (1 major) Biology (2021)

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

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

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)



Module title					Abbreviation
Mathematics for students in Chemistry and Biochemistry					10-M-MCH-172-m01
Module	e coord	inator		Module offered by	
Dean o	Dean of Studies Mathematik (Mathematics)			Institute of Mathematics	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
5	nume	rical grade			
Duration Module level Other prerequisi		Other prerequisites			
1 semester undergraduate					
Contents					

Functional relations, differentiation and integration of functions in one variable, curve sketching, differentiation and integration of functions in several variables, curve integrals, matrix calculus, power series.

Intended learning outcomes

The student is able to recognise and phrase questions from natural sciences as mathematical problems, apply basic mathematical methods to them and interpret the results.

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

V (3) + Ü (2)

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

written examination (approx. 90 to 120 minutes) and written exercises (approx. 25)

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Module studies (Bachelor) Orientierungsstudien (2020)

Bachelor' degree (1 major) Biochemistry (2022)

exchange program Mathematics (2023)



Module title				Abbreviation		
Introduction to Physics for Students of other Disciplines					11-EFNF-152-m01	
Module coordinator				Module offered by	Module offered by	
Manag	ging Dire	ector of the Institute of	Applied Physics	Faculty of Physics	Faculty of Physics and Astronomy	
ECTS	Meth	od of grading	Only after succ. o	ompl. of module(s)		
7	nume	rical grade				
Duration Module level Other prerequisites		es				
2 semester undergraduate						
Contor	nt c	-				

Fundamentals of mechanics, vibration theory, thermodynamics, optics, science of electricity, atomic and nuclear physics.

Intended learning outcomes

The students are able to identify fundamental physical contexts. They are able to assign them to corresponding fields in physics. They are able to apply simple formulae in order to analyse and evaluate these contexts.

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

V(4) + V(3)

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 (60 to 120 minutes)

Allocation of places

--

Additional information

--

Workload

210 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biology (2011)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Psychology (2010)

Bachelor' degree (1 major) Economathematics (2012)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2013)

Bachelor's degree (1 major, 1 minor) Pedagogy (2011)

Bachelor's degree (1 major, 1 minor) Pedagogy (2013)

Bachelor's degree (1 major, 1 minor) French Studies (2013)

Bachelor's degree (1 major, 1 minor) History (2010)

Bachelor's degree (1 major, 1 minor) Philosophy (2013)

Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2012)

Bachelor's degree (1 major, 1 minor) Spanish Studies (2010)

Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)

Bachelor's degree (1 major, 1 minor) English and American Studies (2010)

Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)



```
Bachelor's degree (1 major, 1 minor) Gallo-Roman philology (2010)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2013)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2010)
Bachelor's degree (1 major, 1 minor) Italian Studies (2010)
Bachelor's degree (2 majors) Classical Archaeology (2013)
Bachelor's degree (2 majors) Pedagogy (2013)
Bachelor's degree (2 majors) Philosophy (2013)
Bachelor's degree (2 majors) Special Education (2009)
Bachelor's degree (2 majors) Digital Humanities (2012)
Bachelor's degree (2 majors) Political and Social Studies (2011)
Bachelor's degree (2 majors) Russian Language and Culture (2012)
Bachelor's degree (2 majors) European Ethnology (2013)
Magister Theologiae Catholic Theology (2013)
First state examination for the teaching degree Gymnasium English (2009)
First state examination for the teaching degree Gymnasium Biology (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Gymnasium Geography (2009)
First state examination for the teaching degree Gymnasium French Studies (2009)
First state examination for the teaching degree Gymnasium German (2009)
First state examination for the teaching degree Gymnasium History (2009)
First state examination for the teaching degree Gymnasium Greek Philology (2009)
First state examination for the teaching degree Gymnasium Computer Science (2009)
First state examination for the teaching degree Gymnasium Italian Studies (2009)
First state examination for the teaching degree Gymnasium Catholic Theology (2009)
First state examination for the teaching degree Gymnasium Latin Philology (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Gymnasium Music (2009)
First state examination for the teaching degree Gymnasium Physics (2009)
First state examination for the teaching degree Gymnasium Russian (2009)
First state examination for the teaching degree Gymnasium Social Science (2009)
First state examination for the teaching degree Gymnasium Spanish Studies (2009)
First state examination for the teaching degree Gymnasium Science of Sport (2009)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009)
Bachelor's degree (2 majors) Spanish Studies (2013)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) Gallo-Roman philology (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (2 majors) Italian Studies (2009)
Bachelor' degree (1 major) Biochemistry (2015)
Bachelor' degree (1 major) Chemistry (2015)
Bachelor' degree (1 major) Geography (2015)
Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Food Chemistry (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Musicology (2015)
Bachelor' degree (1 major) Physics (2015)
Bachelor' degree (1 major) Psychology (2015)
Bachelor' degree (1 major) Business Management and Economics (2015)
Bachelor' degree (1 major) Nanostructure Technology (2015)
Bachelor' degree (1 major) Biomedicine (2015)
Bachelor' degree (1 major) Music Education (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
```



```
Bachelor' degree (1 major) Political and Social Studies (2015)
Bachelor' degree (1 major) Functional Materials (2015)
Bachelor' degree (1 major) Academic Speech Therapy (2015)
Bachelor' 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) Music Education (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) Classical Archaeology (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) Digital Humanities (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) Ancient Near Eastern Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
First state examination for the teaching degree Gymnasium Latin Philology (2015)
First state examination for the teaching degree Gymnasium Mathematics (2015)
First state examination for the teaching degree Gymnasium Physics (2015)
First state examination for the teaching degree Gymnasium Russian (2015)
First state examination for the teaching degree Gymnasium Social Science (2015)
First state examination for the teaching degree Gymnasium Spanish Studies (2015)
```



First state examination for the teaching degree Gymnasium Science of Sport (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' degree (1 major) Mathematical Physics (2016)

Bachelor' degree (1 major) Human-Computer Systems (2016)

Bachelor's degree (2 majors) Theological Studies (2011)

First state examination for the teaching degree Gymnasium Music (2015)

First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)

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' degree (1 major) Romanic Languages (French/Italian) (2016)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2016)

Bachelor' degree (1 major) Romanic Languages (Italian/Spanish) (2016)

Bachelor' degree (1 major) Business Information Systems (2016)

First state examination for the teaching degree Gymnasium French Studies (2016)

First state examination for the teaching degree Gymnasium Italian Studies (2016)

First state examination for the teaching degree Gymnasium Spanish Studies (2016)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2016)

Bachelor' degree (1 major) Media Communication (2016)

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)

Bachelor' 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' degree (1 major) Aerospace Computer Science (2017)

Bachelor' degree (1 major) Modern China (2017)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)

Bachelor' degree (1 major) Economathematics (2017)

Bachelor' degree (1 major) Games Engineering (2017)

Bachelor' degree (1 major) Computer Science (2017)

First state examination for the teaching degree Gymnasium Greek Philology (2018)

Bachelor' degree (1 major) Media Communication (2018)

Bachelor' degree (1 major) Biomedicine (2018)

Bachelor' 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)

First state examination for the teaching degree Gymnasium Physics (2018)



Bachelor' degree (1 major) Computer Science (2019)

First state examination for the teaching degree Gymnasium Mathematics (2019)

Bachelor's degree (1 major, 1 minor) English and American Studies (2019)

Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Information Systems (2019)

Bachelor's degree (2 majors) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Management and Economics (2019)

Bachelor' degree (1 major) Modern China (2019)

Bachelor' degree (1 major) Food Chemistry (2019)

Bachelor' degree (1 major) Biomedicine (2020)

Bachelor' degree (1 major) Pedagogy (2020)

Bachelor' degree (1 major) Political and Social Studies (2020)

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

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

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

Bachelor' degree (1 major) Aerospace Computer Science (2020)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)

First state examination for the teaching degree Gymnasium Physics (2020)

Bachelor's degree (1 major, 1 minor) Pedagogy (2020)

Bachelor's degree (2 majors) Pedagogy (2020)

First state examination for the teaching degree Gymnasium Political and Social Studies (2020)

Bachelor' degree (1 major) Psychology (2020)

Bachelor' 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)

First state examination for the teaching degree Gymnasium History (2021)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2021)

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

First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)

Bachelor' degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)

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

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

Bachelor's degree (2 majors) Special Education (2021)

Bachelor' degree (1 major) Business Information Systems (2021)

Bachelor' degree (1 major) Economathematics (2021)

Bachelor' degree (1 major) Business Management and Economics (2021)

Bachelor' degree (1 major) Human-Computer Systems (2022)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)



Bachelor' degree (1 major) Economathematics (2022)

Bachelor' degree (1 major) Mathematical Data Science (2022)

Bachelor' degree (1 major) Artificial Intelligence and Data Science (2022)

First state examination for the teaching degree Gymnasium Philosophy and Ethics (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' degree (1 major) Franco-German studies: language, culture, digital competence (2022)

Bachelor' degree (1 major) Midwifery (2022)

First state examination for the teaching degree Gymnasium Russian (2023)

First state examination for the teaching degree Gymnasium Mathematics (2023)

First state examination for the teaching degree Gymnasium English (2023)

First state examination for the teaching degree Gymnasium Geography (2023)

Bachelor' 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' degree (1 major) Artificial Intelligence and Data Science (2023)

Bachelor' degree (1 major) Mathematics (2023)

Bachelor' degree (1 major) Business Information Systems (2023)

Bachelor' 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' degree (1 major) Business Management and Economics (2023)

Bachelor' 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)

First state examination for the teaching degree Gymnasium German (2024)

Bachelor' 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' degree (1 major) Music Education (2024)

Bachelor's degree (2 majors) Music Education (2024)

Bachelor's degree (1 major, 1 minor) Music Education (2024)



Module title			Abbreviation		
Laboratory Course Physics for Students of other Disciplines			s	11-PFNF-152-m01	
Modul	Module coordinator			Module offered by	
Manag	ing Dire	ector of the Institute of Ap	oplied Physics	Faculty of Physics and Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
3	(not)	successfully completed			
Duratio	ition Module level Other prerequisites				
1 seme	1 semester undergraduate				
Contents					

Simple experiments in the fields of mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance atomic and nuclear physics, imaging methods.

Intended learning outcomes

The students have recognised and understood physical contexts on the basis of the implementation of own experiments. They can conduct simple experiments in the laboratory. They are able to identify and assess sources of errors in experiments. They are able to compile a protocol for experimental procedures. They have a basic understanding of physical phenomena and know the basic ideas and ways of functioning of different measuring and imaging methods as well as their applications, especially in the field of biomedicine.

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

P (4)

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) practical assignment with oral test (approx. 15 minutes, during experiments) and b) written examination (90 minutes).

Each experiment comprises preparation, performance and evaluation. Test as well as performance of experiments can each be repeated once.

Allocation of places

Only as part of pool of general transferable skills (ASQ): 10 places (lottery)

Additional information

--

Workload

90 h

Teaching cycle

--

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

--

Module appears in

Bachelor' degree (1 major) Biology (2011)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Physics (2012)

Bachelor' degree (1 major) Psychology (2010)

Bachelor' degree (1 major) Economathematics (2012)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2013)

Bachelor's degree (1 major, 1 minor) Pedagogy (2011)

Bachelor's degree (1 major, 1 minor) Pedagogy (2013)

Bachelor's degree (1 major, 1 minor) French Studies (2013)

Bachelor's degree (1 major, 1 minor) History (2010)

Bachelor's with 1 major Chemistry (2017)	JMU Würzburg • generated 12-Feb-2024 • exam.	page 104 / 114
	reg. data record Bachelor (180 ECTS) Chemie - 2017	



```
Bachelor's degree (1 major, 1 minor) Philosophy (2013)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2012)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2010)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) English and American Studies (2010)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (1 major, 1 minor) Gallo-Roman philology (2010)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2013)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2010)
Bachelor's degree (1 major, 1 minor) Italian Studies (2010)
Bachelor's degree (2 majors) Classical Archaeology (2013)
Bachelor's degree (2 majors) Pedagogy (2013)
Bachelor's degree (2 majors) Philosophy (2013)
Bachelor's degree (2 majors) Special Education (2009)
Bachelor's degree (2 majors) Digital Humanities (2012)
Bachelor's degree (2 majors) Political and Social Studies (2011)
Bachelor's degree (2 majors) Russian Language and Culture (2012)
Bachelor's degree (2 majors) European Ethnology (2013)
Magister Theologiae Catholic Theology (2013)
First state examination for the teaching degree Gymnasium English (2009)
First state examination for the teaching degree Gymnasium Biology (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Gymnasium Geography (2009)
First state examination for the teaching degree Gymnasium French Studies (2009)
First state examination for the teaching degree Gymnasium German (2009)
First state examination for the teaching degree Gymnasium History (2009)
First state examination for the teaching degree Gymnasium Greek Philology (2009)
First state examination for the teaching degree Gymnasium Computer Science (2009)
First state examination for the teaching degree Gymnasium Italian Studies (2009)
First state examination for the teaching degree Gymnasium Catholic Theology (2009)
First state examination for the teaching degree Gymnasium Latin Philology (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Gymnasium Music (2009)
First state examination for the teaching degree Gymnasium Physics (2009)
First state examination for the teaching degree Gymnasium Russian (2009)
First state examination for the teaching degree Gymnasium Social Science (2009)
First state examination for the teaching degree Gymnasium Spanish Studies (2009)
First state examination for the teaching degree Gymnasium Science of Sport (2009)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009)
Bachelor's degree (2 majors) Spanish Studies (2013)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) Gallo-Roman philology (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (2 majors) Italian Studies (2009)
Bachelor' degree (1 major) Biochemistry (2015)
Bachelor' degree (1 major) Chemistry (2015)
Bachelor' degree (1 major) Geography (2015)
Bachelor' degree (1 major) Computer Science (2015)
Bachelor' degree (1 major) Food Chemistry (2015)
Bachelor' degree (1 major) Mathematics (2015)
Bachelor' degree (1 major) Musicology (2015)
Bachelor' degree (1 major) Physics (2015)
```



```
Bachelor' degree (1 major) Psychology (2015)
Bachelor' degree (1 major) Business Management and Economics (2015)
Bachelor' degree (1 major) Nanostructure Technology (2015)
Bachelor' degree (1 major) Biomedicine (2015)
Bachelor' degree (1 major) Music Education (2015)
Bachelor' degree (1 major) Computational Mathematics (2015)
Bachelor' degree (1 major) Political and Social Studies (2015)
Bachelor' degree (1 major) Functional Materials (2015)
Bachelor' degree (1 major) Academic Speech Therapy (2015)
Bachelor' 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) Music Education (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) Classical Archaeology (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) Digital Humanities (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) Ancient Near Eastern Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
```



First state examination for the teaching degree Gymnasium Latin Philology (2015)

First state examination for the teaching degree Gymnasium Mathematics (2015)

First state examination for the teaching degree Gymnasium Physics (2015)

First state examination for the teaching degree Gymnasium Russian (2015)

First state examination for the teaching degree Gymnasium Social Science (2015)

First state examination for the teaching degree Gymnasium Spanish Studies (2015)

First state examination for the teaching degree Gymnasium Science of Sport (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' degree (1 major) Mathematical Physics (2016)

Bachelor' degree (1 major) Human-Computer Systems (2016)

Bachelor's degree (2 majors) Theological Studies (2011)

First state examination for the teaching degree Gymnasium Music (2015)

First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)

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' degree (1 major) Romanic Languages (French/Italian) (2016)

Bachelor' degree (1 major) Romanic Languages (French/Spanish) (2016)

Bachelor' degree (1 major) Romanic Languages (Italian/Spanish) (2016)

Bachelor' degree (1 major) Business Information Systems (2016)

First state examination for the teaching degree Gymnasium French Studies (2016)

First state examination for the teaching degree Gymnasium Italian Studies (2016)

First state examination for the teaching degree Gymnasium Spanish Studies (2016)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2016)

Bachelor' degree (1 major) Media Communication (2016)

Bachelor' degree (1 major) Food Chemistry (2016)

Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)

Bachelor' 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' degree (1 major) Aerospace Computer Science (2017)

Bachelor' degree (1 major) Modern China (2017)

Bachelor' degree (1 major) Biochemistry (2017)

Bachelor' degree (1 major) Chemistry (2017)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)

Bachelor' degree (1 major) Economathematics (2017)

Bachelor' degree (1 major) Games Engineering (2017)

Bachelor' degree (1 major) Computer Science (2017)

First state examination for the teaching degree Gymnasium Greek Philology (2018)

Bachelor' degree (1 major) Media Communication (2018)

Bachelor' degree (1 major) Biomedicine (2018)



Bachelor' 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)

First state examination for the teaching degree Gymnasium Physics (2018)

Bachelor' degree (1 major) Computer Science (2019)

First state examination for the teaching degree Gymnasium Mathematics (2019)

Bachelor's degree (1 major, 1 minor) English and American Studies (2019)

Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Information Systems (2019)

Bachelor's degree (2 majors) Indology/South Asian Studies (2019)

Bachelor' degree (1 major) Business Management and Economics (2019)

Bachelor' degree (1 major) Modern China (2019)

Bachelor' degree (1 major) Food Chemistry (2019)

Module studies (Bachelor) Orientierungsstudien (2020)

Bachelor' degree (1 major) Biomedicine (2020)

Bachelor' degree (1 major) Pedagogy (2020)

Bachelor' degree (1 major) Political and Social Studies (2020)

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

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

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

Bachelor' degree (1 major) Aerospace Computer Science (2020)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)

First state examination for the teaching degree Gymnasium Physics (2020)

Bachelor's degree (1 major, 1 minor) Pedagogy (2020)

Bachelor's degree (2 majors) Pedagogy (2020)

First state examination for the teaching degree Gymnasium Political and Social Studies (2020)

Bachelor' degree (1 major) Psychology (2020)

Bachelor' 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)

First state examination for the teaching degree Gymnasium History (2021)

Bachelor' 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)

First state examination for the teaching degree Gymnasium English (2021)

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

First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)

Bachelor' degree (1 major) Computer Science und Sustainability (2021)

Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)

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

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

Bachelor's degree (2 majors) Special Education (2021)



Bachelor' degree (1 major) Business Information Systems (2021)

Bachelor' degree (1 major) Economathematics (2021)

Bachelor' degree (1 major) Business Management and Economics (2021)

Bachelor' degree (1 major) Human-Computer Systems (2022)

Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)

Bachelor' degree (1 major) Biochemistry (2022)

Bachelor' degree (1 major) Biology (2022)

Bachelor' degree (1 major) Economathematics (2022)

Bachelor' degree (1 major) Mathematical Data Science (2022)

Bachelor' degree (1 major) Artificial Intelligence and Data Science (2022)

First state examination for the teaching degree Gymnasium Philosophy and Ethics (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' degree (1 major) Franco-German studies: language, culture, digital competence (2022)

Bachelor' degree (1 major) Midwifery (2022)

First state examination for the teaching degree Gymnasium Russian (2023)

First state examination for the teaching degree Gymnasium Mathematics (2023)

First state examination for the teaching degree Gymnasium English (2023)

First state examination for the teaching degree Gymnasium Geography (2023)

Bachelor' 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' degree (1 major) Artificial Intelligence and Data Science (2023)

Bachelor' degree (1 major) Mathematics (2023)

Bachelor' degree (1 major) Business Information Systems (2023)

Bachelor' 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' degree (1 major) Business Management and Economics (2023)

Bachelor' 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)

First state examination for the teaching degree Gymnasium German (2024)

Bachelor' 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' degree (1 major) Music Education (2024)

Bachelor's degree (2 majors) Music Education (2024)

Bachelor's degree (1 major, 1 minor) Music Education (2024)



Subfield Competences from foreign university

(50 ECTS credits)



Module	title		Abbreviation			
Qualific	cations	- Partner University 1			08-VPUB1-152-m01	
Module	Module coordinator			Module offered by		
progran	nme co	ordinator of the exchang	ge programme	Faculty of Chemistr	y and Pharmacy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
25	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
2 seme	ster	undergraduate	Please consult with	course advisory serv	vice in advance.	
Conten	ts					
This mo	odule d	iscusses topics from the	curriculum of the pa	rtner university abroa	ad.	
Intende	ed lear	ning outcomes				
Studen sity.	ts have	e developed the knowled	ge and skills taught i	n the courses attend	led by them at the partner univer-	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
		signed to module pecified by partner unive	ersity abroad			
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
		as specified by partner u ssessment: German and,		at partner university	abroad	
Allocat	ion of p	olaces				
Additio	nal inf	ormation	•			
Worklo	ad					
750 h			•			
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
-						
Module appears in						
	Bachelor' degree (1 major) Chemistry (2015)					
Bachel	or' deg	ree (1 major) Chemistry (2	2017)			



Module	e title	_	Abbreviation						
Qualifi	cations	s - Partner University 2	08-VPUB2-152-m01						
Module	e coord	linator		Module offered by					
programme coordinator of the exchange programme				Faculty of Chemistry and Pharmacy					
ECTS Method of grading		Only after succ. compl. of module(s)							
25	nume	rical grade							
Duration		Module level	Other prerequisites						
2 semester		undergraduate	Please consult with course advisory service in advance.						
Conten	Contents								
This m	This module discusses topics from the curriculum of the partner university abroad.								
Intend	Intended learning outcomes								
Students have developed the knowledge and skills taught in the courses attended by them at the partner university.									
Course	Courses (type, number of weekly contact hours, language — if other than German)								
No cou	rses as	ssigned to module							
	Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)								
	Assessments as specified by partner university abroad Language of assessment: German and/or language spoken at partner university abroad								
Allocat	ion of	places							
Additio	nal inf	ormation							
Worklo	Workload								
750 h									
Teaching cycle									
Referred to in LPO I (examination regulations for teaching-degree programmes)									
Module appears in									
	Bachelor' degree (1 major) Chemistry (2015)								
Bachel	Bachelor' degree (1 major) Chemistry (2017)								



Thesis

(10 ECTS credits)



Module	e title	"		Abbreviation				
Bachelor Thesis 08-BA-152-mo1								
Module	e coord	inator		Module offered by				
head o	f the re	search group offering the	e module	Faculty of Chemistry and Pharmacy				
ECTS	ECTS Method of grading		Only after succ. compl. of module(s)					
10	numerical grade							
Duratio	on	Module level	Other prerequisites	prerequisites				
1 semester		undergraduate	The supervisor may make the successful completion of certain modules that are relevant for the respective topic a prerequisite for the assignment of the topic.					
Conten	its							
This module gives students the opportunity to research and write on a defined problem within a given time frame and using the scientific methods they have learned during the programme.								
Intended learning outcomes								
Students are able to conduct research on a defined problem/topic, adhering to the principles of good scientific practice, and to present the results of their work in written form.								
Courses (type, number of weekly contact hours, language — if other than German)								
No cou	rses as	signed to module						
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)								
Bachelor's thesis (approx. 40 pages) Language of assessment: German and/or English								
Allocat	ion of	places						
Additional information								
Time to complete: 8 weeks.								
Workload								
300 h								
Teaching cycle								
Referred to in LPO I (examination regulations for teaching-degree programmes)								
Module appears in								

Bachelor' degree (1 major) Chemistry (2015) Bachelor' degree (1 major) Chemistry (2017)