

Module Catalogue

for the Subject

Chemistry

as Unterrichtsfach with the degree "Erste Staatsprüfung für das Lehramt an Grundschulen"

> Examination regulations version: 2009 Responsible: Faculty of Chemistry and Pharmacy



Contents

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The subject is divided into

section / sub-section	ECTS credits	starting page
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Compulsory Courses	54	6
Teaching	12	21
Teaching Compulsory courses	12	22
Freier Bereich (general as well as subject-specific electives)		28
Subject-specific Extra Skills		29
Thesis	10	49



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:

LASP02009

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

11-Jan-2012 (2011-102)

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.



Scientific Discipline

(54 ECTS credits)



Compulsory Courses

(54 ECTS credits)



Modul	e title				Abbreviation
Physic	al Cher	nistry (teaching degree	for secondary schools	5)	08-PC-GHR-102-m01
Modul	e coord	inator		Module offered by	
für Stu	dierend	ture "Thermodynamik, K de der Biologie, Lebensm emie GHR"		Institute of Physica	l and Theoretical Chemistry
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
4	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts		•		
This m	odule c	liscusses the fundament	al principles of therm	odynamics, kinetics	and electrochemistry.
Intend	ed lear	ning outcomes			·
		e become familiar with the re able to understand ar	•	•	nics, kinetics and electroche- re and engineering.
Course	es (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langualle for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
writter	exami	nation (approx. 60 minu	tes)		
Alloca	tion of	places			
Additio	onal inf	ormation			
Workle	oad				
Teachi	ing cycl	<u> </u>			
	<u> </u>				
Referre	ed to in	LPO I (examination regulation	ns for teaching-degree progra	ımmes)	

§ 42 (1) 1. Chemie "Allgemeine und Anorganische Chemie" und "Physikalische und Analytische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module	e title	,			Abbreviation
Organic Chemistry - laboratory course (teaching degree for second schools)				secondary	08-OC-Prakt-GHR-092-m01
Module coordinator				Module offered by	
lecture	lecturers Organische Chemie (Organic Chemistry			Institute of Organic Chemistry	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	(not) successfully completed				
Duratio	Duration Module level		Other prerequisites		
1 seme	ster	undergraduate			
Conten	nts				

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. In addition to those experiments, students will be expected to take oral tests and write lab reports to demonstrate their knowledge. The course focuses on the safe handling of hazardous substances, simple experimental unit operations of organic chemistry, simple to multi-level syntheses and the analysis of the products.

Intended learning outcomes

Students know how to safely handle hazardous substances. They are able to conduct simple experimental operations of organic chemistry. They are able to analyse the yield and purity of the products and identify possible error sources. They are able to connect the theoretical aspects covered in the lecture with practical experiments in the laboratory.

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

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

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

pre/post-experiment examination talks (Vor-/Nachtestate, approx. 15 minutes each), log (approx. 5 to 10 pages) Assessment offered: once a year, summer semester

Language of assessment: German or English

Allocation of places

Additional information

Workload

Teaching cycle

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

§ 42 (1) 2. Chemie "Organische und Bioorganische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)





Module	e title		Abbreviation		
Basic Mathematics (teaching degree)					08-PC-VKM-LA-102-m01
Module coordinator Module offered by					
lecture	r of blo	ck course "Mathematik"	(Mathematics)	Institute of Physical and Theoretical Chemistry	
ECTS	Method of grading		Only after succ. compl. of module(s)		
2	(not)	successfully completed			
Duratio	Duration Module level		Other prerequisites		
1 seme	1 semester undergraduate				
Conten	its				

This module provides an introduction to mathematical concepts and methods used in physical/theoretical chemistry. It trains students in those methods with the help of examples taken from thermodynamics and kinetics.

Intended learning outcomes

Students have been trained in mathematical methods. They are able to apply those methods to problems in chemistry.

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

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

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

exercises (4 work sheets)

Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Modul	e title				Abbreviation
Exercises in Experimental Presentation					08-Ch-GH-ÜiV-092-m01
Modul	e coord	inator		Module offered by	
lecture	lecturers of the three lectures offered in this mo			Faculty of Chemistry and Pharmacy	
ECTS	Method of grading Only after succ. co		Only after succ. con	npl. of module(s)	
6	(not)	successfully completed			
Duratio	Duration Module level		Other prerequisites		
1 seme	ester	undergraduate			
<u> </u>					

Contents

Students will design, prepare and deliver presentations on a range of topics in chemistry. Presentations will include live demonstrations.

Intended learning outcomes

Students are able to deliver a detailed and scientifically correct presentation on a given topic that is tailored to the specific needs of their audience. They are able to select experiments on the topic in question that support a particular teaching goal as well as to plan and safely perform them. Students will be expected to apply both their chemistry knowledge and skills and their teaching skills.

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

This module comprises 3 module components. Information on courses will be listed separately for each module component.

- o8-Ch-LA-ÜiV-1-092: Ü (no information on SWS (weekly contact hours) and course language available)
- 08-Ch-LA-ÜiV-2-092: Ü (no information on SWS (weekly contact hours) and course language available)
- o8-Ch-GH-ÜiV-3-092: Ü (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-Ch-LA-ÜiV-1-092: Exercises in Experimental Presentation (Inorganic Chemistry)

- 2 ECTS, Method of grading: (not) successfully completed
- talk with demonstrations (approx. 45 minutes)
- Assessment offered: once a year, winter semester
- Language of assessment: German or English

Assessment in module component o8-Ch-LA-ÜiV-2-092: Exercises in Experimental Presentation (Organic Chemistry)

- 2 ECTS, Method of grading: (not) successfully completed
- talk with demonstrations (approx. 45 minutes)
- Assessment offered: once a year, winter semester
- Language of assessment: German or English

Assessment in module component o8-Ch-GH-ÜiV-3-092: Exercises in Experimental Presentation (Physical Chemistry) for Primary School and Secondary Public School Teachers

- 2 ECTS, Method of grading: (not) successfully completed
- talk with demonstrations (approx. 45 minutes)
- Assessment offered: once a year, winter semester
- Language of assessment: German or English

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Additional information

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LA Grundschulen Chemistry (2009)	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data re-	page 11 / 50
	cord Lehramt Grundschulen (Unterrichtsfach) Chemie - 2009	



Workload

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Teaching cycle

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

§ 42 (1) 3. Chemie "Übungen im Vortragen mit Demonstrationen"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009) First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module	e title				Abbreviation	
Organic Chemistry 1 (teaching degree for secondary scho				chools)	08-0C1-GHR-092-m01	
Module	e coord	linator		Module offe	red by	
holder of the Professorship of Organic Chemis			anic Chemistry	Institute of (Organic Chemistry	
ECTS	Meth	od of grading	Only after succ	Only after succ. compl. of module(s)		
6	nume	rical grade				
Duratio	on	Module level	Other prerequi	Other prerequisites		
1 semester undergraduate Admission prerequisite to assessment: successful conservation ses in the respective classes as specified at the beging (usually 70% of exercises to be successfully completed lar attendance of exercises (usually a maximum of 2 sed absence).		specified at the beginning of the course uccessfully completed) as well as regu-				

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

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

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 42 (1) 2. Chemie "Organische und Bioorganische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009) First state examination for the teaching degree Hauptschule Chemistry (2009)

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First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009) First state examination for the teaching degree Realschule Chemistry (2009)



First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module	e title			,	Abbreviation	
Organi	c Chem	nistry 2 (teaching de	gree for secondary so	chools)	08-0C2-GHR-092-m01	
Module coordinator				Module off	ered by	
holder of the Chair of Physically Organic Chemistry			ganic Chemistry	Institute of	Organic Chemistry	
ECTS	Meth	od of grading	Only after succ	Only after succ. compl. of module(s)		
7	nume	rical grade				
Duratio	n	Module level	Other prerequis	sites		
ses in the respective classes (usually 70% of exercises to		ective classes as f exercises to be	ssment: successful completion of exercispecified at the beginning of the course successfully completed) as well as regulally a maximum of 2 incidents of unexcu-			

Contents

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.

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.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 42 (1) 2. Chemie "Organische und Bioorganische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009) First state examination for the teaching degree Realschule Chemistry (2009)



First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title					Abbreviation	
Bioche	mistry	(teaching degree for se	condary schools)		08-BC-GHR-092-m01	
Module	coord	inator		Module offered by		
holder of the Chair of Biochemistry Chair of Biochemistry			try			
ECTS	Method of grading Only after succ. con		mpl. of module(s)			
4	nume	rical grade				
Duratio	n	Module level	Other prerequisites	s		
1 semester undergraduate		Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).				

Comprising lectures and exercises, this module acquaints students with the fundamental principles of biochemistry.

Intended learning outcomes

Students have become familiar with the fundamental principles of biochemistry. 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 + Ü (no information on SWS (weekly contact hours) and course language available)

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

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

Language of assessment: German or English

Allocation of places

Additional information

Workload

Teaching cycle

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

§ 42 (1) 2. Chemie "Organische und Bioorganische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009) First state examination for the teaching degree Realschule Chemistry (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)





Module	e title			Abbreviation	
Inorganic Chemistry 1 (teaching degree)					08-AC1-LA-102-m01
Module coordinator				Module offered by	
lecturer of lecture "Experimentalchemi Chemistry)		iemie" (Experimental	Institute of Inorgar	nic Chemistry	
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
20	nume	rical grade			
Duration Module level Ot		Other prerequisite	Other prerequisites		
1 semester undergraduate		By way of exceptio assessments.	By way of exception, additional prerequisites are listed in the section of assessments.		

Contents

This module provides students with an overview of the fundamental principles of chemistry. It focuses on particles, metals, acid-base reactions, the periodic table, chemical equilibrium and complexometry. In addition, the module introduces fundamental models of chemistry and principles of inorganic chemistry. It includes practical exercises based on the lecture on experimental chemistry and its extension. After a safety briefing, the students autonomously conduct experiments in the laboratory. The course focuses on laboratory safety, simple lab techniques, the synthesis of simple substances and analyses of unknown substances. In addition, students have the opportunity to advance their laboratory knowledge.

Intended learning outcomes

Students are able to explain the principles of the periodic table and to extract information from it. They are able to explain basic models of the structure of matter. They have developed the ability to use the language of chemical formulas to describe chemical reactions and to interpret them by identifying the type of reaction. Students are able to describe the main quantitative and qualitative analytical methods and their application areas. They are able to identify fundamental problems in chemistry and perform experiments to solve them. They have 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)

This module comprises 3 module components. Information on courses will be listed separately for each module component.

- 08-AC1-1-102: V + V + Ü (no information on SWS (weekly contact hours) and course language available)
- o8-AC1-LA-2-102: P (no information on SWS (weekly contact hours) and course language available)
- 08-AC1-LA-3-102: V (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-AC1-1-102: Principles of Inorganic Chemistry Principles of Inorganic Chemistry Principles of Inorganic Chemistry

- 10 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: German or English
- Other prerequisites: Admission prerequisite to assessment: successful completion of exercises in the
 respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully
 completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused
 absence)

Assessment in module component o8-AC1-LA-2-102: Inorganic and Analytical Chemistry (lab) (teaching degree)
 7 ECTS, Method of grading: (not) successfully completed



- pre/post-experiment examination talks (Vor-/Nachtestate, approx. 15 minutes each), log (approx. 5 to 10 pages)
- Assessment offered: once a year, summer semester
- Language of assessment: German or English

Assessment in module component o8-AC1-LA-3-102: Inorganic Chemistry 1 (accompanying lecture) (teaching degree)

- 3 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: German or English

Allocation of places

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Additional information

Workload

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Teaching cycle

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

§ 42 (1) 1. Chemie "Allgemeine und Anorganische Chemie" und "Physikalische und Analytische Chemie" § 62 (1) 1. Chemie "Allgemeine und Anorganische Chemie"; "Physikalische und Analytische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Teaching

(12 ECTS credits)



Teaching Compulsory courses

(12 ECTS credits)



Module	e title		Abbreviation			
Experi	ments i	n Chemical Education			08-FD-ExUnt-092-m01	
Module	Module coordinator Module offered by					
holder	holder of the Professorship of Didactics of Chemi			Institute of Inorganic Chemistry		
ECTS	CTS Method of grading Only after succ.			npl. of module(s)		
5	5 numerical grade					
Duration Module level			Other prerequisites			
1 seme	ster	undergraduate				
Conton	Contonto					

Contents

This module equips students with experimental skills and teaches them how to incorporate experiments into their lessons.

Intended learning outcomes

Students have learned some essential experiments for the chemistry classroom in Grundschule and Hauptschule schools and have developed the ability to safely perform them. They have developed the ability to design their own experiments, tailor them to their teaching goals and to incorporate them into their lessons.

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

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

- o8-FD-ExUnt-1-092: Ü (no information on SWS (weekly contact hours) and course language available)
- o8-FD-ExUnt-2-092: S (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-FD-ExUnt-1-092: Experiments in Chemical Teaching at Primary and Secondary Public Schools

- 4 ECTS, Method of grading: numerical grade
- presentation with demonstration (approx. 30 minutes)
- Language of assessment: German or English

Assessment in module component o8-FD-ExUnt-2-092: Planning of Teaching Units

- 1 ECTS, Method of grading: numerical grade
- presentation (approx. 20 minutes)
- Language of assessment: German or English

Allocation of places

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Additional information

Workload

Teaching cycle

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

§ 36 (1) 7. Didaktik der Grundschule Chemie

§ 38 (1) 1. Didaktik der Hauptschule Chemie

§ 38 (1) 1. Didaktik der Mittelschule Chemie

§ 42 Chemie Fachdidaktik



Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009) First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009) First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Modul	e title		Abbreviation			
Chemi	stry Ed	ucation: Educational 1	08-FD-Ch-BM-092-m01			
Module coordinator Module offered by						
holder	holder of the Professorship of Didactics of C			Institute of Inorga	Institute of Inorganic Chemistry	
ECTS	Meth	od of grading	Only after succ. c	ompl. of module(s)		
4	nume	rical grade				
Duration Module level		Other prerequisit	Other prerequisites			
1 semester undergraduate						
Conto	Contants					

Contents

This module introduces students to the fundamentals of chemistry didactics.

Intended learning outcomes

Students have become familiar with theories and models for teaching chemistry as well as with the objectives and framework conditions of chemistry lessons.

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

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

- 08-FD-Einf-1-092: V (no information on SWS (weekly contact hours) and course language available)
- o8-FD-Ch-BM-2-092: S (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-FD-Einf-1-092: Introduction in Chemistry Education

- 3 ECTS, Method of grading: numerical grade
- written examination (approx. 90 minutes)
- Language of assessment: German or English

Assessment in module component o8-FD-Ch-BM-2-092: Introduction in Chemistry Education (accompanying seminar)

- 1 ECTS, Method of grading: (not) successfully completed
- presentation (approx. 20 minutes)
- Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 36 (1) 7. Didaktik der Grundschule Chemie

§ 38 (1) 1. Didaktik der Hauptschule Chemie

§ 38 (1) 1. Didaktik der Mittelschule Chemie

§ 42 Chemie Fachdidaktik

§ 62 (1) 6. Chemie Didaktik



Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009) First state examination for the teaching degree Hauptschule Chemistry (2009) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title					Abbreviation	
Conce	pts of T	eaching Chemistry			08-FD-SchulUms-092-m01	
Module coordinator				Module offered by		
holder	of the I	Professorship of Didaction	s of Chemistry	Institute of Inorganic Chemistry		
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)		
3	nume	rical grade				
Duration Module level			Other prerequisites			
1 semester undergraduate						
Conter	Contents					

Topics covered in the chemistry curricula for Grundschule and Hauptschule schools and ways to teach them.

Intended learning outcomes

Students have become familiar with the contents, objectives and framework conditions of chemistry lessons. They have developed the ability to plan and teach lessons in the Grundschule or Hauptschule chemistry classroom on the basis of the relevant curricula.

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

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

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

Testat (exam, approx. 20 minutes)

Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 36 (1) 7. Didaktik der Grundschule Chemie

§ 38 (1) 1. Didaktik der Hauptschule Chemie

§ 38 (1) 1. Didaktik der Mittelschule Chemie

§ 42 Chemie Fachdidaktik

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Mittelschule Chemistry (2013)



Freier Bereich (general as well as subject-specific electives)

(ECTS credits)

Teaching degree students must take modules worth a total of 15 ECTS credits in the area Freier Bereich (general as well as subject-specific electives) (Section 9 LASPO (general academic and examination regulations for teaching-degree programmes)). To achieve the required number of ECTS credits, students may take any modules from the areas below.

Freier Bereich -- interdisciplinary: The interdisciplinary additional offer for a teaching degree can be found in the respective Annex "Ergänzende Bestimmungen für den "Freien Bereich" im Rahmen des Studiums für ein Lehramt".



Subject-specific Extra Skills

(ECTS credits)

(Freier Bereich (general as well as subject-specific electives) -- subject specific)



Module	e title		Abbreviation			
Toxicology and legal studies					03-TR-072-m01	
Module	e coord	inator		Module offered by		
lecture	r of lec	ture "Toxikologie und Red	chtskunde"	Faculty of Medicine		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
3 numerical grade						
Duration Module level		Other prerequisites				
1 semester undergraduate						
Conten	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 + V (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Biochemistry (2011)

Bachelor' degree (1 major) Biochemistry (2013)

Bachelor' degree (1 major) Biochemistry (2009)

Bachelor' degree (1 major) Chemistry (2007)

Bachelor' degree (1 major) Chemistry (2008)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

Bachelor' degree (1 major) Food Chemistry (2009)

Bachelor' degree (1 major) FOKUS Chemistry (2011)

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

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

Master's degree (1 major) Chemistry (2014)

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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



First state examination for the teaching degree Mittelschule Chemistry (2013)



Modul	e title				Abbreviation			
	Physical Chemistry 4: Statistical Thermodynamics 08-PC4-092-m01							
Modul	Module coordinator Module offered by							
lecturer of lecture "Statistische Thermodynamik"			odynamik"	Institute of Physica	l and Theoretical Chemistry			
ECTS	Metho	od of grading	Only after succ. con	c. compl. of module(s)				
3	nume	rical grade						
Duration Module level Other prerequisites								
1 seme			ses in the respective (usually 70% of exe	Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).				
Conter	nts							
This m	odule d	iscusses the fundament	al principles of statis	tical thermodynamic	CS.			
Intend	ed lear	ning outcomes						
		e become familiar with the wiledge they have develo	•	ples of statistical th	ermodynamics and are able to			
Course	es (type, r	number of weekly contact hours,	language — if other than Ger	rman)				
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	lable)			
		Gessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether			
or 90 r	ninutes		itions: approx. 60 mir	nutes each) or b) ora	tten examinations: approx. 60 Il examination of one candidate 3. 30 minutes)			
Allocat	tion of p	olaces						
Additio	onal inf	ormation						
Worklo	oad							
			_					
Teachi	ng cycl	e						
Referre	ed to in	LPO I (examination regulation	ns for teaching-degree progra	mmes)				
Modul	e appea	nrs in						
Bachel	lor' deg	ree (1 major) Chemistry ((2010)					
	_	ree (1 major) Chemistry (· · · · · · · · · · · · · · · · · · ·					
	_	ree (1 major) FOKUS Che	•					
		mination for the teaching		•				
		mination for the teaching mination for the teaching						
				•				
F:	First state examination for the teaching degree Gymnasium Chemistry (2009)							

First state examination for the teaching degree Mittelschule Chemistry (2013)



Modul	Module title Abbreviation							
Physic	Physical and Theoretical Chemistry 3: Symmetry and Quantum Chemistry 08-PC3-092-m01							
Module coordinator Module offered by								
lecture	r of lec	ture "Quantenchemie"		Institute of Physic	cal and Theoretical Chemistry			
ECTS	Metho	od of grading	Only after succ. con					
6	nume	rical grade						
Duratio	on	Module level	Other prerequisites					
Admission prerequisite to assessment: successful completion of exsess in the respective classes as specified at the beginning of the co (usually 70% of exercises to be successfully completed) as well as a lar attendance of exercises (usually a maximum of 2 incidents of unsed absence).					ied at the beginning of the course sfully completed) as well as regu-			
Conten	nts							
This m	odule d	liscusses the fundame	ntal principles of quant	um chemistry and	symmetry in chemistry.			
Intend	ed lear	ning outcomes						
			the fundamental princi wledge they have devel		nemistry and symmetry in che-			
Course	es (type, r	number of weekly contact hou	rs, language — if other than Ger	rman)				
V + Ü +	· V + Ü (no information on SW	S (weekly contact hours) and course langu	age available)			
		sessment (type, scope, lan ole for bonus)	guage — if other than German,	examination offered — if	not every semester, information on whether			
each; 3	3 writte	n examinations: 60 mi		xamination of one	aminations: 60 or 90 minutes candidate each (approx. 20 minu-			
Allocat	tion of p	places						
Additio	onal inf	ormation						
Worklo	oad							
Teachi	Teaching cycle							
Referre	ed to in	LPO I (examination regulat	ions for teaching-degree progra	mmes)				
Module	e appea	ars in						

Bachelor' degree (1 major) Biochemistry (2013)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

Bachelor' degree (1 major) Mathematics (2012)

Bachelor' degree (1 major) Mathematics (2013)

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

Bachelor' degree (1 major) Computational Mathematics (2012)

Bachelor' degree (1 major) Computational Mathematics (2013)

Bachelor' degree (1 major) FOKUS Chemistry (2011)

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

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First state examination for the teaching degree Realschule Chemistry (2009) First state examination for the teaching degree Gymnasium Chemistry (2009) First state examination for the teaching degree Mittelschule Chemistry (2013)



Modul	Module title Abbreviation							
Practio	Practical spectroscopy 1 (teaching degree for secondary schools) 08-0C-Spec-LAGY-092-m01							
Modul								
lecture	er of lec	ture "Organische Chemie	2"	Institute of Organic	Chemistry			
ECTS	ECTS Method of grading Only after succ.			npl. of module(s)				
3	nume	rical grade						
Duratio	on	Module level	Other prerequisites					
1 seme	ester	undergraduate						
Conter	nts							
	odule i pectros		e spectroscopic meth	ods of infrared spec	troscopy, mass spectrometry and			
Intend	ed lear	ning outcomes						
		able to describe importar molecular structure.	nt spectroscopic meth	nods, to evaluate a s	spectrum and to draw conclusions			
Course	es (type, r	number of weekly contact hours,	anguage — if other than Ger	rman)				
V (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language availabl	e)			
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if n	ot every semester, information on whether			
or 90 r each (a	ninutes approx.		tions: approx. 60 mir amination in groups	nutes each) or b) ora	tten examinations: approx. 60 Il examination of one candidate k. 30 minutes)			
Alloca	tion of _I	olaces						
	1							
Additio	onal inf	ormation						
Worklo	oad							
	-,-							
Teachi	ng cycl	e						

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

§ 62 (1) 2. Chemie "Organische und Bioorganische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Mittelschule Chemistry (2013)



Modul	e title		Abbreviation			
Practical spectroscopy 2 (teaching degree for secondary schools)					08-AC2-PS-LA-102-m01	
Module coordinator Module offered by						
lecturer of lecture "Praktische Spektroskopie 2"			skopie 2"	Institute of Inorganic Chemistry		
ECTS	Meth	od of grading Only after succ. compl. of module(s)				
3	nume	rical grade				
Duratio	on	Module level	Other prerequisites	;		
1 seme	ster	undergraduate				
Contents						
		equips students with an a			d saline compounds. It focuses nical processes.	

Intended learning outcomes

Students are able to describe the structure and properties of metals, alloys and saline compounds in an appropriate manner. They can list spectroscopic methods that can be used for the structural analysis of solids and can describe them in an appropriate manner.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title				Abbreviation		
Inorga	nic Che	mistry of the Elements (08-AC2-LAGY-102-m01			
Module coordinator Module offered by				Module offered by		
lecture mistry)		ture "Festkörperchemie"	(Solid State Che-	Institute of Inorganic Chemistry		
ECTS	Meth	od of grading	Only after succ. cor	compl. of module(s)		
3	nume	rical grade				
Duratio	Duration Module level		Other prerequisites			
1 seme	1 semester undergraduate					
Conter	Contents					

Contents

This module equips students with an advanced knowledge of metals, alloys and saline compounds. It focuses on their structures and properties, special material classes, reactivity and technical processes.

Intended learning outcomes

Students are able to describe the structure and properties of metals, alloys and saline compounds in an appropriate manner. They are able to systemise them and characterise their structure and reactivity.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German or English

Allocation of places

Additional information

Workload

Teaching cycle

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

§ 62 (1) 1. Chemie "Allgemeine und Anorganische Chemie"; "Physikalische und Analytische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title					Abbreviation	
Eleme	ntal Org	ganic Chemistry (teachin	g degree for seconda	ry schools)	08-AC3-LA-102-m01	
Modul	Module coordinator			Module offered by		
	er of lec ic Chem	ture "Elementorganische iistry)	Chemie" (Elemental	Institute of Inorgan	ic Chemistry	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
4	nume	rical grade	o8-AC1 (module con nent o8-OC3-2 only)	•	nly) and o8-OC3 (module compo-	
Durati	on	Module level	Other prerequisites			
1 seme	ester	undergraduate	ses in the respective (usually 70% of exe	Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcu-		
Conte	nts					
		equips students with an a			It focuses on their structures and	
Intend	led lear	ning outcomes				
able to	o systen n princi		se their structure and elementary organic co	reactivity. In addition	n an appropriate manner. They are on, they are able to develop and	
V + Ü ((no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	lable)	
		sessment (type, scope, languable for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
or 90 r each (minutes approx.		itions: approx. 60 mir kamination in groups	nutes each) or b) ora	tten examinations: approx. 60 Il examination of one candidate 3. 30 minutes)	
	tion of	1	<u> </u>			
Additi	onal inf	ormation				
Workle	oad					
Teachi	ing cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
First st	First state examination for the teaching degree Grundschule Chemistry (2009)					
	First state examination for the teaching degree Hauptschule Chemistry (2009)					
		mination for the teaching	= =	• • •		
	First state examination for the teaching degree Gymnasium Chemistry (2009)					

First state examination for the teaching degree Mittelschule Chemistry (2013)



Module	e title				Abbreviation
Preparation of Exams Chemistry					08-FBC2-PV-101-m01
Modul	e coord	linator		Module offered by	
lecturers Inorganic and Organische Chemistry)			emie (Organic Che-	Faculty of Chemistr	y and Pharmacy
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	(not)	successfully completed	o8-OC2-GHR and o8 LAGY	3-OC-Prakt-GHR or o8	3-OC2-LAGY and o8-OC-Prakt-
Duration Module level		Other prerequisites			
1 seme	1 semester undergraduate				
Conter	Contents				

Contents

This module gives students the opportunity to revise topics in organic and inorganic chemistry that are likely to be covered on the state examination and try exam papers from previous years.

Intended learning outcomes

Students are able to solve selected questions on organic and inorganic chemistry that were asked in the state examination in previous years.

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

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

- o8-FBC2-PV-1-101: S (no information on SWS (weekly contact hours) and course language available)
- o8-FBC2-PV-2-101: S (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-FBC2-PV-1-101: Preparation of Exams Inorganic Chemistry

- 2 ECTS, Method of grading: (not) successfully completed
- successful participation in the form of short presentations on selected assignments
- Assessment offered: once a year, summer semester
- Language of assessment: German or English

Assessment in module component o8-FBC2-PV-2-101: Preparation of Exams Organic Chemistry

- 3 ECTS, Method of grading: (not) successfully completed
- successful participation in the form of short presentations on selected assignments
- Assessment offered: once a year, summer semester
- Language of assessment: German or English

Allocation of places

Additional information

Workload

Teaching cycle

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

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Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)
First state examination for the teaching degree Hauptschule Chemistry (2009)
First state examination for the teaching degree Realschule Chemistry (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Mittelschule Chemistry (2013)



Module	e title				Abbreviation	
Organic Chemistry 4 - advanced course					08-0C4-LAGY-102-m01	
Module coordinator				Module offered by		
holder	of the	Chair of Organic Chemist	ry II	Institute of Organic	Chemistry	
ECTS	Metho	od of grading	Only after succ. con	mpl. of module(s)		
5	nume	rical grade	08-0C1 or 08-0C1-G	5HR		
Duratio	n	Module level	Other prerequisites			
		Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).				
Conten	Contents					

This module discusses biologically important bonding classes, their reactions and syntheses, working with special hazardous substances, complicated working and synthesis techniques, purification methods and product analysis.

Intended learning outcomes

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

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

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

§ 62 (1) 2. Chemie "Organische und Bioorganische Chemie"

Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title				Abbreviation	
Guidar	ice in S	elf-reliant Scientific Wor	k		08-FD-WPF-WA-092-m01
Module coordinator				Module offered by	
holder	of the I	Professorship of Didactic	s of Chemistry	Institute of Inorganic Chemistry	
ECTS	Meth	od of grading	Only after succ. cor	ompl. of module(s)	
2	(not)	successfully completed			
Duratio	Duration Module level		Other prerequisites		
1 seme	1 semester undergraduate				
Conten	Contents				

This module will teach students how to independently research and write on selected topics in chemistry didactics.

Intended learning outcomes

Students are able to independently research and write on selected topics in chemistry didactics. They are able to provide an account of the current state of research as well as to develop ideas to advance the discipline.

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

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

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

presentation (approx. 30 minutes)

Language of assessment: German or English

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title					Abbreviation
Preparation of Exams (Primary and Secondary Public Scholl Teachers)					08-FD-WPF-PVGSHS-092-m01
Modul	e coord	inator		Module offered by	
			s of Chemistry	Institute of Inorgan	ic Chemistry
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)	
2	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conter	nts				
Studer	nts will s	solve selected questions	that were asked in th	ne state examination	in previous years.
Intend	ed learı	ning outcomes			
Studer	nts are a	able to solve selected qu	estions that were ask	ed in the state exam	nination in previous years.
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)	
S (no i	nformat	tion on SWS (weekly cont	tact hours) and cours	e language available	<u>a)</u>
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
written	examiı	nation (approx. 30 minut	es)		
Allocat	tion of p	olaces			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	<u></u> е			
Referre	ed to in	LPO I (examination regulation:	s for teaching-degree progra	mmes)	
	_				
Modul	e appea	nrs in			
First st	ate exa	mination for the teaching	g degree Grundschule	Chemistry (2009)	
First st	ate exa	mination for the teachinន្	g degree Grundschule	Didactics in Chemis	stry (Primary School) (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009) First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009) First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title				_	Abbreviation
Extracurricular Sites					08-FD-WPF-LLL-092-m01
Module coordinator				Module offered by	
holder	of the I	Professorship of Didactic	s of Chemistry	Institute of Inorganic Chemistry	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
4	(not)	successfully completed			
Duration Module level		Other prerequisites			
1 seme	1 semester undergraduate				
Cantan	Contonto				

Contents

This module discusses the opportunities and limitations of out-of-classroom learning in chemistry.

Intended learning outcomes

Students are able to plan chemistry lessons that include out-of-classroom learning activities and, in particular, activities in school labs that support their teaching goals. They are able to put those plans into practice and guide pupils as they perform experiments.

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

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

- o8-FD-WPF-LLL-1-092: S (no information on SWS (weekly contact hours) and course language available)
- 08-FD-WPF-LLL-2-092: P (no information on SWS (weekly contact hours) and course language available)

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

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

Assessment in module component o8-FD-WPF-LLL-1-092: Opportunities of Extracurricular Sites

- 2 ECTS, Method of grading: (not) successfully completed
- presentation of a project (approx. 30 minutes)
- Language of assessment: German or English

Assessment in module component o8-FD-WPF-LLL-2-092: School Lab

- 2 ECTS, Method of grading: (not) successfully completed
- · successful supervision of experiments in learn-teach-lab
- Language of assessment: German or English

Allocation of places

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Additional information

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Workload

Τ.

Teaching cycle

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

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Module appears in

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Grundschule Didactics in Chemistry (Primary School) (2009) First state examination for the teaching degree Hauptschule Chemistry (2009)

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First state examination for the teaching degree Hauptschule Didactics in Chemistry (Secondary School) (2009) First state examination for the teaching degree Realschule Chemistry (2009)

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

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Secondary School) (2009)

First state examination for the teaching degree Sonderpädagogik Didactics in Chemistry (Middle School) (2013) First state examination for the teaching degree Mittelschule Chemistry (2013)



Module title					Abbreviation	
Electronic structure and spectroscopy					08-PC-ESS-092-m01	
Modul	e coord	inator		Module offered by		
		ture "Elektronische Struk ic Structure and Spectros		Institute of Physica	l and Theoretical Chemistry	
ECTS	Meth	od of grading	Only after succ. com	npl. of module(s)		
3	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate	Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).			
Conter	nts					
Funda	mentals	of atomic and molecular	r structure as well as	spectroscopy.		
Intend	ed lear	ning outcomes				
		e learned the fundamenta nowledge they have deve		ecular structure as w	vell as spectroscopy and are able	
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V + Ü (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
or 90 r each (a	ninutes approx.		tions: approx. 60 min	nutes each) or b) ora	tten examinations: approx. 60 I examination of one candidate . 30 minutes)	
Allocat	tion of	olaces	, -			
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ing cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
First state examination for the teaching degree Grundschule Chemistry (2009) First state examination for the teaching degree Hauptschule Chemistry (2009) First state examination for the teaching degree Realschule Chemistry (2009) First state examination for the teaching degree Gymnasium Chemistry (2009)						
First st	First state examination for the teaching degree Mittelschule Chemistry (2013)					



Module title				Abbreviation		
Theore	etical M	odels in Chemistry (teac	08-TC-LA-092-m01			
Modul	Module coordinator			Module offered by	I.	
lecture	er of lec	ture "Quantenchemie"		Institute of Physica	l and Theoretical Chemistry	
ECTS	Meth	od of grading	Only after succ. com	pl. of module(s)		
3	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate	ses in the respective (usually 70% of exe	e classes as specifie rcises to be success	successful completion of exercid at the beginning of the course fully completed) as well as reguaximum of 2 incidents of unexcu-	
Conter	nts		•			
spin, t	he Paul		inants, the Hartree-Fo	ock method, correlat	antum chemistry. It focuses on ion energy, configuration interacdels of H2+.	
Intend	ed lear	ning outcomes				
Studer	nts are	able to describe excited s	tates of molecules w	ith the help of key c	oncepts and models.	
Course	es (type, i	number of weekly contact hours, l	anguage — if other than Ger	man)		
V + Ü (no info	rmation on SWS (weekly	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua ble for bonus)	ge $-$ if other than German, ϵ	examination offered — if no	ot every semester, information on whether	
or 90 r	ninutes		tions: approx. 60 min	utes each) or b) ora	tten examinations: approx. 60 l examination of one candidate . 30 minutes)	
Alloca	tion of	places	·			
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ing cycl	e				
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	Module appears in					
	First state examination for the teaching degree Grundschule Chemistry (2009)					
	First state examination for the teaching degree Hauptschule Chemistry (2009)					
		mination for the teaching	-	•		
		mination for the teaching		•		
	irst state examination for the teaching degree Mittelschule Chemistry (2013)					



Module title					Abbreviation	
Organi	Organic Chemistry 3 (teaching degree for secondary schools) 08-0C3-LA-102-m01					
Module coordinator				Module offered by		
holder	of the	Professorship of Orgar	ic Chemistry	Institute of Organic	Chemistry	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade	08-0C1 or 08-0C1-G	HR		
Durati	on	Module level	Other prerequisites			
1 semester undergraduate A		ses in the respective (usually 70% of exe	Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcu-			
Conter	nts		•			
radica	ls. It dis				reactions, carbenes, nitriles and asymmetric catalysis, organome-	
Intend	led lear	ning outcomes				
asymn thetic	netric ca analyse	atalyses. Students are es of molecules.	able to describe organo	metallic reactions.	tereoselective syntheses and They are able to conduct retrosyn-	
	_		rs, language — if other than Ger		labla)	
Metho	d of as	sessment (type, scope, lan	ly contact hours) and co		ot every semester, information on whether	
		ole for bonus)				
or 90 r each (a	minutes approx.	each; 3 written exami	nations: approx. 60 mir examination in groups	utes each) or b) ora	tten examinations: approx. 60 all examination of one candidate x. 30 minutes)	
Alloca	tion of	places				
Additio	onal inf	ormation				
Workload						
Teaching cycle						
						
Referr	Referred to in LPO I (examination regulations for teaching-degree programmes)					
	-					
Modul	Module appears in					

First state examination for the teaching degree Grundschule Chemistry (2009)
First state examination for the teaching degree Hauptschule Chemistry (2009)
First state examination for the teaching degree Realschule Chemistry (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Mittelschule Chemistry (2013)



Thesis

(10 ECTS credits)

Preparation of a written Hausarbeit (thesis) in accordance with the provisions of Section 29 LPO I (examination regulations for teaching-degree programmes) is a prerequisite for teaching degree students to be admitted to the Erste Staatsprüfung (First State Examination). In accordance with the provisions of Section 29 LPO I, students studying for a teaching degree Grundschule may write this thesis in the subject Didaktik der Grundschule (Didactics of Grundschule), in the subject they selected as Unterrichtsfach (subject studied with a focus on the scientific discipline) or in the subject Erziehungswissenschaften (Educational Science). Pursuant to Section 29 Subsection 1 Sentence 2 LPO I, students may also choose to write an interdisciplinary thesis.



Module title			Abbreviation
Admission work (Chemistry for Primary School Teachers)			o8-Ch-HA-UF-GS-092-m01
Module coordinator		Module offered by	
head of the research group offering the module		Faculty of Chemistry and Pharmacy	
ECTS Method of grading Only after succ. co		npl. of module(s)	
numerical grade Where applicable, supervisor.		specific modules/module components as specified by	
Duration Module level	Other prerequisites	Other prerequisites	
1 semester undergraduate			
Contents			
Adhering to the principles of good sci in chemistry or chemistry didactics th provisions of Section 29 LPO (examin	ey have agreed upon	with an authorised e	xaminer in accordance with the
Intended learning outcomes			
and analyse a problem, conduct a lite sions, and offer approaches to the so an appropriate written account of the Courses (type, number of weekly contact hours.	lution of said problem results of their work.) be able to work to	
no courses assigned			
Method of assessment (type, scope, langumodule is creditable for bonus)	uage — if other than German,	examination offered — if no	ot every semester, information on whether
written thesis (Zulassungsarbeit, app Language of assessment: German, ex teaching degree programmes)		e with Section 29 LP	O I (examination regulations for
Allocation of places			
Additional information			
Workload			
<u></u>			
Teaching cycle			
<u></u>			
Referred to in LPO I (examination regulation	ns for teaching-degree progra	ammes)	
Referred to in LPO I (examination regulatio	ns for teaching-degree progra	ammes)	

First state examination for the teaching degree Grundschule Chemistry (2009)