

# 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: 2010 Responsible: Faculty of Chemistry and Pharmacy

JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record 82|032|-|-|H|2010

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## The subject is divided into

section / sub-section	ECTS credits	starting page
Compulsory Courses	150	6
General and Inorganic Chemistry	47	7
Organic Chemistry	39	15
Physical and Theoretical Chemistry	38	24
Basics of Natural Sciences	21	33
Specialist Lab Course	5	41
Thesis	10	43
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### **Content and Objectives of the Programme**

The chemistry program in Würzburg offers a research-oriented curriculum. Graduates of the Bachelorprogram in chemistry are acquainted with the fundamentals of chemistry, possess the relevant experimental skills and are familiar with the general methods of scientific research. In lectures and tutorials the basic knowledge of the various areas of chemistry is imparted as well as the foundations of mathematics and physics. A further hallmark is the comparably large number of student lab courses. In these labs the laboratory skills and techniques used in experimental scientific work are taught. During their Bachelor thesis the students finally work for a limited time on a specific chemical problem. They demonstrate their scientific abilities in work which is performed under guidance, but to a large extent independently. The students obtain the necessary knowledge to attend a research-oriented Masters program. In addition they possess the basic qualifications necessary for further professional training in industry and business. In supplementary modules they acquire science-related soft skills in specific areas of chemistry and general soft skills that match their personal interests and serve as an additional qualification for various professional areas.

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## Abbreviations used

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

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

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

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

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

## Conventions

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

### Notes

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

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

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

### In accordance with

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

#### ASP02009

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

#### 10-May-2011 (2011-37)

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.

Bachelor's with 1 major Chemistry (	2010)
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## **Compulsory Courses**

(150 ECTS credits)

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## General and Inorganic Chemistry

(47 ECTS credits)

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Module title		Abbreviation				
Inorganic Chemistry 1 08-AC1-102-m01						
Module coordinator		Module offered by	^			
lecture: Chemis	r of lect try)	ure "Experimentalchem	ie" (Experimental	Institute of Inorgan	ic Chemistry	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
21	nume	rical grade				
Duratio	n	Module level	Other prerequisites	i		
1 seme	ster	undergraduate	By way of exception assessments.	, additional prerequi	isites are listed in th	e section on
Conten	ts					
This mo les, me module exercise autono ques, th opportu	odule p tals, ac introd es base mously ne synt unity to	rovides students with a id-base reactions, the p uces fundamental mod ed on the lecture on exp conduct experiments in hesis of simple substar advance their laborato	n overview of the func periodic table, chemic els of chemistry and p perimental chemistry a n the laboratory. The c nces and analyses of u ry knowledge.	lamental principles of al equilibrium and co rinciples of inorganio and its extension. Aft course focuses on lab anknown substances	of chemistry. It focus omplexometry. In ad c chemistry. It includ er a safety briefing, t ooratory safety, simp . In addition, studen	es on partic- dition, the les practical the students ole lab techni- its have the
Intende	ed learı	ning outcomes				
le to ex mical fo are able are able loped th approp	plain b ormula e to de e to ide he abil riate m	asic models of the struct s to describe chemical r scribe the main quantita entify fundamental prob ity to perform the neces anner, both in written a	cture of matter. They h eactions and to interp ative and qualitative a lems in chemistry and sary stoichiometric ca nd oral form.	ave developed the a oret them by identifyi nalytical methods ar perform experiment lculations and descr	bility to use the lang ng the type of reaction nd their application a s to solve them. The ibe the chemical pro	juage of che- on. Students areas. They y have deve- ocesses in an
Course	<b>5</b> (type, n	umber of weekly contact hours	, language — if other than Ge	rman)		
This mo • o • o • o	odule h 8-AC1- 8-AC1- 8-AC1- 8-AC1-	as 4 components; infor 1-102: V + V + Ü (no info 2-102: P (no informatior 3-102: V (no informatior 4-102: P (no informatior	mation on courses list rmation on language a n on language and nur n on language and nur n on language and nur n on language and nur	ed separately for ead and number of weekl nber of weekly conta nber of weekly conta nber of weekly conta	ch component. ly contact hours avai ct hours available) ct hours available) ct hours available)	lable)
Methoo module is	<b>l of ass</b> creditab	s <b>essment</b> (type, scope, langule for bonus)	lage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
This mo these a	odule h ssessn	as the following 4 assement components to pas	ssment components. I ss the module as a wh	Jnless stated otherw ole.	vise, students must p	bass all of
<ul> <li>Assessment in module component o8-AC1-2-102: Praktikum Anorganische Chemie 1 (Lab Course Inorganic Chemistry 1)</li> <li>6 ECTS credits, pass / fail</li> <li>pre/post-experiment examination talks (Vor-/Nachtestate, approx. 15 minutes each), log (approx. 5 to 10 pages)</li> <li>Assessment offered: once a year, winter semester</li> <li>Language of assessment: German, English</li> <li>Only after successful completion of module component o8-AC1-2 can only be taken by students who successfully completed module component o8-AC1-4.</li> <li>Assessment in module component o8-AC1-3-102: Erläuterungen zum Praktikum Anorganische Chemie 1 (Discussion of Experiments Performed in Lab Course Inorganic Chemistry 1)</li> <li>4 ECTS credits, numerical grading</li> <li>a) 1 to 3 written examinations (approx. 45, 60 or 90 minutes each) or x) oral examination of one candidate each (approx. 20 minutes) or x) oral examination in groups of 2 candidates (approx. 30 minutes total)</li> </ul>						
Ducheitti S	mur i IIIdj	or enclinistry (2010)	reg. data reco	ord Bachelor (180 ECTS) Chem	nie - 2010	page 0 / 5/

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• Language of assessment: German, English

**Assessment in module component o8-AC1-4-102:** Sicheres Arbeiten in chemischen Laboratorien (Chemical Laboratory Safety)

- 1 ECTS credit, pass / fail
- Assessment of practical assignments
- Language of assessment: German, English

**Assessment in module component o8-AC1-1-102:** Grundlagen der Allgemeinen und Anorganischen Chemie (Fundamental Principles of General and Inorganic Chemistry)

- 10 ECTS credits, numerical grading
- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes, 2 written examinations: 60 minutes 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 of 2 candidates (approx. 30 minutes)
- Language of assessment: German or English
- Additional 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 no more than 2 incidents of unexcused absence).

Allocation of places

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) 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

Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title			Abbreviation		
Inorganic Chemistry 2				08-AC2-102-m01	
Module coordinator				Module offered by	
lecturer of lecture "Festkörperchemie" (Solid State Che- mistry)			(Solid State Che-	Institute of Inorgan	ic Chemistry
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
6	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
This mo on thei	odule e r struct	quips students with an a ures and properties, spe	dvanced knowledge cial material classes,	of metals, alloys and reactivity and techn	l saline compounds. It focuses ical processes.
Intende	ed learr	ning outcomes			
Studen priate r troscop manne	ts are a nanner pic metl r.	able to describe the struc . They are able to system hods that can be used fo	ture and properties o ise them and charact r the structural analys	f metals, alloys and erise their structure sis of solids and can	saline compounds in an appro- and reactivity. They can list spec- describe them in an appropriate
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + V (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Method module is	<b>d of ass</b> creditab	s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
a) 1 to <u>3</u> or 90 m each (a Langua	3 writte ninutes pprox. ge of a	n examinations (1 writter each; 3 written examina 20 minutes) or c) oral ex ssessment: German, Eng	n examination: appro tions: approx. 60 mir amination in groups lish	x. 90 minutes; 2 writ iutes each) or b) oral (groups of 2, approx	ten examinations: approx. 60 l examination of one candidate . 30 minutes)
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module appears in					
Bachel	Bachelor' degree (1 major) Chemistry (2010)				
Bachel	or' deg	ree (1 major) FOKUS Cher	nistry (2011)		

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	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title		Abbreviation			
Inorganic Chemistry 3		08-AC3-102-m01			
Module	e coord	inator		Module offered by	
lecture Organie	r of lect c Chem	ture "Elementorganische istry)	Chemie" (Elemental	Institute of Inorgan	ic Chemistry
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
9	nume	rical grade	08-AC1 (module con nent 08-OC3-2 only)	nponent o8-AC1-4 or	ıly) and o8-OC3 (module compo-
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate	By way of exception assessments.	, additional prerequi	sites are listed in the section on
Conten	ts				
This mo propert tunity t handlir is used	odule e ties, sp o do so ng of or l for the	equips students with an a ecial material classes, re ome autonomous researc ganometallic compound e exact determination of p	dvanced knowledge activity and technica h and plan and cond s, their synthesis and products.	of organometallics. I l processes. The mod uct complex synthes working with protec	t focuses on their structures and dule gives students the oppor- es. The course focuses on the ctive atmospheres. Spectroscopy
Intende	ed lear	ning outcomes			
able to explain researc in oral out the	systen princi h and and wri synthe	nise them and characteris ples for the synthesis of e perform experiments to s itten form using appropri esis of a substance using	se their structure and elementary organic co olve complex probler ate scientific termino advanced lab techni	reactivity. In additic ompounds. Students ns. They are able to logy. They are able t ques.	In, they are able to develop and are able to conduct autonomous describe the technical principles o independently plan and carry
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
This mo compo • c • c	odule c nent. 08-AC3- 08-AC3-	omprises 2 module comp 1-102: V + Ü (no informat 2-102: P (no information	oonents. Information ion on SWS (weekly c on SWS (weekly cont	on courses will be li contact hours) and co act hours) and cours	sted separately for each module ourse language available) se language available)
Metho module is	<b>d of ass</b> s creditab	s <b>essment</b> (type, scope, langua ile for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
Assess low. Ur vidual	ment ir Iless st assess	n this module comprises ated otherwise, successf ments.	the assessments in t ful completion of the	he individual module module will require s	e components as specified be- successful completion of all indi-
Assess	ment in ECTS, 1 to 3 50 or 90 andida anguag Other p especti omplet bsence ment in ECTS, ore/pos bages) anguag	n module component o8- Method of grading: nume written examinations (1 w o minutes each; 3 written te each (approx. 20 minu ge of assessment: Germa rerequisites: Admission ve classes as specified at ted) as well as regular at e). n module component o8- Method of grading: (not) t-experiment examinatio	AC3-1-102: Elementa erical grade vritten examination: a examinations: appro- utes) or c) oral examir n, English prerequisite to asses the beginning of the tendance of exercises AC3-2-102: Inorganic successfully complet n talks (Vor-/Nachtes n. English	l Organic Chemistry pprox. 90 minutes; 2 ox. 60 minutes each) nation in groups (gro course (usually 70% 5 (usually a maximus c Chemistry 2 (lab) ted tate, approx. 15 minu	Elemental Organic Chemistry written examinations: approx. ) or b) oral examination of one ups of 2, approx. 30 minutes) completion of exercises in the of exercises to be successfully m of 2 incidents of unexcused utes each), log (approx. 5 to 10

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#### Allocation of places

#### Additional information

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#### Workload

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#### Teaching cycle

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

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#### Module appears in

Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011)

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	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module	e title				Abbreviation
Chemistry of the Elements and Analytical Chemistry			cal Chemistry		08-AS1-102-m01
Module	e coord	inator		Module offered by	
lecture te" (Ch	r of lec emistry	ture "Chemie der Hauptg v of Main-group Elements	ruppenelemen- )	Institute of Inorgan	ic Chemistry
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
11	nume	rical grade	08-AC1 (module con nent 08-OC3-2 only)	nponent o8-AC1-4 or	nly) and o8-OC3 (module compo-
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
ses on on, it ir module lecture riments	bondir ntroduc gives (s). Afte s focus	eg conditions, trends in the es students to elemental students the opportunity er a safety briefing, the st on different methods for	ne periodic table and ry organic chemistry, to apply in practice t cudents autonomous the analysis of unkno	the description and coordination chemis he knowledge they y conduct experime own substances.	structure of elements. In additi- stry and complex chemistry. The have gained through the related nts in the laboratory. These expe-
Intend	ed lear	ning outcomes			
Studen reactiv how to lyse un	its are a ity and use the known	able to characterise main fabrication. They are able e periodic table, an esser substances. In addition,	group elements and e to identify the coord ntial tool for chemists they are able to sepa	transition metal ele dination of the atoms S. Students are able arate and analyse mi	ments in terms of their structure, s. In addition, they have learned to use different methods to ana- xtures.
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
<ul> <li>This module comprises 2 module components. Information on courses will be listed separately for each module component.</li> <li>08-AN1-2-102: P (no information on SWS (weekly contact hours) and course language available)</li> <li>08-AS1-1-102: V + V (no information on SWS (weekly contact hours) and course language available)</li> </ul>					sted separately for each module se language available) burse language available)
Metho module is	<b>d of ass</b> s creditab	<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
Assess low. Ur vidual	ment in nless st assess	n this module comprises ated otherwise, successf ments.	the assessments in t ful completion of the	he individual modul module will require :	e components as specified be- successful completion of all indi-
<ul> <li>Assessment in module component o8-AN1-2-102: Analytical Chemistry (lab)</li> <li>5 ECTS, Method of grading: (not) successfully completed</li> <li>Vortestate (pre-experiment exams), assessment of practical performance, Nachtestate (post-experiment exams), log (5 to 10 pages)</li> <li>Assessment offered: once a year, summer semester</li> <li>Language of assessment: German, English</li> <li>Assessment in module component o8-AS1-1-102: Chemistry of the elements Chemistry of the elements</li> </ul>					
<ul> <li>6 ECTS, Method of grading: numerical grade</li> <li>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)</li> <li>Language of assessment: German or English</li> </ul>				written examinations: approx. ) or b) oral examination of one pups of 2, approx. 30 minutes)	
Allocat	ion of <sub>l</sub>	olaces			
Additio	Additional information				

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#### Workload

Teaching cycle

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

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

#### Module appears in

Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011)

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## Organic Chemistry

(39 ECTS credits)

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Module title Abbreviation					
Organic Chemistry 1         08-0C1-092-m01					
Module coordinator			Module offered by		
holder of t	he Professorship of Organ	ic Chemistry	Institute of Organic	Chemistry	
ECTS M	ethod of grading	Only after succ. con	ompl. of module(s)		
5 nu	Imerical grade				
Duration	Module level	Other prerequisites			
1 semester undergraduate		Admission prerequi ses in the respective (usually 70% of exe lar attendance of ex sed absence).	Admission prerequisite to assessment: successful completion of exerci- ses in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regu- lar attendance of exercises (usually a maximum of 2 incidents of unexcu- sed absence).		
Contents					
This modu the bondir organic co dition and	le provides students with ng situation of carbon and mpounds. The module als elimination reactions as v	an overview of the fund introduces students to o discusses the fundan vell as synthesis planni	lamental principles of the nomenclature of nental principles of sng.	of organic chemistry. simple and modera tereochemistry, sub	It examines tely complex stitution, ad-
Intended l	earning outcomes				
Students k of nomenc lecules. Th that purpo syntheses	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.				
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)					
V + Ü (no information on SWS (weekly contact hours) and course language available)					
<b>Method of assessment</b> (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 wi nutes each minutes) c	ritten examinations (1 writt n; 3 written examinations: or c) oral examination in gr	en examination: appro 60 minutes each) or b) oups (groups of 2, appl	x. 90 minutes; 2 writ oral examination of ox. 30 minutes)	ten examinations: 6 one candidate each	o or 90 mi- (approx. 20
Allocation	of places				
Additional	information				
Workload					
Teaching o	cycle				
Referred to	o in LPO I (examination regulati	ons for teaching-degree progra	immes)		
§ 62 (1) 2.	Chemie "Organische und I	Bioorganische Chemie"			
Module ap	opears in				
Bachelor' ( Bachelor' ( Bachelor' ( Bachelor' ( Bachelor' ( Bachelor' (	degree (1 major) Biochemi degree (1 major) Biochemi degree (1 major) Biochemi degree (1 major) Chemistry degree (1 major) Chemistry degree (1 major) Mathema	stry (2011) stry (2013) stry (2009) v (2010) v (2009) tics (2012)			
Bachelor's with	1 major Chemistry (2010)	JMU Würzbu reg. data reco	rg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Chem	• exam. ie - 2010	page 16 / 57

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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 Gymnasium Chemistry (2009)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg ● generated 26-Aug-2024 ● exam.	page 17 / 5
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Organi ⊂ Chemistry z       Module offered by         Module ⊂ the ⊂ hair of Physically Organi⊂ Chemistry       Institute of Organic Chemistry         ECTS       Method for grading       Only after succ. compl. of module(s)         9       numerical grade       08-0C1         Duration       Module level       Other 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 to be successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular stendance of exercises (usually a maximum of 2 incidents of unexculsed as beence).         Content       Exercises (usually anaximum of 2 incidents of unexculsed as segurargement. In addition, it introduces students to the rules of aromaticity and discusses on oxidation and reduction reactions coppy.         Name as spectrometry and NMR spectroscopy.       Intervectroscopic methods of infrared spectroscopic methods of infrared spectrum and 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 unknow reactions. Students 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 unknow reactions. Students ar				
Module coordinator       Module offered by         holder of the Chair of Physically Organic Chemistry       Institute of Organic Chemistry         ECTS       Method for grading       Only after succ. compl. of module(s)         9       numerical grade       08-0C1         Duration       Module level       Other 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 at tendance of exercises to be successfully completed) as well as regular at tendance of exercises (usually a maximum of 2 incidents of unexcused absence).         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 or 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, ymass 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 precific reactions of carbonyls and aromatics. For that purpose, they can plan and formulate multi-stage syntheses with complex reaction mechanisms and can trans				
holder of the ⊂hair of Physically Organic Chemistry       Institute of Organic Chemistry         ECTS       Metword of grading       Only after succ. compL of module(s)         9       numerical grade       08-0C1         Duration       Module level       Other 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 at tendance of exercises (usually a maximum of 2 incidents of unexcused absence).         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 as on exidation and reduction reactions as well as rearrargement. In addition, it introduces students to the spectroscopic methods of infrared spectroscopy.         Instruct USTUDE       Students have become familiar with the criteria for aromaticity. They can analyse the varying reactivity of carbonyl compounds. They are able to describe important spectroscopic methods, to evaluate a spectrum and to draw ucisions regarding the 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 ucisions regarding the multi-stage synthese 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 additite to romalite multi-stage synthese with complex reaction mechanisms and can transfer them to unknown reactions. Students are able to describe i				
ECTS         Method of grading         Only after succ. compl. of module(s)           9         numerical grade         08-0C1           Duration         Module level         Other prerequisites           1 semistry         Module level         Admission prerequisite to assessment: successful completion of exercises is 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 a incidents of unexcused ased absence).           Contents         Employee         Employee         Secondation of a secondation of a secondation of a secondation of a secondation on reactions of 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         Employee         Employee         Employee           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 (tye, number of weekly contact hours, language – if other than Germa				
9         numerical grade         08-0C1           Duration         Module level         Other prerequisites           1 semister         admission prerequisite o assessment: successful completion of exercises in the respective classes as specificed 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 unexcussed absence).           Content=         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 rearrargement. In addition, it introduces students to the spectroscopic methods of infrared spectroscopy, mass spectrometry and NMR spectroscopy.           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 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 process 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 toraractions. Steparding the molecu				
Duration       Module level       Other prequisites         1 semester       undergraduate       Admission prerequisite to assessment: successful completion of exercises (usually completion) as verguinated and exercises to be successfully completed) as well as reguinated and exercises to usually a maximum of 2 incidents of unexcessed usually compounds, it extends the students' knowledge of substitution, elimination and addition or reactions to complex reaction met-bisms. The course also focuses on oxidation and reduction reactions as well as rearratives are three to use the students' knowledge of substitution, elimination and addition or preduction reactions as the course also focuses on oxidation and reduction reactions as well as rearratives and NMR spectrum to trouces students to the spectroscopic methods, for that purpose, yn, mass spectrum and NMR spectrum set without set extends the students' knowledge of substitution, elimination and addition on the truttor duces students to the spectroscopic methods. For that purpose, yn, mass spectrum and MRR spectrum set without set of the spectrum set				
1 semester       undergraduate       Admission prerequisite to assessment: successful completion of exercises is 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).         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 or 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, y, mass spectrometry and NMR spectroscopy.         Intended learning outcomes       Totage 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 Geman)       V + V \ 10 (no information on SWS (weekly contact hours; approx. 90 minutes; 2 written examination of one candidate each gave, approx. 20 minutes) or c) or al examination of one candidate each (approx. 20 minutes) or c) or al examination: approx. 90 minutes; 2 written examination on one candidate each (approx. 20 minutes) or c) or al examination in groups (groups of 2, approx. 30 minutes) approx. 90 minutes each or 30 minutes) or c) or al examination in groups (groups of 2, approx. 30 minutes) (andidate anditate anditasteas approx. 40 min				
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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 + 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)         Allocation of places              Korkload              For Allocation of places              Horkload              Additional information              For Allocation of places				
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 + 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 examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) Language of assessment: German, English  Allocation of places  Korkload  Feaching cycle				
Courses (type, number of weekly contact hours, language – if other than German)         V + 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, English         Allocation of places            Workload            Teaching cycle				
V + 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, English Allocation of places Morkload Teaching cycle				
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, English         Allocation of places            Additional information            Workload            Teaching cycle				
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, English Allocation of places  Additional information  Workload  Teaching cycle				
Allocation of places Additional information Workload Teaching cycle				
Additional information Workload Teaching cycle				
Additional information Workload Teaching cycle				
Workload Teaching cycle				
Workload  Teaching cycle				
 Teaching cycle				
Teaching cycle				
<b>Referred to in LPO I</b> (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) Chemistry (2010) Bachelor' degree (1 major) Mathematics (2012)				
Bachelor's with 1 major Chemistry (2010)       JMU Würzburg • generated 26-Aug-2024 • exam.       page 18 / 57         reg. data record Bachelor (180 ECTS) Chemie - 2010       Page 18 / 57				

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 19 / 5
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module	e title				Abbreviation
Organi	c Cherr	iistry 3			08-0C3-102-m01
Module	e coord	inator		Module offered by	
holder	of the l	Professorship of Organic	Chemistry	Institute of Organic	Chemistry
ECTS	Methe	od of grading	Only after succ. compl. of module(s)		
15	nume	rical grade	o8-OC1 and o8-AC1 (module component o8-AC1-2 only) or o8-OC1 and o8-AN1 (module component o8-AN1-2 only), o8-OC1 may be replaced by o8-OC1-GHR		
Duratio	on	Module level	Other prerequisites		
1 seme	emester undergraduate By way of exception, additional prerequisites are listed in th assessments.		isites are listed in the section on		
Cantan	4				

#### 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, organometallic chemistry and retrosynthesis. The 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 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. 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)

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

- 08-0C3-1-102: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 08-OC3-2-102: 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-OC3-1-102: Organic Chemistry 3 Organic Chemistry 3

- 6 ECTS, Method of grading: numerical grade
- 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, 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-OC3-2-102: Organic Chemistry - lab 1

• 9 ECTS, Method of grading: (not) successfully completed

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	reg. data record Bachelor (180 ECTS) Chemie - 2010	

#### Module Catalogue for the Subject Chemistry Bachelor's with 1 major, 180 ECTS credits

- 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, English

#### Allocation of places

Julius-Maxir

WÜRZBURG

UNIVERSITÄT

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#### Additional information

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Workload

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#### Teaching cycle

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

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#### Module appears in

Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 21 / 57
	reg. data record Bachelor (180 FCTS) Chemie - 2010	

Module title				Abbreviation	
Organic Chemistry 4					08-0C4-102-m01
Module	e coord	inator		Module offered by	
holder of the Chair of Organic Chemistry			ry II	Institute of Organic Chemistry	
ECTS	Metho	od of grading	Only after succ. compl. of module(s)		
10	nume	rical grade			
Duration Module level			Other prerequisites		
1 semester undergraduate			By way of exception, additional prerequisites are listed in the section on assessments.		

#### Contents

This module focuses on heterocyclic compounds, dyes, naturally occurring substances, biopolymers and protecting group techniques. Students enhance their experimental skills by working with special hazardous substances, using complicated working and synthesis techniques as well as extensive purification methods and performing elaborate product analyses.

#### 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. 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)

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

- 08-0C4-1-102: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 08-0C4-2-102: 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-OC4-1-102: Organic Chemistry 4 Organic Chemistry 4

- 5 ECTS, Method of grading: numerical grade
- 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
- Only after successful completion of module components: o8-OC1 or o8-OC1-GHR
- 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-OC4-2-102:** Organic Chemistry - advanced laboratory course for students of chemistry

- 5 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, winter semester
- Language of assessment: German, English

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 22 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

 Only after successful completion of module components: o8-OC3 (module component o8-OC3-2 only) or o8-OC3P

#### **Allocation of places**

Julius-Maxir

WÜRZBURG

UNIVERSITÄT

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#### Additional information

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Workload

Teaching cycle

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 $\label{eq:result} \textbf{Referred to in LPO I} ~~ (examination ~ regulations for teaching-degree ~ programmes)$ 

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

#### Module appears in

Bachelor' degree (1 major) Biochemistry (2011) Bachelor' degree (1 major) Biochemistry (2013) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011)

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## Physical and Theoretical Chemistry

(38 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 24 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	i i

Module title		Abbreviation					
Physical Chemistry 1				08-PC1-092-m01			
Module coordinator Module o							
lecturer of le Spektroskop Spectroscop	lecturer of lecture "Grundlagen der Quantenmechanik and Spektroskopie" (Principles of Quantum Mechanics and Spectroscopy)						
ECTS Meth	nod of grading	Only after succ. con	npl. of module(s)				
8 num	erical grade						
Duration	Module level	Other prerequisites					
1 semester	undergraduate	Admission prerequi ses in the respective (usually 70% of exe lar attendance of ex sed absence).	site to assessment: s e classes as specifie rcises to be success ercises (usually a ma	successful completion d at the beginning o fully completed) as v aximum of 2 inciden	on of exerci- f the course vell as regu- ts of unexcu-		
Contents							
This module introduces students to the fundamental principles of quantum mechanics. It analyses molecules on 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 lea	rning outcomes						
Students are to describe c quantum me	able to explain key mod lifferent spectroscopic r chanics.	dels of quantum mecha nethods. In addition, st	nics and to apply the udents know how to	em to molecules. Th apply the mathema	ey are able tical bases of		
Courses (type,	number of weekly contact hour	rs, language — if other than Ger	rman)				
V + Ü + V + Ü	(no information on SWS	6 (weekly contact hours	) and course languag	ge available)			
Method of as module is credita	<b>Ssessment</b> (type, scope, lang able for bonus)	guage — if other than German,	examination offered — if no	t every semester, informat	ion on whether		
a) 1 to 3 writt nutes each; minutes) or c	en examinations (1 writ 3 written examinations: 2) oral examination in gr	ten examination: appro 60 minutes each) or b) oups (groups of 2, appr	x. 90 minutes; 2 writ oral examination of rox. 30 minutes)	ten examinations: 6 one candidate each	o or 90 mi- (approx. 20		
Allocation of	places						
Additional in	formation						
Workload							
Teaching cycle							
<b>Referred to in LPO I</b> (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 (2010)							
Bachelor's with 1 m	ajor Chemistry (2010)	JMU Würzbu reg. data recc	rrg • generated 26-Aug-2024 ord Bachelor (180 ECTS) Chem	• exam. iie - 2010	page 25 / 57		

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG



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)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 26 / 5
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title A					Abbreviation
Physical Chemistry 2: Thermodynamics, Kinetics, Electrochemistry					08-PC2-092-m01
Module	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)	
18	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate	By way of exception assessments.	, additional prerequ	isites are listed in the section on
Conten	ts				
chemic dynami tunity t the stu will be	al equi ic proce o apply dents a expect	libria, ideal and real gass esses, it discusses the fu in practice the knowledg autonomously conduct ex ed to take oral tests and	ses/solutions/mixed ndamental principles ge they have gained t periments in the labe write lab reports to d	phases and electroo s of kinetics. The mo through the related l oratory. In addition t emonstrate their kno	chemistry. In addition to thermo- dule gives students the oppor- ecture(s). After a safety briefing, to those experiments, students powledge.
Intende	ed lear	ning outcomes			
solutio of chen chemis rement	ns, gas nical re try and s.	es, mixed phases and ele actions. They are able to spectroscopy with pract	ectrochemical reactic connect the theoretic ical laboratory experi	ons. Students are ab cal principles of ther iments. They are able	le to interpret the kinetic aspects modynamics, kinetics, electro- e to analyse the resulting measu-
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)	
This mo	odule c	omprises 2 module comp	oonents. Information	on courses will be li	sted separately for each module
compo • 0	nent. 8-PC2- 8-PC2-	2-092: P (no information 1-092: V + Ü (no informat	on SWS (weekly cont ion on SWS (weekly c	tact hours) and cour	se language available) ourse language available)
Metho	l of ass	essment (type scope langua	ge — if other than German	examination offered — if no	t every semester information on whether
module is	creditab	le for bonus)			st every semester, monnation on whether
Assess low. Un vidual a	ment in Iless st assess	n this module comprises ated otherwise, successf ments.	the assessments in t ul completion of the	he individual modul module will require :	e components as specified be- successful completion of all indi-
<ul> <li>Assessment in module component o8-PC2-2-o92: Physical Chemistry (lab)</li> <li>9 ECTS, Method of grading: (not) successfully completed</li> <li>Vortestate (pre-experiment exams, approx. 15 minutes each), assessment of practical performance, Nachtestate (post-experiment exams, approx. 15 minutes each)</li> <li>Assessment offered: once a year, winter semester</li> <li>Only after successful completion of module components: o8-PC1-1 or o8-PC2-1</li> <li>Assessment in module component o8-PC2-1-o92: Thermodynamics, Kinetics, Electrochemistry Thermodynamics, Kinetics, Electrochemistry</li> <li>9 ECTS, Method of grading: numerical grade</li> <li>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)</li> <li>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</li> </ul>					

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 27 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

#### Allocation of places

#### Additional information

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#### Workload

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#### Teaching cycle

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

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

#### Module appears in

Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) FOKUS Chemistry (2011)

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	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module	Module title					
Physical and Theoretical Chemistry 3: Symmetry and Quantum Chemistry				tum Chemistry	08-PC3-092-m01	
Module coordinator				Module offered by		
lecture	r of lect	ture "Quantenchemie"		Institute of Physica	l and Theoretical Ch	emistry
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme:	ster	undergraduate	Admission prerequines ses in the respective (usually 70% of exec lar attendance of ex sed absence).	site to assessment: s classes as specifie rcises to be success ercises (usually a ma	successful completion d at the beginning o fully completed) as v aximum of 2 inciden	on of exerci- f the course vell as regu- ts of unexcu-
Conten	ts					
This mo	odule d	iscusses the fundame	ntal principles of quant	um chemistry and sy	mmetry in chemistry	y.
Intende	ed lear	ning outcomes				
Studen mistry a	ts have and are	e become familiar with able to apply the know	the fundamental princi vledge they have devel	ples of quantum che oped.	emistry and symmetr	y in che-
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ger	man)		
V + Ü +	V + Ü (	no information on SWS	(weekly contact hours	) and course langua	ge available)	
Methoo module is	<b>d of ass</b> creditab	<b>sessment</b> (type, scope, lang le for bonus)	guage — if other than German, o	examination offered — if no	ot every semester, informati	ion on whether
a) 1 to <u>3</u> each; 3 tes) or 6	3 writte writte c) oral	n examinations (1 writi n examinations: 60 mir examination in groups	en examination: 90 mi nutes each) or b) oral ex (groups of 2, approx. 3	nutes; 2 written exar kamination of one ca o minutes)	minations: 60 or 90 i andidate each (appro	minutes ox. 20 minu-
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
			·			
Teachir	ıg cycl	e				
Referre	d to in	LPO I (examination regulati	ons for teaching-degree progra	mmes)		
Module appears in						
Bachel	or' deg	ree (1 major) Biochemi	stry (2013)			
Bachelor' degree (1 major) Chemistry (2010)						
Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Mathematics (2012)						
Bachelor' degree (1 major) Mathematics (2012)						
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)						
FIIST ST	ate exa	initiation for the teach	ng degree nauptschule	chemistry (2009)		
Bachelor's	with 1 maj	jor Chemistry (2010)	JMU Würzbu reg. data reco	rg • generated 26-Aug-2024 rd Bachelor (180 ECTS) Chem	• exam. nie - 2010	page 29 / 57



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)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 30 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title				Abbreviation	
Physica	al Chen	nistry 4: Statistical Therr	nodynamics		08-PC4-092-m01
Module coordinator				Module offered by	
lecture	r of lect	ture "Statistische Thermo	dynamik"	Institute of Physica	l and Theoretical Chemistry
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
3	nume	rical grade		-	
Duratio	n	Module level	Other prerequisites		
1 seme:	ster	undergraduate	Admission prerequis ses in the respective (usually 70% of exer lar attendance of ex sed absence).	site to assessment: s classes as specifie rcises to be successf ercises (usually a ma	successful completion of exerci- d at the beginning of the course fully completed) as well as regu- aximum of 2 incidents of unexcu-
Conten	ts				
This mo	odule d	iscusses the fundamenta	al principles of statist	ical thermodynamic	s.
Intende	ed learr	ning outcomes			
Studen apply tl	ts have he knov	e become familiar with th wledge they have develo	e fundamental princi ped.	ples of statistical the	ermodynamics and are able to
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
Methoo module is	<b>d of ass</b> creditab	<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
a) 1 to <u>3</u> or 90 m each (a	3 writte 1inutes 1pprox.	n examinations (1 writter each; 3 written examinat 20 minutes) or c) oral ex	examination: appro tions: approx. 60 min amination in groups (	x. 90 minutes; 2 writ utes each) or b) oral (groups of 2, approx.	ten examinations: approx. 60 l examination of one candidate . 30 minutes)
Allocat	ion of p	olaces			
	· · ·				
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cvcl	e			
	3 - 9 - 0	-			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module appears in					
Bachelor' degree (1 major) Chemistry (2010)					
Bachelor' degree (1 major) Chemistry (2009)					
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)					
First Sta	First state examination for the teaching degree Realschule Chemistry (2009)				
First sta	ate exa	mination for the teaching	degree Mittelschule	Chemistry (2009)	
This state examination for the teaching degree mittelsenate chemistry (2015)					

Theoretike in Chemistry       Module offered by         Module control is in Chemistry       Institute of Physical and Theoretical Chemistry         ECTS       Method of grading       Only after succ. compute of Module (ST)         3       numerical grade          1       Module level       Other 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 unexcussisting the targeted classes as specified at the beginning of the course (usually 70% of exercises (usually a maximum of 2 incidents of unexcussisting the targeted control (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcussisting the targeted control (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcussisting the examinations, the Hartree-Tock method, correlation energy, configuration interaction and excited states, the Born-Oppenheimer approximation and bonding models of H2+.         Intended learner of unexely contact hours, language if other than German	Module	title				Abbreviation
<table-container>         Module result       Module result       Module result         Itest       Itest</table-container>	Theoret	Theoretical Models in Chemistry     08-TC-092-m01				08-TC-092-m01
Institute of Physical and Theoretical Chemistry         GCTS       Method Is grading       Only after succ>L of module(s)         3       numetical grading       Second Seco	Module	coord	inator		Module offered by	
ECTS         Method ∪ f grading         Only after succ. compl. of module(s)           3         numerical grade            Duration         Module level         Other prerequisites           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 unexculsed absence).           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-Oppenhemer approximation and bonding models of H2+.           Intend=U informing 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 + 0 (n information on SWS (weekly contact hours) and course language available)           Method of assessment (type, scope, language — if other than German, examination of end — if not every semester, information on whether module is calcitable for homas           a) to 3 written examinations (1 written examination: approx. 90 on inutes; 2 written examinations on on eandidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)           Additional Information         Parset <td< td=""><td>lecture</td><td>r of lect</td><td>ture "Quantenchemie"</td><td></td><td>Institute of Physica</td><td>l and Theoretical Chemistry</td></td<>	lecture	r of lect	ture "Quantenchemie"		Institute of Physica	l and Theoretical Chemistry
3       numerical grade          Duration       Module level       Other prerequisites         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).         Contents       This module provides students with deeper insights into advanced topics in quantum chemistry. It focuses on spin, the Paul principle, Stater determinants, the Harree-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, examination offered – if not every semester, 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 or 90 minutes each; 3 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 90 minutes; 2 written examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)         Aldication of places	ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
Duration         Module level         Other prerequisites           1 semester         Undergraduate         Admission prerequisite to assessment: successful completion of exercises is so successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular attendance of exercises to be successfully completed) as well as regular attendance of exercises to be successfully completed attents, 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 + 0 (no information on SWS (weekly contact hours) and course language available)           Method of assessment (type, scope, language – if other than German, examination of the examinations of one candidate each (approx. 20 minutes) or c) oral examinations: approx. 60 ominutes each or b) for al examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)           Additional information	3	nume	rical grade	-		
1 semester       undergraduate       Admission prerequisite to assessment: successful completion of exercises is 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 a incidents of unexculsed absence).         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       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 + Ü (no information on SWS (weekly contact hours) and course language available)         Method of assessment (type, scope, language – if other than German)         a) 1 to 3 written examinations (a written examination: approx. 90 minutes; 2 written examinations on one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)         Additional information       Image: Supervisite (Supervisite)	Duratio	n	Module level	Other prerequisites		
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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 + Ü (no information on SWS (weekly contact hours) and course language available) Method of assessment (type, scope, 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 senester, 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 jo on inutes each); 3 written examinations: approx. 60 minutes each (2 approx. 30 minutes) Allocation of places	Conten	ts				
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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 + 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)  Allocation of places Additional information Workload Teaching cycle Referred to in LPO I (examination regulations for teaching-degree programmes) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2013) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major	Intende	ed leari	ning outcomes			
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) 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)         Allocation of places            Additional information            Additional information            Faching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         Bachelor' degree (1 major) Chemistry (2010)         Bachelor' degree (1 major) Mathematics (2012)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (2012)         Bachelor' degree (1 major) Computational Mathematics (2012)         Bachelor' degree (1 major) Computational Mathematics (2012)         Bachelor' degree (1 major) Computational Mathematics (2013)         Bachelor' degree (1 major) Computational Mat	Studen	ts are a	able to describe excited s	tates of molecules w	ith the help of key co	oncepts and models.
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)         Allocation of places            Additional information            Morkload            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         Bachelor' degree (1 major) Chemistry (2010)         Bachelor' degree (1 major) Mathematics (2012)         Bachelor' degree (1 major) Computational Mathematics (2009)         Bachelor' degree (1 major) Computational Mathematics (2012)         Bachelor' degree (1 major) Computational Mathematics (2013)	Course	<b>S</b> (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)	
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Allocation of places Additional information Workload Teaching cycle Teaching cycle Referred to in LPO 1 (examination regulations for teaching-degree programmes) Referred to in LPO 1 (examination regulations for teaching-degree programmes) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (201)	each (a	pprox.	20 minutes) or c) oral ex	amination in groups	(groups of 2, approx.	. 30 minutes)
Additional information Additional information Additional information Additional information Additional information Workload Additional information Workload Additional information Addite accord and the addites (2012) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2012) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)	Allocat	ion of p	olaces			
Additional information            Workload            Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         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 (2013)         Bachelor' degree (1 major) FOKUS Chemistry (2011)						
Workload            Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         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 (2012)         Bachelor' degree (1 major) Computational Mathematics (2013)         Bachelor' degree (1 major) FOKUS Chemistry (2011)	Additio	nal inf	ormation			
Workload            Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         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 (2012)         Bachelor' degree (1 major) Computational Mathematics (2013)         Bachelor' degree (1 major) Computational Mathematics (2013)         Bachelor' degree (1 major) FOKUS Chemistry (2011)						
Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         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 (2012)         Bachelor' degree (1 major) FOKUS Chemistry (201)	Worklo	ad				
Teaching cycle            Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         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) Computational Mathematics (2013)         Bachelor' degree (1 major) FOKUS Chemistry (2011)						
Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         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 (2013)         Bachelor' degree (1 major) FOKUS Chemistry (2011)	Teachir	ng cycl	<u>م</u>			
Referred to in LPO I (examination regulations for teaching-degree programmes)            Module appears in         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)		15 0900				
Module appears in 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) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)	Deferre	d to in				
Module appears inBachelor' 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 (2012)Bachelor' degree (1 major) Computational Mathematics (2013)Bachelor' degree (1 major) Computational Mathematics (2013)Bachelor' degree (1 major) Computational Mathematics (2013)Bachelor' degree (1 major) FOKUS Chemistry (2011)						
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) Computational Mathematics (2013)	Module appears in					
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)	Bachelor' degree (1 major) Chemistry (2010)					
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)	Bachelor' degree (1 major) Chemistry (2009)					
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)	Bachelor' degree (1 major) Mathematics (2012)					
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)	Bachelo	or' deg	ree (1 major) Mathematic	s (2013)	,	
Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)	Bachelor' degree (1 major) Computational Mathematics (2009)					
Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)	Bachelo	or' deg	ree (1 major) Computation	nal Mathematics (20:	12)	
Bachelor' degree (1 major) FUKUS Chemistry (2011)	Bachelo	or' deg	ree (1 major) Computation	nal Mathematics (20:	13)	
	Bachelo	or deg	ree (1 major) FOKUS Chen	nistry (2011)		



## **Basics of Natural Sciences**

(21 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 33 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title			Abbreviation			
Introduction to Physics for Students of Non-physics-related Minor Subjects 11-EFNF-072-m01						
Module coordinator			Module offered by			
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
7	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
2 seme	ster	undergraduate				
Conten	ts					
Mecha	nics, vi	bration theory, thermo	lynamics, optics, scier	nce of electricity, Ato	mic and Nuclear Phy	sics.
Intend	ed lear	ning outcomes	<u>, , . ,</u>	,	,	
The stu	Idents	have knowledge of the	principles of Physics			
Course		number of weekly contact hours	language — if other than Ge	rman)		
	o infor	mation on SWS (wook)	, contact hours) and co	ninan)	abla)	
V + V (I						
module is	<b>OF ASS</b> creditab	Sessment (type, scope, lang	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether
written	exami	nation (approx 120 mir	 uites)			
Allocat	ion of I					
Only as	nart o	f pool of general key sk	ille (ASO): 10 places P	laces will be allocate	ad by lot	
		ormation				
Additio	nat m	ormation				
	•					
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)		
Module	e appea	ars in				
Bachel	or' deg	ree (1 major) Biochemis	stry (2011)			
Bachel	or' deg	ree (1 major) Biochemis	stry (2013)			
Bachel	or' deg	ree (1 major) Biochemis	stry (2009)			
Bachel	or' deg	ree (1 major) Biology (2	011)			
Bachel	or' deg	ree (1 major) Biology (2	007)			
Bachel	or' deg	ree (1 major) Biology (2	010)			
Bachel	or' deg	ree (1 major) Chemistry	(2007)			
Bachel	or deg	ree (1 major) Chemistry	(2008)			
Bachelor' degree (1 major) Chemistry (2010)						
Dachelor' degree (1 major) Chemistry (2009)						
Bachelor' degree (1 major) Geography (2007)						
Bachel	Bachelor' degree (1 major) Geography (2000)					
Bachel	Bachelor' degree (1 major) Computer Science (2007)					
Dachelor' degree (1 major) Computer Science (2007) Bachelor' degree (1 major) Computer Science (2014)						
Dachel	Bachelor' degree (1 major) Computer Science (2014)					
Dachel	or deg	ree (1 major) Computer	$\frac{2010}{2010}$			
Bachel	or ueg or deg	ree (1 major) rood Cher ree (1 major) Mathemat	insuy (2009) ics (2008)			
Bachelor's	with 1 ma	ior Chemistry (2010)	IMU Würzhı	rg • generated 26-Aug-2024	• exam.	page 34 / 57
		, , ( ,	reg. data reco	ord Bachelor (180 ECTS) Chem	ie - 2010	F-0- J+ / J/

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG



Bachelor' degree (1 major) Mathematics (2014) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Mathematics (2007) Bachelor' degree (1 major) Biomedicine (2009) Bachelor' degree (1 major) Biomedicine (2013) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2014) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 35 / 5
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title			Abbreviation			
Practic	Practical Course Physics for Students of Non-physics-related Minor Subjects 11-PFNF-072-m01					
Modul	e coord	inator		Module offered by		
Manag	ing Dire	ector of the Institute of <i>I</i>	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	,	
3	(not) s	successfully completed		•		
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
Mecha Physic:	Mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance, Atomic and Nuclear Physics.					
Intend	ed lear	ning outcomes				
The stu	udents	have knowledge of the	principles of Physics.			
Course	es (type, r	number of weekly contact hours	language — if other than Gen	rman)		
P (no ii	nformat	tion on SWS (weekly co	ntact hours) and cours	e language available	2)	
Metho	d of ass	sessment (type, scope, lang	lage — if other than German,	examination offered — if no	, t every semester, informati	ion on whether
module i	s creditab	le for bonus)			· ·	
a) oral	test (ap	oprox. 15 minutes) durir	g experiment and b) u	ngraded written exa	mination (approx. 90	o minutes)
Allocat	tion of <sub>l</sub>	olaces				
Only as	Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.					
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cvcl	e				
	<u> </u>					
Referre	ed to in	<b>LPO I</b> (examination regulation	ns for teaching-degree progra	ummes)		
Modul	e appea	ars in				
Bachel	or' deg	ree (1 maior) Biochemis	trv (2011)			
Bachel	lor' deg	ree (1 major) Biochemis	try (2013)			
Bachel	lor' deg	ree (1 major) Biochemis	try (2009)			
Bachel	lor' deg	ree (1 major) Biology (2	D11)			
Bachel	lor' deg	ree (1 major) Biology (2	,, 207)			
Bachel	lor' deg	ree (1 major) Biology (2	D10)			
Bachel	lor' deg	ree (1 major) Chemistry	(2007)			
Bachel	lor' deg	ree (1 major) Chemistry	(2008)			
Bachel	lor' deg	ree (1 major) Chemistry	(2010)			
Bachelor' degree (1 major) Chemistry (2009)						
Bachel	Bachelor' degree (1 major) Geography (2007)					
Bachel	Bachelor' degree (1 major) Geography (2008)					
Bachel	lor' deg	ree (1 major) Geography	(2010)			
Bachel	lor' deg	ree (1 major) Computer	Science (2007)			
Bachel	Bachelor' degree (1 major) Computer Science (2014)					
Bachel	lor' deg	ree (1 major) Computer	Science (2010)			
Bachel	lor' deg	ree (1 major) Food Chen	nistry (2009)			
Bachelor's	with 1 ma	jor Chemistry (2010)	JMU Würzbu	rg • generated 26-Aug-2024	• exam.	page 36 / 57
			reg. data reco	ord Bachelor (180 ECTS) Chem	nie - 2010	



Bachelor' degree (1 major) Biomedicine (2009) Bachelor' degree (1 major) Biomedicine (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 37 / 5
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module	title				Abbreviation
Biochemistry 08-BC-092-m01			08-BC-092-m01		
Module	e coord	inator		Module offered by	
holder	of the O	Chair of Biochemistry		Chair of Biochemist	try
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
6	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
2 seme	ster	undergraduate	Admission prerequis ses in the respective (usually 70% of exer lar attendance of ex sed absence).	site to assessment: s e classes as specifie rcises to be successf ercises (usually a ma	successful completion of exerci- d at the beginning of the course fully completed) as well as regu- aximum of 2 incidents of unexcu-
Conten	ts				
Compri mistry.	sing le	ctures and exercises, this	s module acquaints s	tudents with the fun	damental principles of bioche-
Intende	ed leari	ning outcomes			
Studen key bio	ts have chemio	e become familiar with th cal processes in cellular s	e fundamental princi systems.	ples of biochemistry	. They are able to describe the
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V + Ü +	V + Ü (	no information on SWS (\	weekly contact hours	) and course languag	ge available)
Method module is	<b>d of ass</b> creditab	<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
a) 1 to 3 or 90 m each (a	3 writte 1inutes 1pprox.	n examinations (1 writter each; 3 written examinat 20 minutes) or c) oral ex	examination: appro tions: approx. 60 min amination in groups (	x. 90 minutes; 2 writ nutes each) or b) oral (groups of 2, approx.	tten examinations: approx. 60 l examination of one candidate . 30 minutes)
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)				
Module appears in					
Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Nanostructure Technology (2010) Bachelor' degree (1 major) Nanostructure Technology (2012) Bachelor' degree (1 major) FOKUS Chemistry (2011) Master's degree (1 major) Chemistry (2010)					

Module title					Abbreviation	
Mathe	Mathematics for students in Chemistry and Biology				10-M-MCB-101-m01	
Modul	e coord	inator		Module offered by		
Dean o	of Studi	es Mathematik (Mathe	matics)	tics) Institute of Mathematics		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duration Module level			Other prerequisites			
1 semester undergraduate		Registration for the ning of the course o the specified registr to qualify for admiss certain percentage o the respective detai exercise will be con sessment. If studen assessment over the gistration for assess will be admitted to a ster. For assessmen lification for admiss too.	Registration for the exercise must be made via SB@home at the begin- ning of the course or as announced by the lecturer in accordance with the specified registration deadlines. Certain prerequisites must be met to qualify for admission to assessment (e. g. successful completion of a certain percentage of exercises). The lecturer will inform students about the respective details at the beginning of the course. Registration for the exercise will be considered a declaration of will to seek admission to as- sessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their re- gistration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent seme- ster. For assessment at a later date, students will have to obtain the qua- lification for admission to assessment anew and have to register anew,			
Conter	nts	<u> </u>				
Function of function	onal rel tions ir s in sta	ations, differentiation and several variables, pow tistics.	and integration of funct ver series, ordinary diff	ions in one variable, erential equations, s	curve sketching, dif ystems of linear equ	ferentiation lations, basic
Intend	ed lear	ning outcomes				
The stu apply b	udent is pasic m	able to recognise and athematical methods t	phrase simple questio to them and interpret th	ns from natural scier e results.	nces as mathematica	al problems,
Course	<b>S</b> (type, r	number of weekly contact hour	rs, language — if other than Ger	rman)		
V + Ü (	no info	mation on SWS (week	ly contact hours) and co	ourse language avail	able)	
Metho module i	<b>d of ass</b> s creditab	<b>sessment</b> (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informati	on on whether
written	exami	nation (approx. 90 to 1	20 minutes)			
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teaching cycle						
Referre	ed to in	LPO I (examination regulation	ions for teaching-degree progra	mmes)		
Module appears in						
Bachel Bachel Bachel	Bachelor' degree (1 major) Biochemistry (2011) Bachelor' degree (1 major) Biochemistry (2009) Bachelor' degree (1 major) Biology (2011)					
Bachelor's	with 1 ma	jor Chemistry (2010)	JMU Würzbu reg. data recc	rg • generated 26-Aug-2024 rd Bachelor (180 ECTS) Chem	• exam. ie - 2010	page 39 / 57

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Bachelor' degree (1 major) Biology (2010) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Food Chemistry (2009) Bachelor' degree (1 major) FOKUS Chemistry (2011) No final examination Special study offering (2010)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 40 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	1



## **Specialist Lab Course**

(5 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 41 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	1

Module title Abbreviation				Abbreviation	
Advanced laboratory course					08-VP-102-m01
Module	coord	inator		Module offered by	
head of	f the re	search group offering the	module	Faculty of Chemistr	y and Pharmacy
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	(not) s	successfully completed	Where applicable, s supervisor (cf. Secti	pecific modules/mo on 12 Subsection 4 F	dule components as specified by SB (subject-specific provisions)).
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
This mo in the d	odule g lisciplii	ives students the opport ne in question.	unity to explore a res	earch topic and app	ly the methods commonly used
Intende	ed leari	ning outcomes			
Studen oral pre	ts are a sentat	able to explore a specific ion.	research topic and p	resent the results of	their work in a written report or
Courses	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
P (no in	Iformat	ion on SWS (weekly cont	act hours) and course	e language available	)
Method	l of ass	essment (type, scope, langua	ge — if other than German, e	examination offered — if no	t every semester, information on whether
module is	creditab	e for bonus)			
Langua	ge of a	ssessment: German, Eng	lish		
Allocati	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module	e appea	irs in			
Bachelo	Bachelor' degree (1 major) Chemistry (2010)				



# **Thesis** (10 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 43 / 57
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Module title Abbreviation				Abbreviation	
Bachelor Thesis					08-BA-102-m01
Module	e coord	inator		Module offered by	
head of	f the re	search group offering the	module	Faculty of Chemistr	y and Pharmacy
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
10	nume	rical grade	Where applicable, s supervisor (cf. Secti	pecific modules/mo on 16 Subsection 2 I	dule components as specified by FSB (subject-specific provisions)).
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
This mo and usi	odule g	ives students the opport scientific methods they l	unity to research and nave learned during t	write on a defined p he programme.	problem within a given time frame
Intende	ed leari	ning outcomes			
Studen <sup>®</sup> practice	ts are a e. and f	able to conduct research to present the results of t	on a defined problem heir work in written fo	n/topic, adhering to orm.	the principles of good scientific
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)	
no cour	rses as	signed			
Method	d of ass	<b>essment</b> (type, scope, langua	ge — if other than German, e	examination offered — if no	t every semester, information on whether
module is	creditab	le for bonus)			
written Langua	thesis ge of a	(approx. 40 pages) ssessment: German, Eng	lish		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Additio	nal info	ormation on module dura	tion: 8 weeks.		
Worklo	ad				
Teaching cycle					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module	e appea	nrs in			
Bachelor' degree (1 major) Chemistry (2010)					



## Courses at partner university abroad

(50 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 45 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	1

Module title					Abbreviation
Courses at the partner university					08-VPUB-132-m01
Module	coord	inator		Module offered by	
program	nme co	ordinator of the exchang	e programme	Faculty of Chemistr	y and Pharmacy
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
50	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
This mo	odule d	iscusses topics from the	curriculum of the par	tner university abroa	ad.
Intende	ed learn	ning outcomes			
Studen sity.	ts have	e developed the knowled	ge and skills taught i	n the courses attend	ed by them at the partner univer-
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
no cour	ses as	signed			
Methoo module is	l of ass creditab	e <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
assessi Langua	ments a ge of a	according to examinatior ssessment: German, Eng	n regulations of the re lish or language of in	spective partner uni struction at the part	versity ner university
Allocat	ion of p	olaces			
Additio	nal infe	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)				
Module	Module appears in				
Bachelo	or' degi	ree (1 major) Chemistry (2	2010)		

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 46 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	



## Subject-specific Key Skills

(15 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg ● generated 26-Aug-2024 ● exam.	page 47 / 57
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## **Compulsory Courses**

(5 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 48 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title			Abbreviation			
Toxico	Toxicology and legal studies     03-TR-072-m01					
Module coordinator				Module offered by		
lecturer of lecture "Toxikologie und Rechtskunde" Faculty of Medicine						
ECTS	Metho	od of grading	Only after succ. compl. of module(s)			
2	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
Duratit	/II					
1 seme	ster	undergraduate				
Conten	ts					
Basics toxicol	of lega ogy.	l regulations for chemis	sts (handling and trans	portation of hazardo	us materials), funda	mentals of
Intende	ed lear	ning outcomes				
The stu ces) as	idents i well as	master the basics of leg the fundamentals of to	gal regulations for cher oxicology.	nists (handling and t	ransport of hazardo	us substan-
Course	<b>S</b> (type, r	number of weekly contact hours	, language — if other than Ge	rman)		
V + V (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
Metho	d of ass	sessment (type, scope, lang	uage — if other than German,	examination offered — if no	t every semester, informati	ion on whether
written	evami	nation (approx, oo min	 			
Allocat	ion of					
Allocal		JIACES				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	mmes)		
Module	20002	urs in				
Rachal	e appea	roo (1 major) Biachamic	stru (2014)			
Bachel	or' deg	ree (1 major) Biochemis	stry(2011)			
Bachel	or deg or deg	ree (1 major) Biochemis	stry(2013)			
Bachel	or deg or deg	ree (1 major) Chemistry	(2007)			
Bachel	or deg or deg	ree (1 major) Chemistry	(2007)			
Bachel	or' deg	ree (1 major) Chemistry	(2000)			
Bachel	or' deg	ree (1 major) Chemistry	(2009)			
Bachel	or' deg	ree (1 major) Food Cher	nistry (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 sta	ate exa	mination for the teachi	ng degree Gymnasium	Chemistry (2009)		
Bachelor's	with 1 ma	jor Chemistry (2010)	JMU Würzbu reg. data reco	rg • generated 26-Aug-2024 rd Bachelor (180 ECTS) Cherr	• exam. ie - 2010	page 49 / 57



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

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 50 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module	e title				Abbreviation
Literature research methods					08-LRAC-092-m01
Module	e coord	inator		Module offered by	
lecture Organi	r of lec c Chem	ture "Elementorganische istry)	Chemie" (Elemental	Institute of Inorgan	ic Chemistry
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
1	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Literatı	ire sea	rch for planning experime	ents in the field of inc	organic chemistry.	
Intend	ed lear	ning outcomes			
Studen	ts knov	w how to conduct literatu	re searches for plann	ing experiments in t	he field of inorganic chemistry.
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
Ü (no iı	nforma	tion on SWS (weekly cont	tact hours) and cours	e language available	e)
Metho module is	<b>d of ass</b> s creditab	<b>Sessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
2 litera	ture se	arches about given prepa	arations		
Allocat	ion of <sub>l</sub>	olaces			
Additio	onal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module appears in					
Bachel	or' deg	ree (1 major) Chemistry (2	2010)		
Bachel	Bachelor' degree (1 major) Chemistry (2009)				

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 51 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title					Abbreviation
Literatu	ure reso	earch methods			08-LROC-092-m01
Module	e coord	inator		Module offered by	
lecture	r of lect	ture "Organische Chemie	4"	Institute of Organic	Chemistry
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
1	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Literatu	ire sea	rch for planning experime	ents in the field of org	anic chemistry.	
Intende	ed learı	ning outcomes			
Studen	ts knov	v how to conduct literatu	re searches for plann	ing experiments in t	he field of organic chemistry.
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
Ü (no ir	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	2)
Methoo module is	<b>d of ass</b> creditab	<b>eessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
1 literat	ure sea	arch about given prepara	tions		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachir	ıg cycl	e			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module appears in					
Bachelo Bachelo	or' deg or' deg	ree (1 major) Chemistry (2 ree (1 major) Chemistry (2	2010) 2009)		



## **Compulsory Electives**

(10 ECTS credits)

Bachelor's with 1 major Chemistry (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 53 / 57
	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title				Abbreviation		
Advanced chemical practical course					08-OP-102-m01	
Module coordinator				Module offered by		
head of the research group offering the modu			module	Faculty of Chemistry and Pharmacy		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	(s)	
5	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Conten	ts					
This mo in the d	odule g isciplir	ives students the opport ne in question.	unity to explore a res	earch topic and appl	y the methods commonly used	
Intende	ed learr	ning 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	<b>5</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
P (no in	format	ion on SWS (weekly cont	act hours) and course	e language available	)	
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)						
talk (approx. 15 minutes) or written report (approx. 10 to 20 pages) Language of assessment: German, English						
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) Chemistry (2010)						

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	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title				Abbreviation	
Applied Spectroscopy 3 08-PS3-092-m					08-PS3-092-m01
Module coordinator				Module offered by	
lecture	r of lect	ure "Praktische Spektros	kopie 3"	Institute of Physica	l and Theoretical Chemistry
ECTS	Method of grading Only after succ. compl. of module(s)				
5	nume	rical grade			
Duration Module level		Other prerequisites			
1 seme	ster	undergraduate			
Conten	ts				
This mo practice tra and	odule g e and to discus	ives students the opport o interpret readings or gra s modern mass spectrom	unity to apply their th aphs. We will record a netry methods.	eoretical knowledge and analyse UV-VIS,	e of spectroscopic methods in fluorescence and vibration spec-
Intende	ed learı	ning outcomes			
Studen conduc	ts are a t error	able to work with differen discussions.	t spectrometers and	to interpret the resul	lting spectra. They are able to
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (no ir	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	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)         1 written examination (approx. 90 minutes) or 2 written examinations (approx. 60 or 90 minutes each) or 3 written examinations (approx. 60 minutes each) or oral examination of one candidate each (approx. 20 minutes) or					
Allocation of places					
Additional information					
Workload					
Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Master's degree (1 major) Technology of Functional Materials (2010) Master's degree (1 major) Technology of Functional Materials (2000)					
Master's degree (1 major) Functional Materials (2012)					

Module title				Abbreviation	
Programming course for Chemistry Major					08-PKC-102-m01
Module coordinator				Module offered by	
lecture	r of lect	ture "Programmierkurs fü	r Chemiker"	Institute of Physica	l and Theoretical Chemistry
ECTS Method of grading		Only after succ. compl. of module(s)			
5	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semester		undergraduate	Admission prerequisite to assessment: successful completion of exerci- ses in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regu- lar attendance of exercises (usually a maximum of 2 incidents of unexcu- sed absence).		
Conten	ts				
This mo can be	odule p applied	rovides an introduction t d to problems in chemist	o the fundamentals c ry.	of a programming lar	nguage and discusses how they
Intende	ed learı	ning outcomes			
Studen chemis	ts are a try.	able to describe the funda	amentals of the prog	amming language a	nd to apply them to problems in
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
S + Ü (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)					
practical examination: completion of programming exercises and oral description of algorithms used Language of assessment: German, English					
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) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011)					
Bachelor' degree (1 major) Functional Materials (2012)					

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	reg. data record Bachelor (180 ECTS) Chemie - 2010	

Module title	Abbreviation				
Biochemistry Lab			08-BCP-092-m01		
Module coordinator		Module offered by			
holder of the Chair of Biochemistry		Chair of Biochemist	ry		
ECTS Method of grading	Only after succ. com	Only after succ. compl. of module(s)			
5 (not) successfully completed	o8-BC	08-BC			
Duration Module level	Other prerequisites	Other prerequisites			
1 semester undergraduate					
Contents					
Practical exercises give students the o experiments.	pportunity to learn th	e fundamental princ	iples of conducting biochemical		
Intended learning outcomes					
Students have become proficient in es	sential methods in bi	ochemistry.			
<b>Courses</b> (type, number of weekly contact hours,	language — if other than Ger	man)			
P (no information on SWS (weekly con	tact hours) and cours	e language available	2)		
Method of assessment (type, scope, langua module is creditable for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
pre/post-experiment examination talks (Vortestate and Nachtestate, approx. 15 minutes each), practical work (log, approx. 5 to 10 pages) Assessment offered: once a year, summer semester					
Allocation of places					
Number of places: 24. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (80% of places): grade achieved in module 08-BC; among applicants with the same grade, places will be allocated by lot. Quota 2 (20% of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.					
Additional information					
Workload					
Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010)					