

# Module Catalogue

for the Subject

## FOKUS Chemistry

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

Examination regulations version: 2011  
Responsible: Faculty of Chemistry and Pharmacy

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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
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## Content and Objectives of the Programme

No translation available.

## Abbreviations used

Course types: **E** = field trip, **K** = colloquium, **O** = conversatorium, **P** = placement/lab course, **R** = project, **S** = seminar, **T** = tutorial, **Ü** = exercise, **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:

**ASPO2009**

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

**29-Aug-2011 (2011-71)**

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

## Compulsory Courses

(150 ECTS credits)

## General and Inorganic Chemistry

(47 ECTS credits)

Module title			Abbreviation
Inorganic Chemistry 1			o8-AC1-102-m01
Module coordinator		Module offered by	
lecturer of lecture "Experimentalchemie" (Experimental Chemistry)		Institute of Inorganic Chemistry	
ECTS	Method of grading	Only after succ. compl. of module(s)	
21	numerical grade	--	
Duration	Module level	Other prerequisites	
1 semester	undergraduate	By way of exception, additional prerequisites are listed in the section on assessments.	
Contents			
<p>This module provides students with an overview of the fundamental principles of chemistry. It focuses on particles, metals, acid-base reactions, the periodic table, chemical equilibrium and complexometry. In addition, the module introduces fundamental models of chemistry and principles of inorganic chemistry. It includes practical exercises based on the lecture on experimental chemistry and its extension. After a safety briefing, the students autonomously conduct experiments in the laboratory. The course focuses on laboratory safety, simple lab techniques, the synthesis of simple substances and analyses of unknown substances. In addition, students have the opportunity to advance their laboratory knowledge.</p>			
Intended learning outcomes			
<p>Students are able to explain the principles of the periodic table and to extract information from it. They are able to explain basic models of the structure of matter. They have developed the ability to use the language of chemical formulas to describe chemical reactions and to interpret them by identifying the type of reaction. Students are able to describe the main quantitative and qualitative analytical methods and their application areas. They are able to identify fundamental problems in chemistry and perform experiments to solve them. They have developed the ability to perform the necessary stoichiometric calculations and describe the chemical processes in an appropriate manner, both in written and oral form.</p>			
Courses (type, number of weekly contact hours, language — if other than German)			
<p>This module has 4 components; information on courses listed separately for each component.</p> <ul style="list-style-type: none"><li>o8-AC1-1-102: V + V + Ü (no information on language and number of weekly contact hours available)</li><li>o8-AC1-2-102: P (no information on language and number of weekly contact hours available)</li><li>o8-AC1-3-102: V (no information on language and number of weekly contact hours available)</li><li>o8-AC1-4-102: P (no information on language and number of weekly contact hours available)</li></ul>			
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)			
<p>This module has the following 4 assessment components. Unless stated otherwise, students must pass all of these assessment components to pass the module as a whole.</p>			
<p><b>Assessment in module component o8-AC1-2-102:</b> Praktikum Anorganische Chemie 1 (Lab Course Inorganic Chemistry 1)</p> <ul style="list-style-type: none"><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 components: Module component o8-AC1-2 can only be taken by students who successfully completed module component o8-AC1-4.</li></ul>			
<p><b>Assessment in module component o8-AC1-3-102:</b> Erläuterungen zum Praktikum Anorganische Chemie 1 (Discussion of Experiments Performed in Lab Course Inorganic Chemistry 1)</p> <ul style="list-style-type: none"><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>			
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<ul style="list-style-type: none"> <li>• Language of assessment: German, English</li> </ul> <p><b>Assessment in module component 08-AC1-4-102:</b> Sicheres Arbeiten in chemischen Laboratorien (Chemical Laboratory Safety)</p> <ul style="list-style-type: none"> <li>• 1 ECTS credit, pass / fail</li> <li>• Assessment of practical assignments</li> <li>• Language of assessment: German, English</li> </ul> <p><b>Assessment in module component 08-AC1-1-102:</b> Grundlagen der Allgemeinen und Anorganischen Chemie (Fundamental Principles of General and Inorganic Chemistry)</p> <ul style="list-style-type: none"> <li>• 10 ECTS credits, numerical grading</li> <li>• 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)</li> <li>• Language of assessment: German or English</li> <li>• 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).</li> </ul>
<b>Allocation of places</b>
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<b>Additional information</b>
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<b>Workload</b>
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<b>Teaching cycle</b>
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<b>Referred to in LPO I</b> (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"
<b>Module appears in</b>
Bachelor' degree (1 major) Chemistry (2010)
Bachelor' degree (1 major) FOKUS Chemie (2011)

Module title		Abbreviation
Inorganic Chemistry 2		o8-AC2-102-m01
Module coordinator		Module offered by
lecturer of lecture "Festkörperchemie" (Solid State Chemistry)		Institute of Inorganic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
6	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
<b>Contents</b>		
This module equips students with an advanced knowledge of metals, alloys and saline compounds. It focuses on their structures and properties, special material classes, reactivity and technical processes.		
<b>Intended learning outcomes</b>		
Students are able to describe the structure and properties of metals, alloys and saline compounds in an appropriate manner. They are able to systemise them and characterise their structure and reactivity. They can list spectroscopic methods that can be used for the structural analysis of solids and can describe them in an appropriate manner.		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
V + V (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 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		
<b>Allocation of places</b>		
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<b>Additional information</b>		
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<b>Workload</b>		
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<b>Teaching cycle</b>		
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)		
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<b>Module appears in</b>		
Bachelor' degree (1 major) Chemistry (2010)		
Bachelor' degree (1 major) FOKUS Chemistry (2011)		

Module title		Abbreviation
Inorganic Chemistry 3		o8-AC3-102-m01
Module coordinator		Module offered by
lecturer of lecture "Elementorganische Chemie" (Elemental Organic Chemistry)		Institute of Inorganic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
9	numerical grade	o8-AC1 (module component o8-AC1-4 only) and o8-OC3 (module component o8-OC3-2 only)
Duration	Module level	Other prerequisites
1 semester	undergraduate	By way of exception, additional prerequisites are listed in the section on assessments.
Contents		
This module equips students with an advanced knowledge of organometallics. It focuses on their structures and properties, special material classes, reactivity and technical processes. The module gives students the opportunity to do some autonomous research and plan and conduct complex syntheses. The course focuses on the handling of organometallic compounds, their synthesis and working with protective atmospheres. Spectroscopy is used for the exact determination of products.		
Intended learning outcomes		
Students are able to describe the structure and properties of organometallics in an appropriate manner. They are able to systemise them and characterise their structure and reactivity. In addition, they are able to develop and explain principles for the synthesis of elementary organic compounds. Students are able to conduct autonomous research and perform experiments to solve complex problems. They are able to describe the technical principles in oral and written form using appropriate scientific terminology. They are able to independently plan and carry out the synthesis of a substance using advanced lab techniques.		
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. <ul style="list-style-type: none"> <li>o8-AC3-1-102: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>o8-AC3-2-102: P (no information on SWS (weekly contact hours) and course language available)</li> </ul>		
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.		
<b>Assessment in module component o8-AC3-1-102: Elemental Organic Chemistry</b> Elemental Organic Chemistry <ul style="list-style-type: none"> <li>4 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, English</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 absence).</li> </ul> <b>Assessment in module component o8-AC3-2-102: Inorganic Chemistry 2 (lab)</b> <ul style="list-style-type: none"> <li>5 ECTS, Method of grading: (not) successfully completed</li> <li>pre/post-experiment examination talks (Vor-/Nachtestate, approx. 15 minutes each), log (approx. 5 to 10 pages)</li> <li>Language of assessment: German, English</li> </ul>		

<b>Allocation of places</b>
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<b>Additional information</b>
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<b>Workload</b>
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<b>Teaching cycle</b>
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)
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<b>Module appears in</b>
Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Module title		Abbreviation
Chemistry of the Elements and Analytical Chemistry		o8-AS1-102-m01
Module coordinator		Module offered by
lecturer of lecture "Chemie der Hauptgruppenelemente" (Chemistry of Main-group Elements)		Institute of Inorganic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
11	numerical grade	o8-AC1 (module component o8-AC1-4 only) and o8-OC3 (module component o8-OC3-2 only)
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
<b>Contents</b>		
<p>This module equips students with an advanced knowledge of the periodic table and selected elements. It focuses on bonding conditions, trends in the periodic table and the description and structure of elements. In addition, it introduces students to elementary organic chemistry, coordination chemistry and complex chemistry. 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. These experiments focus on different methods for the analysis of unknown substances.</p>		
<b>Intended learning outcomes</b>		
<p>Students are able to characterise main group elements and transition metal elements in terms of their structure, reactivity and fabrication. They are able to identify the coordination of the atoms. In addition, they have learned how to use the periodic table, an essential tool for chemists. Students are able to use different methods to analyse unknown substances. In addition, they are able to separate and analyse mixtures.</p>		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
<p>This module comprises 2 module components. Information on courses will be listed separately for each module component.</p> <ul style="list-style-type: none"> <li>o8-AN1-2-102: P (no information on SWS (weekly contact hours) and course language available)</li> <li>o8-AS1-1-102: V + V (no information on SWS (weekly contact hours) and course language available)</li> </ul>		
<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)		
<p>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.</p> <p><b>Assessment in module component o8-AN1-2-102: Analytical Chemistry (lab)</b></p> <ul style="list-style-type: none"> <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> </ul> <p><b>Assessment in module component o8-AS1-1-102: Chemistry of the elements</b></p> <ul style="list-style-type: none"> <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>		
<b>Allocation of places</b>		
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<b>Additional information</b>		
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<b>Workload</b>
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<b>Teaching cycle</b>
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)
§ 62 (1) 1. Chemie "Allgemeine und Anorganische Chemie"; "Physikalische und Analytische Chemie"
<b>Module appears in</b>
Bachelor' degree (1 major) Chemistry (2010)
Bachelor' degree (1 major) FOKUS Chemistry (2011)

# Organic Chemistry

(39 ECTS credits)

Module title		Abbreviation
Organic Chemistry 1		o8-OC1-092-m01
Module coordinator		Module offered by
holder of the Professorship of Organic Chemistry		Institute of Organic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	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 an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, addition and elimination reactions as well as synthesis planning.		
Intended learning outcomes		
Students know important categories of substances in organic chemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses.		
Courses (type, number of weekly contact hours, language — if other than German)		
V + Ü (no information on SWS (weekly contact hours) and course language available)		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 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)		
Allocation of places		
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Additional information		
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Workload		
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Teaching cycle		
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Referred to in LPO I (examination regulations for teaching-degree programmes)		
§ 62 (1) 2. Chemie "Organische und Bioorganische Chemie"		
Module appears in		
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' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Mathematics (2012)		
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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)

Module title		Abbreviation
Organic Chemistry 2		o8-OC2-102-m01
Module coordinator		Module offered by
holder of the Chair of Physically Organic Chemistry		Institute of Organic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
9	numerical grade	o8-OC1
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 introduces students to the rules of aromaticity and discusses specific reactions of aromatics. Using the example of carbonyl compounds, it extends the students' knowledge of substitution, elimination and addition reactions to complex reaction mechanisms. The course also focuses on oxidation and reduction reactions as well as rearrangement. In addition, it introduces students to the spectroscopic methods of infrared spectroscopy, mass spectrometry and NMR spectroscopy.		
Intended learning outcomes		
Students have become familiar with the criteria for aromaticity. They can analyse the varying reactivity of carbonyl compounds. They are able to describe specific reactions of carbonyls and aromatics. For that purpose, they can plan and formulate multi-stage syntheses with complex reaction mechanisms and can transfer them to unknown reactions. Students are able to describe important spectroscopic methods, to evaluate a spectrum and to draw conclusions regarding the molecular structure.		
Courses (type, number of weekly contact hours, language — if other than German)		
V + 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		
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Additional information		
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Workload		
--		
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) 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 FOKUS Chemistry (2011)	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) FOKUS Chemie - 2011	page 18 / 53

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)

Module title		Abbreviation
Organic Chemistry 3		o8-OC3-102-m01
Module coordinator		Module offered by
holder of the Professorship of Organic Chemistry		Institute of Organic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
15	numerical 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
Duration	Module level	Other prerequisites
1 semester	undergraduate	By way of exception, additional prerequisites are listed in the section on assessments.
<b>Contents</b>		
<p>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.</p>		
<b>Intended learning outcomes</b>		
<p>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.</p>		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
<p>This module comprises 2 module components. Information on courses will be listed separately for each module component.</p> <ul style="list-style-type: none"> <li>o8-OC3-1-102: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>o8-OC3-2-102: P (no information on SWS (weekly contact hours) and course language available)</li> </ul>		
<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)		
<p>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.</p> <p><b>Assessment in module component o8-OC3-1-102: Organic Chemistry 3 Organic Chemistry 3</b></p> <ul style="list-style-type: none"> <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, English</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 absence).</li> </ul> <p><b>Assessment in module component o8-OC3-2-102: Organic Chemistry - lab 1</b></p> <ul style="list-style-type: none"> <li>9 ECTS, Method of grading: (not) successfully completed</li> </ul>		

<ul style="list-style-type: none"> <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, summer semester</li> <li>• Language of assessment: German, English</li> </ul>
<b>Allocation of places</b>
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<b>Additional information</b>
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<b>Workload</b>
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<b>Teaching cycle</b>
--
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)
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<b>Module appears in</b>
Bachelor' degree (1 major) Chemistry (2010)
Bachelor' degree (1 major) FOKUS Chemistry (2011)

Module title		Abbreviation
<b>Organic Chemistry 4</b>		o8-OC4-102-m01
Module coordinator		Module offered by
holder of the Chair of Organic Chemistry II		Institute of Organic Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
10	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	By way of exception, additional prerequisites are listed in the section on assessments.
<b>Contents</b>		
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.		
<b>Intended learning outcomes</b>		
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.		
<b>Courses</b> (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. <ul style="list-style-type: none"> <li>o8-OC4-1-102: V + Ü (no information on SWS (weekly contact hours) and course language available)</li> <li>o8-OC4-2-102: P (no information on SWS (weekly contact hours) and course language available)</li> </ul>		
<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)		
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.		
<b>Assessment in module component o8-OC4-1-102: Organic Chemistry 4 Organic Chemistry 4</b> <ul style="list-style-type: none"> <li>5 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> <li>Only after successful completion of module components: o8-OC1 or o8-OC1-GHR</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 absence).</li> </ul> <b>Assessment in module component o8-OC4-2-102: Organic Chemistry - advanced laboratory course for students of chemistry</b> <ul style="list-style-type: none"> <li>5 ECTS, Method of grading: (not) successfully completed</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> </ul>		

<ul style="list-style-type: none"> <li>Only after successful completion of module components: o8-OC3 (module component o8-OC3-2 only) or o8-OC3P</li> </ul>
<b>Allocation of places</b>
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<b>Additional information</b>
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<b>Workload</b>
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<b>Teaching cycle</b>
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)
§ 62 (1) 2. Chemie "Organische und Bioorganische Chemie"
<b>Module appears in</b>
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)

## Physical and Theoretical Chemistry

(38 ECTS credits)



Module title		Abbreviation
Physical Chemistry 1		o8-PC1-092-m01
Module coordinator		Module offered by
lecturer of lecture "Grundlagen der Quantenmechanik and Spektroskopie" (Principles of Quantum Mechanics and Spectroscopy)		Institute of Physical and Theoretical Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
8	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 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 learning outcomes		
Students are able to explain key models of quantum mechanics and to apply them to molecules. They are able to describe different spectroscopic methods. In addition, students know how to apply the mathematical bases of quantum mechanics.		
Courses (type, number of weekly contact hours, language — if other than German)		
V + Ü + V + Ü (no information on SWS (weekly contact hours) and course language available)		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)		
Allocation of places		
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Additional information		
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Workload		
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Teaching cycle		
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Referred to in LPO I (examination regulations for teaching-degree programmes)		
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Module appears in		
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 major FOKUS Chemistry (2011)	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) FOKUS Chemie - 2011	page 25 / 53

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)

Module title			Abbreviation
Physical Chemistry 2: Thermodynamics, Kinetics, Electrochemistry			o8-PC2-092-m01
Module coordinator		Module offered by	
lecturer of lecture "Thermodynamik, Kinetik, Elektrochemie"		Institute of Physical and Theoretical Chemistry	
ECTS	Method of grading	Only after succ. compl. of module(s)	
18	numerical 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 introduces students to the principles of thermodynamics. It focuses on the laws of thermodynamics, chemical equilibria, ideal and real gasses/solutions/mixed phases and electrochemistry. In addition to thermodynamic processes, it discusses the fundamental principles of kinetics. 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.			
Intended learning outcomes			
Students are able to explain the laws of thermodynamics. They are able to describe thermodynamic aspects of solutions, gases, mixed phases and electrochemical reactions. Students are able to interpret the kinetic aspects of chemical reactions. They are able to connect the theoretical principles of thermodynamics, kinetics, electrochemistry and spectroscopy with practical laboratory experiments. They are able to analyse the resulting measurements.			
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. <ul style="list-style-type: none"><li>o8-PC2-2-092: P (no information on SWS (weekly contact hours) and course language available)</li><li>o8-PC2-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)</li></ul>			
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.			
<b>Assessment in module component o8-PC2-2-092:</b> Physical Chemistry (lab) <ul style="list-style-type: none"><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></ul>			
<b>Assessment in module component o8-PC2-1-092:</b> Thermodynamics, Kinetics, Electrochemistry Thermodynamics, Kinetics, Electrochemistry <ul style="list-style-type: none"><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 absence).</li></ul>			

<b>Allocation of places</b>
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<b>Additional information</b>
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<b>Workload</b>
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<b>Teaching cycle</b>
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)
§ 62 (1) 1. Chemie "Allgemeine und Anorganische Chemie"; "Physikalische und Analytische Chemie"
<b>Module appears in</b>
Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) FOKUS Chemistry (2011)

Module title			Abbreviation
Physical and Theoretical Chemistry 3: Symmetry and Quantum Chemistry			o8-PC3-092-m01
Module coordinator		Module offered by	
lecturer of lecture "Quantenchemie"		Institute of Physical and Theoretical Chemistry	
ECTS	Method of grading	Only after succ. compl. of module(s)	
6	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 discusses the fundamental principles of quantum chemistry and symmetry in chemistry.			
Intended learning outcomes			
Students have become familiar with the fundamental principles of quantum chemistry and symmetry in chemistry and are able to apply the knowledge they have developed.			
Courses (type, number of weekly contact hours, language — if other than German)			
V + Ü + 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: 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)			
Allocation of places			
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Additional information			
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Workload			
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Teaching cycle			
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Referred to in LPO I (examination regulations for teaching-degree programmes)			
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Module appears in			
Bachelor' degree (1 major) Biochemistry (2013) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Mathematics (2012) Bachelor' degree (1 major) Mathematics (2013) Bachelor' degree (1 major) Computational Mathematics (2009) Bachelor' degree (1 major) Computational Mathematics (2012) Bachelor' degree (1 major) Computational Mathematics (2013) Bachelor' degree (1 major) FOKUS Chemistry (2011) First state examination for the teaching degree Grundschule Chemistry (2009) First state examination for the teaching degree Hauptschule Chemistry (2009)			
Bachelor's with 1 major FOKUS Chemistry (2011)		JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) FOKUS Chemie - 2011	page 29 / 53

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

Module title			Abbreviation
Physical Chemistry 4: Statistical Thermodynamics			o8-PC4-092-m01
Module coordinator		Module offered by	
lecturer of lecture "Statistische Thermodynamik"		Institute of Physical and Theoretical Chemistry	
ECTS	Method of 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 unexcused absence).	
Contents			
This module discusses the fundamental principles of statistical thermodynamics.			
Intended learning outcomes			
Students have become familiar with the fundamental principles of statistical thermodynamics and are able to apply the knowledge they have developed.			
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			
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Additional information			
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Workload			
--			
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) 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 state examination for the teaching degree Realschule Chemistry (2009) First state examination for the teaching degree Gymnasium Chemistry (2009) First state examination for the teaching degree Mittelschule Chemistry (2013)			

Module title		Abbreviation
Theoretical Models in Chemistry		o8-TC-092-m01
Module coordinator		Module offered by
lecturer of lecture "Quantenchemie"		Institute of Physical and Theoretical Chemistry
ECTS	Method of 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 unexcused 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 H <sub>2</sub> <sup>+</sup> .		
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, 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		
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Additional information		
--		
Workload		
--		
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) 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)		



## Basics of Natural Sciences

(21 ECTS credits)

Module title		Abbreviation
Biochemistry		o8-BC-o92-m01
Module coordinator		Module offered by
holder of the Chair of Biochemistry		Chair of Biochemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
6	numerical grade	--
Duration	Module level	Other prerequisites
2 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		
Comprising lectures and exercises, this module acquaints students with the fundamental principles of biochemistry.		
Intended learning outcomes		
Students have become familiar with the fundamental principles of biochemistry. They are able to describe the key biochemical processes in cellular systems.		
Courses (type, number of weekly contact hours, language — if other than German)		
V + Ü + 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		
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Additional information		
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Workload		
--		
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) 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
Mathematics for students in Chemistry and Biology		10-M-MCB-101-m01
Module coordinator		Module offered by
Dean of Studies Mathematik (Mathematics)		Institute of Mathematics
ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	Registration for the exercise must be made via SB@home at the beginning 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 assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew and have to register anew, too.
Contents		
Functional relations, differentiation and integration of functions in one variable, curve sketching, differentiation of functions in several variables, power series, ordinary differential equations, systems of linear equations, basic notions in statistics.		
Intended learning outcomes		
The student is able to recognise and phrase simple questions from natural sciences as mathematical problems, apply basic mathematical methods to them and interpret the results.		
Courses (type, number of weekly contact hours, language — if other than German)		
V + 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)		
written examination (approx. 90 to 120 minutes)		
Allocation of places		
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Additional information		
--		
Workload		
--		
Teaching cycle		
--		
Referred to in LPO I (examination regulations for teaching-degree programmes)		
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Module appears in		
Bachelor' degree (1 major) Biochemistry (2011) Bachelor' degree (1 major) Biochemistry (2009) Bachelor' degree (1 major) Biology (2011)		
Bachelor's with 1 major FOKUS Chemistry (2011)	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) FOKUS Chemie - 2011	page 35 / 53

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)

Module title			Abbreviation
Introduction to Physics for Students of Non-physics-related Minor Subjects			11-EFNF-072-m01
Module coordinator		Module offered by	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	Method of grading	Only after succ. compl. of module(s)	
7	numerical grade	--	
Duration	Module level	Other prerequisites	
2 semester	undergraduate	--	
Contents			
Mechanics, vibration theory, thermodynamics, optics, science of electricity, Atomic and Nuclear Physics.			
Intended learning outcomes			
The students have knowledge of the principles of Physics.			
Courses (type, number of weekly contact hours, language — if other than German)			
V + V (no information on SWS (weekly contact hours) and course language available)			
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)			
written examination (approx. 120 minutes)			
Allocation of places			
Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.			
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) Biochemistry (2011) Bachelor' degree (1 major) Biochemistry (2013) Bachelor' degree (1 major) Biochemistry (2009) Bachelor' degree (1 major) Biology (2011) Bachelor' degree (1 major) Biology (2007) Bachelor' degree (1 major) Biology (2010) Bachelor' degree (1 major) Chemistry (2007) Bachelor' degree (1 major) Chemistry (2008) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Geography (2007) Bachelor' degree (1 major) Geography (2008) Bachelor' degree (1 major) Geography (2010) Bachelor' degree (1 major) Computer Science (2007) Bachelor' degree (1 major) Computer Science (2014) Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Food Chemistry (2009) Bachelor' degree (1 major) Mathematics (2008)			
Bachelor's with 1 major FOKUS Chemistry (2011)		JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) FOKUS Chemie - 2011	
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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) FOKUS Chemistry (2011)

Module title			Abbreviation
Practical Course Physics for Students of Non-physics-related Minor Subjects			11-PFNF-072-m01
Module coordinator		Module offered by	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	Method of grading	Only after succ. compl. of module(s)	
3	(not) successfully completed	--	
Duration	Module level	Other prerequisites	
1 semester	undergraduate	--	
Contents			
Mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance, Atomic and Nuclear Physics.			
Intended learning outcomes			
The students have knowledge of the principles of Physics.			
Courses (type, number of weekly contact hours, language — if other than German)			
P (no information on SWS (weekly contact hours) and course language available)			
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)			
a) oral test (approx. 15 minutes) during experiment and b) ungraded written examination (approx. 90 minutes)			
Allocation of places			
Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.			
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) Biochemistry (2011) Bachelor' degree (1 major) Biochemistry (2013) Bachelor' degree (1 major) Biochemistry (2009) Bachelor' degree (1 major) Biology (2011) Bachelor' degree (1 major) Biology (2007) Bachelor' degree (1 major) Biology (2010) Bachelor' degree (1 major) Chemistry (2007) Bachelor' degree (1 major) Chemistry (2008) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Geography (2007) Bachelor' degree (1 major) Geography (2008) Bachelor' degree (1 major) Geography (2010) Bachelor' degree (1 major) Computer Science (2007) Bachelor' degree (1 major) Computer Science (2014) Bachelor' degree (1 major) Computer Science (2010) Bachelor' degree (1 major) Food Chemistry (2009)			
Bachelor's with 1 major FOKUS Chemistry (2011)		JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) FOKUS Chemie - 2011	
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Bachelor' degree (1 major) Biomedicine (2009)  
Bachelor' degree (1 major) Biomedicine (2013)  
Bachelor' degree (1 major) FOKUS Chemistry (2011)



## Scientific Discussion

(5 ECTS credits)

Module title		Abbreviation
Scientific Discussion		o8-WD-FOKUS-112-m01
Module coordinator		Module offered by
degree programme coordinator FOKUS Chemie (Chemistry)		Faculty of Chemistry and Pharmacy
ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	Where applicable, specific modules/module components as specified by supervisor (cf. Section 12 Subsection 4 FSB (subject-specific provisions)).
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
<b>Contents</b>		
This module gives students the opportunity to deliver presentations on and discuss topics in a range of research fields.		
<b>Intended learning outcomes</b>		
Students are able to present scientific information in a manner that is tailored to their target group as well as to discuss topical research problems.		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
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) oral examination of one candidate each (approx. 45 minutes) or b) 2 oral examinations of one candidate each (approx. 30 minutes each) or c) 3 oral examinations of one candidate each (approx. 20 minutes each) Language of assessment: German, English		
<b>Allocation of places</b>		
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<b>Additional information</b>		
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<b>Workload</b>		
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<b>Teaching cycle</b>		
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)		
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<b>Module appears in</b>		
Bachelor' degree (1 major) FOKUS Chemistry (2011)		

# Thesis

(10 ECTS credits)

Module title		Abbreviation
Bachelor Thesis FOKUS Chemistry		o8-BA-FOKUS-112-mo1
Module coordinator		Module offered by
head of the research group offering the module		Chair of Biochemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
10	numerical grade	Where applicable, specific modules/module components as specified by supervisor (cf. Section 15 Subsection 2 FSB (subject-specific provisions)).
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
<b>Contents</b>		
This module gives students the opportunity to research and write on a defined problem within a given time frame and using the scientific methods they have learned during the programme.		
<b>Intended learning outcomes</b>		
Students are able to conduct research on a defined problem/topic, adhering to the principles of good scientific practice, and to present the results of their work in written form.		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
no courses assigned		
<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)		
written thesis (approx. 40 pages) Language of assessment: German, English		
<b>Allocation of places</b>		
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<b>Additional information</b>		
Additional information on module duration: 8 weeks.		
<b>Workload</b>		
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<b>Teaching cycle</b>		
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)		
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<b>Module appears in</b>		
Bachelor' degree (1 major) FOKUS Chemistry (2011)		

## Subject-specific Key Skills

(17 ECTS credits)

## Compulsory Courses

(8 ECTS credits)

Module title		Abbreviation
Toxicology and legal studies		03-TR-072-m01
Module coordinator		Module offered by
lecturer of lecture "Toxikologie und Rechtskunde"		Faculty of Medicine
ECTS	Method of grading	Only after succ. compl. of module(s)
3	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
<b>Contents</b>		
Basics of legal regulations for chemists (handling and transportation of hazardous materials), fundamentals of toxicology.		
<b>Intended learning outcomes</b>		
The students master the basics of legal regulations for chemists (handling and transport of hazardous substances) as well as the fundamentals of toxicology.		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
V + V (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)		
written examination (approx. 90 minutes)		
<b>Allocation of places</b>		
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<b>Additional information</b>		
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<b>Workload</b>		
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<b>Teaching cycle</b>		
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)		
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<b>Module appears in</b>		
Bachelor' degree (1 major) Biochemistry (2011) Bachelor' degree (1 major) Biochemistry (2013) Bachelor' degree (1 major) Biochemistry (2009) Bachelor' degree (1 major) Chemistry (2007) Bachelor' degree (1 major) Chemistry (2008) Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) Chemistry (2009) Bachelor' degree (1 major) Food Chemistry (2009) Bachelor' degree (1 major) FOKUS Chemistry (2011) Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Chemistry (2014) First state examination for the teaching degree Grundschule Chemistry (2009) First state examination for the teaching degree Hauptschule Chemistry (2009) First state examination for the teaching degree Realschule Chemistry (2009) First state examination for the teaching degree Gymnasium Chemistry (2009)		
Bachelor's with 1 major FOKUS Chemistry (2011)	JMU Würzburg • generated 26-Aug-2024 • exam. reg. data record Bachelor (180 ECTS) FOKUS Chemie - 2011	page 47 / 53

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



Module title		Abbreviation
Programming course for Chemistry Major		o8-PKC-102-m01
Module coordinator		Module offered by
lecturer of lecture "Programmierkurs für Chemiker"		Institute of Physical and Theoretical Chemistry
ECTS	Method of grading	Only after succ. compl. of module(s)
5	(not) successfully completed	--
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 an introduction to the fundamentals of a programming language and discusses how they can be applied to problems in chemistry.		
Intended learning outcomes		
Students are able to describe the fundamentals of the programming language and to apply them to problems in chemistry.		
Courses (type, number of weekly contact hours, language — if other than German)		
S + 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)		
practical examination: completion of programming exercises and oral description of algorithms used Language of assessment: German, English		
Allocation of places		
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Additional information		
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Workload		
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Teaching cycle		
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Referred to in LPO I (examination regulations for teaching-degree programmes)		
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Module appears in		
Bachelor' degree (1 major) Chemistry (2010) Bachelor' degree (1 major) FOKUS Chemistry (2011) Bachelor' degree (1 major) Functional Materials (2012)		

## Compulsory Electives

(9 ECTS credits)

Module title		Abbreviation
Advanced research lab course		o8-FOP-112-m01
Module coordinator		Module offered by
head of the research group offering the module		Faculty of Chemistry and Pharmacy
ECTS	Method of grading	Only after succ. compl. of module(s)
9	(not) successfully completed	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
<b>Contents</b>		
This module gives students the opportunity to explore a research topic and apply the methods commonly used in the discipline in question.		
<b>Intended learning outcomes</b>		
Students are able to explore a specific research topic and present the results of their work in a written report or oral presentation.		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
P (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)		
talk (approx. 15 minutes) or written report (approx. 10 to 20 pages) Language of assessment: German, English		
<b>Allocation of places</b>		
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<b>Additional information</b>		
Additional information on module duration: 8 weeks.		
<b>Workload</b>		
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<b>Teaching cycle</b>		
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)		
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<b>Module appears in</b>		
Bachelor' degree (1 major) FOKUS Chemistry (2011)		

Module title		Abbreviation
FOKUS Foreign Studies		o8-FAP-112-m01
Module coordinator		Module offered by
degree programme coordinator FOKUS Chemie (Chemistry)		Faculty of Chemistry and Pharmacy
ECTS	Method of grading	Only after succ. compl. of module(s)
9	(not) successfully completed	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
<b>Contents</b>		
Practical course to be completed at universities abroad. Students may complete this course in the context of exchange programmes such as Erasmus etc. The contents of the course should correspond to the contents of a lab course offered in the context of the Bachelor's programme in Chemistry (180 ECTS credits); please consult with the competent coordinator in advance.		
<b>Intended learning outcomes</b>		
Students are familiar with procedures and processes used at universities in countries other than Germany. They have acquired subject-specific skills as well as language and interpersonal skills.		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
P (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)		
talk (approx. 15 minutes) or written report (approx. 10 to 20 pages) Language of assessment: German, English		
<b>Allocation of places</b>		
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<b>Additional information</b>		
Additional information on module duration: 8 weeks.		
<b>Workload</b>		
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<b>Teaching cycle</b>		
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)		
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<b>Module appears in</b>		
Bachelor' degree (1 major) FOKUS Chemistry (2011)		

Module title		Abbreviation
FOKUS Industrial work experience		o8-FIP-112-m01
Module coordinator		Module offered by
degree programme coordinator FOKUS Chemie (Chemistry)		Faculty of Chemistry and Pharmacy
ECTS	Method of grading	Only after succ. compl. of module(s)
9	(not) successfully completed	--
Duration	Module level	Other prerequisites
1 semester	undergraduate	--
Contents		
A placement in industry. The contents of the placement should correspond to the contents of a lab course offered in the context of the Bachelor's programme in Chemistry (180 ECTS credits); please consult with the competent coordinator in advance.		
Intended learning outcomes		
Students are familiar with procedures and processes used in industry. They have developed both subject-specific and interpersonal skills.		
Courses (type, number of weekly contact hours, language — if other than German)		
P (no information on SWS (weekly contact hours) and course language available)		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
talk (approx. 15 minutes) or written report (approx. 10 to 20 pages) Language of assessment: German, English		
Allocation of places		
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Additional information		
Additional information on module duration: 8 weeks.		
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) FOKUS Chemistry (2011)		