Module Catalogue
for the Subject
Chemistry
as vertieft studiertes Fach (studied with a focus on the scientific discipline)
with the degree "Erste Staatsprüfung für das Lehramt an Gymnasien"

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

The subject is divided into

Abbreviations used, Conventions, Notes, In accordance with

### Scientific Discipline

#### Compulsory Courses

- Principles of Inorganic Chemistry
- Concepts of Inorganic Chemistry
- Inorganic and Analytical Chemistry (lab) (teaching degree)
- Inorganic Chemistry of the Elements
- Solid State Chemistry
- Organic Chemistry 1
- Organic Chemistry 2
- Organic Chemistry - laboratory course (teaching degree for secondary schools)
- Organic Chemistry 4
- Practical spectroscopy 1
- Thermodynamics, Kinetics, Electrochemistry
- Molecular structure and spectroscopy
- Physical Chemistry lab (teaching degree)
- Praktikum der Physik für Lehramt Gymnasium
- Biochemistry 1
- Practical Research Course for Grammar School Teachers
- Exercises in Experimental Presentation, Intermediate School

#### Teaching

#### Compulsory Courses

- Introduction into Teaching Chemistry for High School
- Teaching Chemical Practice for High School

### Paper

- Internship at High Schools

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

#### Chemistry

- Practical spectroscopy 2
- Elemental Organic Chemistry
- Organic Chemistry 3
- Quantum Chemistry
- Symmetry, chemical bonding and light - Part 1
- Toxicology and legal studies
- Basic Mathematics
- Training for Exams in Inorganic Chemistry
- Training for Exams in Organic Chemistry
- Training for Exams in Chemistry Teaching for High School Teachers
- Instructions for Scientific Research
- Chemistry SchoolLabs
- Collecting Data with CASSY System
- Microscale Experiments in Chemistry Teaching
- Out-Of-School Education
- W- and P-Seminars in High Schools

#### Paper

- Final Thesis according to § 29 LPO I in Chemistry for High School Teachers
The subject is divided into

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<td>Paper</td>
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<td>48</td>
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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:

LASPO2015

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

8-Sep-2015 (2015-126)

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.
Scientific Discipline
(92 ECTS credits)
Compulsory Courses
(92 ECTS credits)
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Principles of Inorganic Chemistry</td>
<td>08-AC1-152-m01</td>
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<td>lecturer of lecture &quot;Experimentalchemie&quot; (Experimental Chemistry)</td>
<td>Institute of Inorganic Chemistry</td>
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**Contents**

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

**Intended learning outcomes**

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

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

V (4) + V (2)

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

**Allocation of places**

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**Additional information**

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

§ 42 I Nr. 1 and § 22 II Nr. 1 h)

§ 62 I Nr. 1
Module title: Concepts of Inorganic Chemistry
Abbreviation: 08-AC-KAC-152-m01

Module coordinator:

Concepts of Inorganic Chemistry (Concepts of Anorganic Chemistry)

Module offered by:
Institute of Inorganic Chemistry

ECTS: 5

Method of grading:
Numerical grade

Only after succ. compl. of module(s):
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Duration:
1 semester

Module level:
Undergraduate

Other prerequisites:
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Contents:
The module provides an introduction to atoms and the MO theory. Topics are the orbital model, the VSEPR theory, and the valence bond theory. Further focuses are redox reactions, acids and bases, and electrochemistry.

Intended learning outcomes:
The student is able to outline the bonding situation and the structure of simple molecules based on different basic theories. He/She can assign oxidation numbers to atoms in chemical compounds and knows different acid-base concepts.

Courses:
(V (1) + Ü (2))

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

Allocation of places:
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Additional information:
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Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 42 I Nr. 1
§ 62 I Nr. 1
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**Module coordinator**
holder of the Chair of Anorganic Chemistry

**Module offered by**
Institute of Inorganic Chemistry

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**Contents**
The module provides the opportunity to apply the knowledge of the introductory lectures in a practical course. After a safety introduction the students experiment independently in the laboratory. Focuses are laboratory safety, basic laboratory techniques, synthesis of basic compounds and analysis of an unknown compound.

**Intended learning outcomes**
The student is able to identify basic chemical issues and to solve them experimentally. Therefore he/she can carry out the necessary stoichiometric calculations and correctly outline the chemical processes written and verbal.

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

| P (12) |

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

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)
Assessment offered: Once a year, summer semester
Language of assessment: German and/or English

**Allocation of places**
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**Additional information**
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**Referred to in LPO I**
(examination regulations for teaching-degree programmes)

§ 42 I Nr. 1
§ 62 I Nr. 1
Inorganic Chemistry of the Elements

Module title

Abbreviation: 08-AS1-152-m01

Module coordinator

Inorganic Chemistry of the Elements

Module offered by

Institute of Inorganic Chemistry

ECTS

Method of grading

Only after succ. compl. of module(s)

Duration

Module level

Other prerequisites

Contents

German contents available but not translated yet.


Intended learning outcomes

German intended learning outcomes available but not translated yet.


Courses

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

V (2) + V (2)

Method of assessment

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

Allocation of places

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Additional information

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

§ 62 I Nr. 1
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**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Der/Die Studierende kann die Struktur und Eigenschaften von Metallen, Legierungen und salzartigen Verbindungen fachgerecht darstellen. Er/Sie ist in der Lage, diese zu systematisieren und in Bezug auf Struktur und Reaktivität zu charakterisieren.

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

V (2)

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

**Allocation of places**

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**Additional information**

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

§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 62 I Nr. 1
Module title  |  Abbreviation
---|---
Organic Chemistry 1 | 08-OC1-152-m01

Module coordinator  |  Module offered by
holder of the Professorship of Organic Chemistry | Institute of Organic Chemistry

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Duration  | Module level  | Other prerequisites |
1 semester  | undergraduate | -- |

Contents

German contents available but not translated yet.

Das Modul bietet einen Überblick über die elementaren Grundkenntnisse der organischen Chemie. Dazu wird die Bindungssituation am Kohlenstoff betrachtet und in die Nomenklatur einfacher und mäßig komplexer organischer Verbindungen eingeführt. Es werden Grundlagen der Stereochemie, Substitutions-, Additions- und Eliminierungsreaktionen sowie der Syntheseplanung vermittelt.

Intended learning outcomes

German intended learning outcomes available but not translated yet.


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

V (3) + Ü (1)

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

Allocation of places

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Additional information

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

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**Module coordinator**

holder of the Chair of Physically Organic Chemistry

**Module offered by**

Institute of Organic Chemistry

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**Duration**

1 semester undergraduate

**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


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

V (3) + Ü (1)

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

**Allocation of places**

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**Additional information**

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

§ 42 I Nr. 2 and § 22 II Nr. 1 h)

§ 62 I Nr. 2
Module title | Abbreviation
--- | ---
Organic Chemistry - laboratory course (teaching degree for secondary schools) | 08-OCP-LAGY-152-m01

Module coordinator | Module offered by
--- | ---
lecturers Organische Chemie (Organic Chemistry) | Institute of Organic Chemistry

ECTS | Method of grading | Only after succ. compl. of module(s)
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6 | (not) successfully completed | 08-OC1

Duration | Module level | Other prerequisites
--- | --- | ---
1 semester | undergraduate | --

Contents

German contents available but not translated yet.


Intended learning outcomes

German intended learning outcomes available but not translated yet.


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

P (9)

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

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)
Assessment offered: Once a year, summer semester
Language of assessment: German and/or English

Allocation of places

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Additional information

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

§ 62 I Nr. 2
### Module title

Organic Chemistry 4

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### Module coordinator

holder of the Chair of Organic Chemistry II

### Module offered by

Institute of Organic Chemistry

### ECTS

5

### Method of grading

Only after succ. compl. of module(s)

### Module level

undergraduate

### Other prerequisites

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### Contents

German contents available but not translated yet.

Das Modul behandelt biologisch wichtige Verbindungsklassen, deren Reaktionen und Synthesen, den Umgang mit besonderen Gefahrstoffen, anspruchsvollere Arbeits- und Synthesetechniken, Reinigungsmethoden und Produktaanalytik.

### Intended learning outcomes

German intended learning outcomes available but not translated yet.


### Courses

V (2) + Ü (2)

### Method of assessment

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

### Allocation of places

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### Additional information

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### Referred to in LPO I

( examination regulations for teaching-degree programmes)

- § 22 II Nr. 1 h)
- § 22 II Nr. 2 f)
- § 62 I Nr. 2
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<td>Practical spectroscopy 1</td>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
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**Contents**

German contents available but not translated yet.

Das Modul führt in die spektroskopischen Methoden der Infrarotspektroskopie, Massenspektrometrie und NMR-Spektroskopie ein.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Die Studierenden können wichtige spektroskopische Methoden darstellen sowie ein Spektrum auswerten und Rückschlüsse auf die Molekülstruktur ziehen.

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

V (2)

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

- a) written examination (approx. 90 to 180 minutes) or
- b) oral examination of one candidate each (20 to 30 minutes) or
- c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or
- d) log (approx. 20 pages) or
- e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

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

§ 22 II Nr. 1 h)  
§ 22 II Nr. 2 f)  
§ 62 I Nr. 2
**Module title**  
Thermodynamics, Kinetics, Electrochemistry

**Abbreviation**  
08-PC-TKE-152-m01

**Module coordinator**  
Lecturer of lecture "Thermodynamik, Kinetik, Elektrochemie"

**Module offered by**  
Institute of Physical and Theoretical Chemistry

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**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Die Studierenden sind in der Lage, die Hauptsätze der Thermodynamik zu erklären. Er/Sie kann thermodynamische Aspekte von Lösungen, Gasen, Mischphasen sowie elektrochemischen Reaktionen darstellen. Die Studierenden können chemische Reaktionen auf kinetischer Ebene interpretieren.

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

V (4) + Ü (2)

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English creditable for bonus

**Allocation of places**

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**Additional information**

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

§ 62 I Nr. 1
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<td>Molecular structure and spectroscopy</td>
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<td>lecturer of lecture &quot;Molekülbau and Spektroskopie&quot;</td>
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**Contents**

The module provides an introduction to the fundamental basics of molecular structure, spectroscopy and quantum mechanics. Via the particle in a box model and a quantum mechanical view of the hydrogen atom one gets to atomic orbitals, molecular orbitals and a basic understanding of the chemical bond. Molecules are analyzed based on the harmonic oscillator and the rigid rotor models. Spectroscopical focuses are UV/Vis spectroscopy, vibrational spectroscopy and rotational spectroscopy.

**Intended learning outcomes**

The student is able to explain basic models of quantum mechanics and to apply them on molecules. He/She can outline different spectroscopical methods.

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

V (2) + Ü (2)

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English creditable for bonus

**Allocation of places**

--

**Additional information**

--

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

§ 62 I Nr. 1
## Physical Chemistry lab (teaching degree)

### Abbreviation
08-PCP-LA-152-m01

### Module coordinator
Lecturer of lecture "Thermodynamik, Kinetik, Elektrochemie"

### Module offered by
Institute of Physical and Theoretical Chemistry

### ECTS
3

### Method of grading
Only after succ. compl. of module(s)

### Duration
1 semester

### Module level
Undergraduate

### Other prerequisites
--

### Contents
German contents available but not translated yet.


### Intended learning outcomes
German intended learning outcomes available but not translated yet.


### Courses

<table>
<thead>
<tr>
<th>Type</th>
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<th>Language</th>
</tr>
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<tbody>
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### Method of assessment

- Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)
- Assessment offered: Once a year, winter semester
- Language of assessment: German and/or English

### Allocation of places
--

### Additional information
--

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

- § 42 I Nr. 1
- § 62 I Nr. 1
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Praktikum der Physik für Lehramt Gymnasium</td>
<td>08-PHP-LAGY-152-m01</td>
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<tr>
<td>Lecturers Physikalische Chemie (Physical Chemistry)</td>
<td>Institute of Physical and Theoretical Chemistry</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

**Contents**

This module deals with basic experiments in physics.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Der/Die Studierende kann grundlegende Versuche zur Physik planen, durchführen und auswerten.

**Courses**

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

P (3)

**Method of assessment**

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

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

Assessment offered: Once a year, summer semester

Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

§ 62 I Nr. 3
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<td>Biochemistry 1</td>
<td>08-BC1-152-m01</td>
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<td>1 semester</td>
<td>undergraduate</td>
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**Contents**

The module imparts the basic knowledge of biochemistry by lectures and tutorials. Main topics of the module Biochemistry 1 are particularly the biochemistry of proteins (amino acids, peptide bond, primary, secondary, tertiary and quaternary structure), catalytic strategies and enzyme kinetics, carbohydrate metabolism (glycolysis, gluconeogenesis, citric acid cycle, cellular respiration, photosynthesis), fatty acid metabolism (beta-oxidation, fatty acid synthesis), nucleotide metabolism, urea cycle and metabolism of amino acids. Additionally the module conveys basic knowledge about the structure of DNA and the basics of passing and transformation of genetic information (central dogma).

**Intended learning outcomes**

The student has basic knowledge in the covered subject areas of biochemistry. He/She is able to describe the basic biochemical processes in cellular systems.

**Courses**

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

V (2) + Ü (1)

**Method of assessment**

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

written examination (approx. 60 to 90 minutes)

**Allocation of places**

--

**Additional information**

--

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

§ 42 I Nr. 2
§ 62 I Nr. 2
<table>
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<th>Module title</th>
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<tbody>
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<td>Practical Research Course for Grammar School Teachers</td>
<td>08-Forsch-LAGY-152-m01</td>
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<td>Depending on their choice of topic, students who are writing their Hausarbeit (thesis) pursuant to Section 29 LPO I (examination regulations for teaching-degree programmes) in the vertieft studiertes Fach (subject studied with a focus on the scientific discipline) Chemie (Chemistry) are highly recommended to complete module 08-Forsch-LAGY directly before completing module 08-Ch-HA-GY.</td>
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</table>

**Contents**

The module enables the processing of a defined problem within a specified period by applying the scientific methods learned in the course of study.

**Intended learning outcomes**

The student has the ability to deal with a defined problem/issue using scientific methods and to document the results.

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

| P (16) |

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

| Log (approx. 20 pages) |
| Language of assessment: German and/or English |

**Allocation of places**

--

**Additional information**

--

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

§ 62 I Nr. 4
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<th>Module title</th>
<th>Abbreviation</th>
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<td>Exercises in Experimental Presentation, Intermediate School</td>
<td>08-ÜIVmD-LAGY-152-m01</td>
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<td>Lecturers of the three lectures offered in this module</td>
<td>Faculty of Chemistry and Pharmacy</td>
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**Contents**

German contents available but not translated yet.

Im Rahmen dieses Moduls werden von den Studierenden Vorträge mit Demonstrationen auf verschiedenen Gebieten der Chemie konzipiert, vorbereitet und präsentiert.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


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

Ü (3) + Ü (3) + Ü (3)

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

One talk each in the fields of inorganic, organic and physical chemistry including demonstrations (approx. 45 minutes each)

Assessment offered: Once a year, winter semester

Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

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

§ 62 I Nr. 5
Teaching
(10 ECTS credits)
Compulsory Courses
(10 ECTS credits)
<table>
<thead>
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<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Introduction into Teaching Chemistry for High School</td>
<td>08-FD1-LAGY-152-m01</td>
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**Module coordinator**
holder of the Professorship of Didactics of Chemistry

**Module offered by**
Institute of Inorganic Chemistry

<table>
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<th>Method of grading</th>
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**Duration**
2 semester

**Module level**
unknown

**Other prerequisites**
--

**Contents**
No information on contents available.

**Intended learning outcomes**
No information on intended learning outcomes available.

**Courses**
(type, number of weekly contact hours, language — if other than German)
V (2) + S (2)

**Method of assessment**
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
a) written examination (approx. 90 minutes) and b) presentation (approx. 20 minutes)
Language of assessment: German and/or English

**Allocation of places**
--

**Additional information**
--

**Referred to in LPO I**
(examination regulations for teaching-degree programmes)
§ 62 I Nr. 6
<table>
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<td>Teaching Chemical Practice for High School</td>
<td>08-FD2-LAGY-152-m01</td>
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<tr>
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<td>Institute of Inorganic Chemistry</td>
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**Contents**

No information on contents available.

**Intended learning outcomes**

No information on intended learning outcomes available.

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

S (2) + S (2)

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

a) written examination (approx. 60 minutes) and b) portfolio (approx. 15 pages)

Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

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

§ 62 I Nr. 6
Paper
(4 ECTS credits)

Students studying for a teaching degree Gymnasium must complete a practical training in didactics and teaching methodology (studienbegleitendes fachdidaktisches Praktikum) which refers to one of the subjects they selected as vertieft studierter Fach (subject studied with a focus on the scientific discipline) pursuant to Section 34 Subsection 1 No. 4 LPO I (examination regulations for teaching-degree programmes). The obligatory accompanying tutorial is offered by the respective subject. The ECTS credits obtained are counted in the subject Erziehungswissenschaften pursuant to Section 10 Subsection 3 LASPO (general academic and examination regulations for teaching-degree programmes).
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Internship at High Schools</td>
<td>08-Ch-SBPrakt-LAGY-152-m01</td>
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<td>Faculty of Chemistry and Pharmacy</td>
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**Contents**

No information on contents available.

**Intended learning outcomes**

No information on intended learning outcomes available.

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

P (0) + S (2)

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

written elaboration of teaching practice to be prepared at home (approx. 8 pages)

**Allocation of places**

--

**Additional information**

--

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

§ 34 I 1 Nr. 4
Freier Bereich (general as well as subject-specific electives) (0-15 ECTS credits)

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

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

(Freier Bereich (general as well as subject-specific electives) -- subject specific)
Module title: Practical spectroscopy 2
Abbreviation: 08-AC-Spec-152-m01

Module coordinator: lecturer of lecture "Praktische Spektroskopie 2"
Module offered by: Institute of Inorganic Chemistry

ECTS: 3
Method of grading: Only after succ. compl. of module(s)
Duration: 1 semester
Module level: undergraduate
Other prerequisites: --

Contents
German contents available but not translated yet.

Intended learning outcomes
German intended learning outcomes available but not translated yet.

Courses
(type, number of weekly contact hours, language — if other than German)
V (2)

Method of assessment
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)
Language of assessment: German and/or English

Allocation of places
--

Additional information
--

Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
Module title | Abbreviation
--- | ---
Elemental Organic Chemistry | 08-AC-ELO-152-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)
--- | --- | ---
5 | numerical grade | --

Duration | Module level | Other prerequisites
--- | --- | ---
1 semester | undergraduate | --

Contents

German contents available but not translated yet.

Das Modul vermittelt vertiefendes Wissen über Organometalle. Schwerpunkte sind Struktur und Eigenschaften, Spezielle Stoffklassen, Reaktivität und Technische Prozesse.

Intended learning outcomes

German intended learning outcomes available but not translated yet.

Der/Die Studierende kann die Struktur und Eigenschaften von Organometallen fachgerecht darstellen. Er/Sie ist in der Lage, diese zu systematisieren und in Bezug auf Struktur und Reaktivität zu charakterisieren. Zudem kann er/sie Syntheseprinzipien für elementorganische Verbindungen entwickeln und erklären.

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

V (2) + Ü (1)

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

- written examination (approx. 90 to 180 minutes)
- oral examination of one candidate each (20 to 30 minutes)
- oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)
- log (approx. 20 pages)
- presentation (approx. 30 minutes)

Language of assessment: German and/or English

Allocation of places

--

Additional information

--

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

§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
**Module title**  
Organic Chemistry 3

**Abbreviation**  
08-OC3-152-m01

**Module coordinator**  
holder of the Professorship of Organic Chemistry

**Module offered by**  
Institute of Organic Chemistry

**ECTS**  
6

**Method of grading**  
Only after succ. compl. of module(s)

**Numerical grade**  
--

**Duration**  
1 semester

**Module level**  
undergraduate

**Other prerequisites**  
--

**Contents**
The module focuses on polar rearrangements, olefination reactions, pericyclic reactions, carbenes, nitriles and radicals. It imparts basic knowledge of stereoselective synthesis, asymmetric catalysis, organometallic chemistry and retrosynthesis.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

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

V (2) + Ü (2)

**Method of assessment**

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

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

§ 22 II Nr. 1 h)  
§ 22 II Nr. 2 f)  
§ 22 II Nr. 3 f)
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<td>lecturer of lecture &quot;Quantenchemie&quot;</td>
<td>Institute of Physical and Theoretical Chemistry</td>
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</table>

### Contents

German contents available but not translated yet.


### Intended learning outcomes

German intended learning outcomes available but not translated yet.

Die Studierenden sind in der Lage, mit Hilfe grundlegender Konzepte und Modelle angeregte Zustände von Molekülen zu beschreiben.

### Courses

**V (2) + Ü (1)**

### Method of assessment

**a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)**

Language of assessment: German and/or English creditable for bonus

### Allocation of places

--

### Additional information

--

### Referred to in LPO I

(examination regulations for teaching-degree programmes)

§ 22 II Nr. 1 h)  
§ 22 II Nr. 2 f)  
§ 22 II Nr. 3 f)  

LA Gymnasien Chemistry (2015)  
JMU Würzburg • generated 03-Apr-2021 • exam.  
reg. data record Lehramt Gymnasien Chemie - 2015
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<td>Institute of Physical and Theoretical Chemistry</td>
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### Contents

The module provides an introduction to the symmetry of molecules. It focuses on group theory, symmetry operations, point groups, character tables, and selection rules. The module deals with the chemical bond based on the qualitative MO theory and gives an introduction into the basics of computational chemistry.

### Intended learning outcomes

The student is able to analyze the symmetry of molecules. He/She can imply on the spectroscopic properties of a molecule by its symmetry.

### Courses

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

V (3) + Ü (2)

### Method of assessment

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (20 to 30 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes)

Language of assessment: German and/or English

### Allocation of places

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### Additional information

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

§ 22 ll Nr. 1 h)
§ 22 ll Nr. 2 f)
§ 22 ll Nr. 3 f)
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<thead>
<tr>
<th>Module title</th>
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<td>Toxicology and legal studies</td>
<td>03-TR-152-m01</td>
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<tr>
<td>lecturer of lecture &quot;Toxikologie und Rechtskunde&quot;</td>
<td>Faculty of Medicine</td>
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<td>1 semester</td>
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**Contents**
Basics of legal regulations for chemists (handling and transportation of hazardous materials), fundamentals of toxicology.

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

**Courses** (type, number of weekly contact hours, language — if other than German)
V (1) + V (1)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
written examination (approx. 90 minutes)

**Allocation of places**
--

**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
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<td>Institute of Physical and Theoretical Chemistry</td>
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<td>undergraduate</td>
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**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Der/Die Studierende erlernt den Umgang mit mathematischen Methoden. Er/Sie ist in der Lage, diese auf konkrete Fragestellungen in der Chemie anzuwenden.

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

V (1) + Ü (1)

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

written exercises (approx. 20)

Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

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

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**Contents**
Repetition of relevant topics and work on selected state examination issues in Inorganic Chemistry.

**Intended learning outcomes**
The student is able to solve selected state examination issues of the previous years in Inorganic Chemistry.

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

| S (2) |

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

2 to 4 short talks on selected exercises (approx. 10 minutes each)
Language of assessment: German and/or English

**Allocation of places**
--

**Additional information**
--

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

§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
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**Module coordinator**

lecturer of the seminar

**Module offered by**

Faculty of Chemistry and Pharmacy

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**Contents**

Repetition of relevant topics and work on selected state examination issues in Organic Chemistry.

**Intended learning outcomes**

The student is able to solve selected state examination issues of the previous years in Organic Chemistry.

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

S (2)

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

4 to 8 short talks on selected assignments (approx. 10 minutes each)

Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

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

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§ 22 II Nr. 2 f)
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**Contents**

No information on contents available.

**Intended learning outcomes**

No information on intended learning outcomes available.

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

S (2)

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

talk on 3 selected assignments (approx. 30 minutes each)
Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

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

§ 22 II Nr. 3 f)
Module title | Abbreviation
---|---
Instructions for Scientific Research | 08-FD-WA-152-m01

Module coordinator | Module offered by
holder of the Professorship of Didactics of Chemistry | Institute of Inorganic Chemistry

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Contents
No information on contents available.

Intended learning outcomes
No information on intended learning outcomes available.

Courses (type, number of weekly contact hours, language — if other than German)
S (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
presentation (approx. 30 minutes)
Language of assessment: German and/or English

Allocation of places
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Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
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**Contents**

No information on contents available.

**Intended learning outcomes**

No information on intended learning outcomes available.

**Courses**

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

P (3)

**Method of assessment**

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

practical assignment (successful supervision of 2 sessions in learn-teach-lab, approx. 4 to 6 hours each)

Language of assessment: German and/or English

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

§ 22 II Nr. 1 h)
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### Contents

No information on contents available.

### Intended learning outcomes

No information on intended learning outcomes available.

### Courses

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### Method of assessment

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

- presentation of a project (approx. 30 minutes)
- Language of assessment: German and/or English

### Allocation of places

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### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)

- § 22 II Nr. 2 f)
- § 22 II Nr. 3 f)
- § 22 II Nr. 1 h)
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**Contents**

No information on contents available.

**Intended learning outcomes**

No information on intended learning outcomes available.

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

| S (2) |

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

project: presentation of a project (approx. 30 minutes)  
Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

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

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**Contents**

No information on contents available.

**Intended learning outcomes**

No information on intended learning outcomes available.

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

S (2)

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

project: presentation of a project (approx. 30 minutes)
Language of assessment: German and/or English

**Allocation of places**

--

**Additional information**

--

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

§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
**Module title**  
W- and P-Seminars in High Schools

**Abbreviation**  
08-FD-WP-152-m01

**Module coordinator**  
holders of the Professorships of Chemistry Teaching and Physics Teaching

**Module offered by**  
Institute of Inorganic Chemistry

**ECTS**  
2

**Method of grading**  
Only after succ. compl. of module(s)

**Duration**  
1 semester

**Module level**  
undergraduate

**Other prerequisites**  
--

**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Die Studierenden können W- und P-Seminare der gymnasialen Oberstufe eigenständig planen und durchführen.

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

S (2)

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

project: presentation of a project (approx. 30 minutes)

Language of assessment: German and/or English

**Allocation of places**  
--

**Additional information**  
--

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

§ 22 II Nr. 3 f)
Paper
(10 ECTS credits)

Preparation of a written Hausarbeit (thesis) in accordance with the provisions of Section 29 LPO I (examination regulations for teaching-degree programmes) is a prerequisite for teaching degree students to be admitted to the Erste Staatsprüfung (First State Examination). In accordance with the provisions of Section 29 LPO I, students studying for a teaching degree Gymnasium may write this thesis in one of the subjects they selected as vertieft studiertes Fach (subject studied with a focus on the scientific discipline) or in the subject Erziehungswissenschaften (Educational Science). Pursuant to Section 29 Subsection 1 Sentence 2 LPO I, students may also choose to write an interdisciplinary thesis.
**Module title**
Final Thesis according to § 29 LPO I in Chemistry for High School Teachers

**Abbreviation**
08-Ch-HA-GY-152-m01

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<td>head of the research group offering the module</td>
<td>Faculty of Chemistry and Pharmacy</td>
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<td>Depending on their choice of topic, students who are writing their Hausarbeit (thesis) pursuant to Section 29 LPO I (examination regulations for teaching-degree programmes) in the vertieft studiertes Fach (subject studied with a focus on the scientific discipline) Chemie (Chemistry) are highly recommended to complete module 08-Forsch-LAGY directly before completing module 08-Ch-HA-GY.</td>
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</table>

**Contents**

German contents available but not translated yet.

Selbstständige wissenschaftliche Bearbeitung eines gemäß § 29 LPO mit einer prüfungsberechtigen Dozentin/einem prüfungsberechtigten Dozenten vereinbarten Themas aus den Teilbereichen des Faches Chemie oder der Didaktik der Chemie.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

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

No courses assigned to module

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

Hausarbeit (thesis) pursuant to Section 29 LPO I (examination regulations for teaching-degree programmes) (30 to 50 pages)
Language of assessment: German; exceptions pursuant to Section 29 Subsection 4 LPO I (examination regulations for teaching-degree programmes)

**Allocation of places**

--

**Additional information**

--

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

§ 29