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
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## The subject is divided into

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<td>Paper</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)
# Module: Principles of Inorganic Chemistry

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<th>Module title</th>
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<td>Principles of Inorganic Chemistry</td>
<td>08-AC1-152-m01</td>
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<thead>
<tr>
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<th>Module level</th>
<th>Other prerequisites</th>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
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## Contents
Basics of general and anorganic chemistry.

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

Kenntnis der Grundlagen der Allgemeinen und Anorganischen Chemie

## Courses
<table>
<thead>
<tr>
<th>(type, number of weekly contact hours, language — if other than German)</th>
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<tbody>
<tr>
<td>V (4) + V (2)</td>
</tr>
</tbody>
</table>

## 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 Catalogue for the Subject Chemistry

## LA Gymnasien

### Module title
- **Concepts of Inorganic Chemistry**

### Abbreviation
- 08-AC-KAC-152-m01

### Module coordinator
- Lecturers of lecture "Konzepte der Anorganischen Chemie" (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)
- --

### Duration
- 1 semester

### Module level
- Undergraduate

### Other prerequisites
- --

## 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

- 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

- § 42 I Nr. 1
- § 62 I Nr. 1
### Module title

Inorganic and Analytical Chemistry (lab) (teaching degree)

### Abbreviation

08-ACP1-LA-152-m01

### Module coordinator

holder of the Chair of Anorganic Chemistry

### Module offered by

Institute of Inorganic Chemistry

### ECTS

7

### Method of grading

Only after succ. compl. of module(s)

### (not) successfully completed

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### Duration

1 semester

### Module level

undergraduate

### Other prerequisites

--

### 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
### Module Catalogue for the Subject Chemistry
LA Gymnasien

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<td>lecturer of lecture &quot;Chemie der Hauptgruppenelemente&quot; (Chemistry of Main-group Elements)</td>
<td>Institute of Inorganic 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.

Der/Die Studierende kann Hauptgruppenelemente und Übergangsmetall-Elemente hinsichtlich Struktur, Reaktivität und Herstellung charakterisieren. Er/Sie ist in der Lage, die Koordination der Atome zu erkennen und zu benennen. Zudem kann er/sie das Periodensystem als grundlegendes Werkzeug in der Chemie verwenden.

### 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
### Module title
Solid State Chemistry

### Abbreviation
08-AC-FK-152-m01

### Module coordinator
Lecturer of lecture "Festkörperchemie" (Solid State Chemistry)

### Module offered by
Institute of Inorganic Chemistry

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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.

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

Organic Chemistry 1

### Abbreviation

08-OC1-152-m01

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### Module coordinator

holder of the Professorship of Organic Chemistry

### Module offered by

Institute of Organic Chemistry

### ECTS

5

### Method of grading

Only after succ. compl. of module(s)

### Numerical grade

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### Duration

1 semester

### Module level

undergraduate

### Other prerequisites

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### 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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**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**

lecturers Organische Chemie (Organic Chemistry)

**Module offered by**

Institute of Organic Chemistry

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**Duration**

1 semester

**Module level**

undergraduate

**Method of grading**

Only after successfully completed 08-OC1

**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

P (9)

**Method of assessment**

Vor- und 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

Abbreviation
08-OC4-152-m01

Module coordinator
holder of the Chair of Organic Chemistry II

Module offered by
Institute of Organic Chemistry

ECTS
5

Method of grading
numerical grade

Only after succ. compl. of module(s)
--

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

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 Produktanalytik.

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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§ 22 II Nr. 2 f)
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<td>1 semester</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**

(V (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**

--

**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)
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<th>Module title</th>
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<td>Thermodynamics, Kinetics, Electrochemistry</td>
<td>08-PC-TKE-152-m01</td>
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<tr>
<td>lecturer of lecture &quot;Thermodynamik, Kinetik, Elektrochemie&quot;</td>
<td>Institute of Physical and Theoretical Chemistry</td>
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<tbody>
<tr>
<td>1 semester</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, 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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<tr>
<td>1 semester</td>
<td>undergraduate</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**

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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
<table>
<thead>
<tr>
<th><strong>Module title</strong></th>
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<tbody>
<tr>
<td>Physical Chemistry lab (teaching degree)</td>
<td>08-PCP-LA-152-m01</td>
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<tbody>
<tr>
<td>lecturer of lecture &quot;Thermodynamik, Kinetik, Elektrochemie&quot;</td>
<td>Institute of Physical and Theoretical Chemistry</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.


**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, winter semester
- 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)

- § 42 I Nr. 1
- § 62 I Nr. 1
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<td>Praktikum der Physik für Lehramt Gymnasium</td>
<td>08-PHP-LAGY-152-m01</td>
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<td>Physikalische Chemie (Physical Chemistry)</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>Chair of Biochemistry</td>
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</table>

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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<td>Practical Research Course for Grammar School Teachers</td>
<td>08-Forsch-LAGY-152-m01</td>
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<td>lecturer of the respective research group</td>
<td>Faculty of Chemistry and Pharmacy</td>
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<tr>
<td></td>
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<td>Depending on their choice of topic, students who are writing their Haus-arbeit (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
### Module title
Exercises in Experimental Presentation, Intermediate School

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>08-ÜIVmD-LAGY-152-m01</th>
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### Module coordinator
Lecturers of the three lectures offered in this module

### Module offered by
Faculty of Chemistry and Pharmacy

### ECTS
5

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

### (not) successfully completed
08-OCP-LAGY and 08-PCP-LA

### Duration
1 semester

### Module level
Undergraduate

### Other prerequisites
--

### 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
(3) + Ü (3) + Ü (3)

### Method of assessment
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
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### 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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<tr>
<td>Introduction into Teaching Chemistry for High School</td>
<td>08-FD1-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)

| 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**

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**Additional information**

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

§ 62 I Nr. 6
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<td>Teaching Chemical Practice for High School</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 studiertes 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).
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<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)
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<td>Practical spectroscopy 2</td>
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<td>lecturer of lecture &quot;Praktische Spektroskopie 2&quot;</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.


**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 Stuktur 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)

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

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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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<td>Organic Chemistry 3</td>
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<td>holder of the Professorship of Organic Chemistry</td>
<td>Institute of Organic Chemistry</td>
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</table>

**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)

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<th>Language</th>
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<td></td>
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<tr>
<td>Ü</td>
<td>(2)</td>
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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)

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)

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<td>§ 22 II Nr. 2 f)</td>
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<td>§ 22 II Nr. 3 f)</td>
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</table>
Module title
Quantum Chemistry

Abbreviation
08-TC-152-m01

Module coordinator
lecturer of lecture "Quantenchemie"

Module offered by
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 --

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 (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)
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)
§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
## Module title

**Symmetry, chemical bonding and light - Part 1**

**Abbreviation**

08-PC-SBL1-152-m01

## Module coordinator

Lecturer of lecture "Symmetrie, chemische Bindung und Licht"

## Module offered by

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 | --

## 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 II Nr. 1 h)  
§ 22 II Nr. 2 f)  
§ 22 II Nr. 3 f)
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<thead>
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<td>Faculty of Medicine</td>
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<td>1 semester</td>
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</table>

**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**
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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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§ 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>1 semester</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

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<thead>
<tr>
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<td>V (1) + Ü (1)</td>
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Method of assessment

<table>
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<th>if not every semester, information on whether module is creditable for bonus</th>
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</thead>
<tbody>
<tr>
<td>written exercises (approx. 20)</td>
<td>Language of assessment: German and/or English</td>
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Allocation of places

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Additional information

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Referred to in LPO I

(examination regulations for teaching-degree programmes)

--
## Module Catalogue for the Subject Chemistry

### LA Gymnasien

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<thead>
<tr>
<th>Module title</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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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

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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**
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**
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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)
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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
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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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**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)
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§ 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)**

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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)

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)

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**Module coordinator**

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**Duration**

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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)

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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)

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**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)

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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)

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)

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§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
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<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**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**

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**Additional information**

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**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

### Module coordinator
head of the research group offering the module

### Module offered by
Faculty of Chemistry and Pharmacy

### ECTS
10

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

### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
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.

### 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
No courses assigned to module

### Method of assessment
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
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### Additional information
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### Referred to in LPO I
§ 29