Module Catalogue
for the Subject
Chemistry
as Unterrichtsfach
with the degree "Erste Staatsprüfung für das Lehramt an Mittelschulen"

Examination regulations version: 2020 (Prüfungsordnungsversion 2015)
Responsible: Faculty of Chemistry and Pharmacy
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<tr>
<td>Paper</td>
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Content and Objectives of the Programme

The FOKUS master study program is a special course, which provides on the one hand short time study (only 8 semesters in a consecutive Bachelor and Master program) and on the other hand puts significant emphasis on early integration of research activities. This Master study program is embedded and financed through the »Elitenetzwerk Bayern« (ENB). The master course is especially preparing the students for their later scientific work in the field of Physics. Qualified graduates may pursue doctoral work (degree Dr. rer. nat.) at doctorate-granting institutions. The goal of the studies is it to mediate special knowledge on the most important subsections of the experimental and theoretical physics and to make the students familiar with the methods of scientific and physical thinking and working. By training of analytic thinking abilities the students acquire the ability to deal later with the various fields of applications and to compile the special knowledge obtained within the Bachelor programme. During the Master thesis the student should independently work on a new thematic and temporally limited experimental or theoretical engineering-scientific task in the field of experimental or theoretical physics using well-known procedures and scientific criteria.
Abbreviations used

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

Term: \textbf{SS} = summer semester, \textbf{WS} = winter semester

Methods of grading: \textbf{NUM} = numerical grade, \textbf{B/NB} = (not) successfully completed

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

Other: \textbf{A} = thesis, \textbf{LV} = course(s), \textbf{PL} = assessment(s), \textbf{TN} = participants, \textbf{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:

\textbf{LASPO2015}

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

\textbf{8-Sep-2015 (2015-129)}

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

(54 ECTS credits)
Compulsory Courses

(54 ECTS credits)
### Module title

**Principles of Inorganic Chemistry**

**Abbreviation**

08-AC1-152-m01

### Module coordinator

**Module offered by**

lecturer of lecture "Experimentalchemie" (Experimental Chemistry)

Institute of Inorganic Chemistry

### ECTS

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### Duration

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<th>Module level</th>
<th>Other prerequisites</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</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

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<th>(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)</th>
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<td>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)</td>
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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 | Lecturers of lecture "Konzepte der Anorganischen Chemie" (Concepts of Anorganic Chemistry)
Module offered by | Institute of Inorganic Chemistry

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<th>Numerical grade</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
</table>

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 (type, number of weekly contact hours, language — if other than German)
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
<table>
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<tr>
<td>Inorganic and Analytical Chemistry (lab) (teaching degree)</td>
<td>08-ACP1-LA-152-m01</td>
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**Module coordinator**

holder of the Chair of Anorganic Chemistry

**Module offered by**

Institute of Inorganic Chemistry

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<td>1 semester</td>
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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. Therefor 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 title
Organic Chemistry 1 (teaching degree for secondary schools)

### Abbreviation
08-OC1-LAGMR-152-m01

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

### Module offered by
Institute of Organic Chemistry

### ECTS
6

### Method of grading
numeral 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 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)

§ 42 I Nr. 2 and § 22 II Nr. 1 h)
Module title | Abbreviation
---|---
Organic Chemistry 2 | 08-OC2-VL-152-m01

Module coordinator | Module offered by
holder of the Chair of Physically Organic Chemistry | Institute of Organic 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.


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
<table>
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<td>Organic Chemistry - laboratory course (teaching degree for secondary schools)</td>
<td>08-OCP-LAGMR-152-m01</td>
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**Module coordinator**

lecturers Organische Chemie (Organic Chemistry)

**Module offered by**

Institute of Organic Chemistry

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**Duration**

1 semester

**Module level**

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 (7)

**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)

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<td>Physical Chemistry (teaching degree for secondary schools)</td>
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**Module coordinator**

lecturer of lecture "Thermodynamik, Kinetik, Elektrochemie für Studierende der Biologie, Lebensmittelechemie and des Lehramtes Chemie GHR"

**Module offered by**

Institute of Physical and Theoretical Chemistry

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**Duration**

1 semester undergraduate

**Contents**

This module deals with basics of thermodynamics, kinetics and electrochemistry.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

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<thead>
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<td>V (2) + Ü (1) + V (1) + Ü (1)</td>
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**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)

§ 42 I Nr. 1 and § 22 II Nr. 1 h)
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<td>Biochemistry 1</td>
<td>08-BC1-152-m01</td>
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<tbody>
<tr>
<td>holder of the Chair of Biochemistry</td>
<td>Chair of Biochemistry</td>
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<td>1 semester</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**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

§ 42 I Nr. 2
§ 62 I Nr. 2
### Module title

**Exercises in Experimental Presentation (teaching degree for secondary schools)**

**Abbreviation**

08-ÜiVmD-LAGMR-152-m01

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

### 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

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### Additional information

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### Referred to in LPO 1

(examination regulations for teaching-degree programmes)

§ 42 I Nr. 3
Teaching
(12 ECTS credits)
Compulsory Courses
(12 ECTS credits)
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<td>Introduction into Teaching Chemistry for Elementary, Secondary and Middle School</td>
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<tbody>
<tr>
<td>holder of the Professorship of Didactics of Chemistry</td>
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<tbody>
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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)

§ 42 I Nr. 4
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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) presentation with practical examination (approx. 30 minutes) and b) presentation (approx. 20 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)

§ 42 I Nr. 4 and § 36 I Nr. 7
§ 38 I Nr. 1
<table>
<thead>
<tr>
<th>Module title</th>
<th>Chemistry in Elementary and Secondary School</th>
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<tbody>
<tr>
<td>Abbreviation</td>
<td>08-FD3-LAGM-152-m01</td>
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<tr>
<td>Module coordinator</td>
<td>holder of the Professorship of Didactics of Chemistry</td>
</tr>
<tr>
<td>Module offered by</td>
<td>Institute of Inorganic Chemistry</td>
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<td>Duration</td>
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<tr>
<td>Module level</td>
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<tr>
<td>Method of grading</td>
<td>Only after succ. compl. of module(s)</td>
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<tr>
<td>No information on contents available.</td>
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<tr>
<td>No information on intended learning outcomes available.</td>
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<tr>
<td>Courses</td>
<td>S (2)</td>
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<tr>
<td>Method of assessment</td>
<td>presentation (approx. 20 minutes)</td>
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<tr>
<td>Language of assessment: German and/or English</td>
<td></td>
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<tr>
<td>Allocation of places</td>
<td>--</td>
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<tr>
<td>Additional information</td>
<td>--</td>
</tr>
<tr>
<td>Referred to in LPO I</td>
<td>§ 42 I Nr. 4 (examination regulations for teaching-degree programmes)</td>
</tr>
</tbody>
</table>

LA Mittelschulen Chemistry (2020 (Prüfungsordnungsversion 2015))
Paper
(4 ECTS credits)

Students studying for a teaching degree Mittelschule 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).
<table>
<thead>
<tr>
<th>Module title</th>
<th>Internship at Secondary Schools</th>
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<tbody>
<tr>
<td>Abbreviation</td>
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<tr>
<td>Module coordinator</td>
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<tr>
<td>Module offered by</td>
<td>Faculty of Chemistry and Pharmacy</td>
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<td>--</td>
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<td>Module level</td>
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<td>Intended learning outcomes</td>
<td>No information on intended learning outcomes available.</td>
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<tr>
<td>Courses</td>
<td>P (0) + S (2)</td>
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<td>Method of assessment</td>
<td>written elaboration of teaching practice to be prepared at home (approx. 8 pages)</td>
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<td>Allocation of places</td>
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<td>Additional information</td>
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<td>Referred to in LPO I</td>
<td>§ 34 I I Nr. 4</td>
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</table>
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".
Subject-specific Extra Skills

(ECTS credits)

(Freier Bereich (general as well as subject-specific electives) -- subject specific)
<table>
<thead>
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<tr>
<td>Practical spectroscopy 2</td>
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<tbody>
<tr>
<td>lecturer of lecture &quot;Praktische Spektroskopie 2&quot;</td>
<td>Institute of Inorganic 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.


**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)
- § 22 II Nr. 3 f)
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<td>Practical spectroscopy 1</td>
<td>08-OC-Spec-152-m01</td>
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<td>Institute of Organic Chemistry</td>
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<th>Other prerequisites</th>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
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</tr>
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</table>

**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**

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**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 Catalogue for the Subject Chemistry

### LA Mittelschulen

#### Module title
Solid State Chemistry

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

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>lecturer of lecture &quot;Festkörperchemie&quot; (Solid State Chemistry)</td>
<td>Institute of Inorganic Chemistry</td>
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<tbody>
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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 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

--

### 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. 1
### Module Catalogue for the Subject Chemistry
LA Mittelschulen

<table>
<thead>
<tr>
<th>Module title</th>
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<td>Elemental Organic Chemistry</td>
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<thead>
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<tbody>
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<td>lecturer of lecture &quot;Elementorganische Chemie&quot; (Elemental Organic Chemistry)</td>
<td>Institute of Inorganic Chemistry</td>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

### 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)

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
---|---
Organic Chemistry 3 | 08-OC3-152-m01

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

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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>--</td>
</tr>
</tbody>
</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)

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

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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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<th>Abbreviation</th>
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<td>Organic Chemistry 4</td>
<td>08-OC4-152-m01</td>
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**Module coordinator**

holder of the Chair of Organic Chemistry II

**Module offered by**

Institute of Organic Chemistry

<table>
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<th>Other prerequisites</th>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
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</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>(type, number of weekly contact hours, language — if other than German)</th>
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<td>V (2) + Ü (2)</td>
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**Method of assessment**

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<th>(type, scope, language — if other than German, examination offered — If not every semester, information on whether module is creditable for bonus)</th>
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<tbody>
<tr>
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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 | Quantum Chemistry
---|---
Abbreviation | 08-TC-152-m01

Module coordinator | lecturer of lecture "Quantenchemie"
Module offered by | Institute of Physical and Theoretical Chemistry

ECTS | 3
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.


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

--

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

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
--

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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<thead>
<tr>
<th>Module title</th>
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<tbody>
<tr>
<td>Toxicology and legal studies</td>
<td>03-TR-152-m01</td>
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**Module coordinator**

lecturer of lecture "Toxikologie und Rechtskunde"

**Module offered by**

Faculty of Medicine

<table>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>--</td>
</tr>
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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**

--

**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>Training for Exams in Inorganic Chemistry</td>
<td>08-PVAC-152-m01</td>
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**Module coordinator**

Lecturer of the seminar

**Module offered by**

Faculty of Chemistry and Pharmacy

<table>
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**Duration**

1 semester

**Module level**

Undergraduate

**Other prerequisites**

--

**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)
### Module Catalogue for the Subject Chemistry LA Mittelschulen

<table>
<thead>
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<td>Training for Exams in Organic Chemistry</td>
<td>08-PVOC-152-m01</td>
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<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>lecturer of the seminar</td>
<td>Faculty of Chemistry and Pharmacy</td>
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<tbody>
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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)

§ 22 II Nr. 1 h)
§ 22 II Nr. 2 f)
§ 22 II Nr. 3 f)
## Module Catalogue for the Subject Chemistry LA Mittelschulen

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Training for Exams in Chemistry Teaching for Elementary, Secondary and Middle School Teachers</td>
<td>08-FD-PVLAGMRS-152-m01</td>
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</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>holder of the Professorship of Didactics of Chemistry</td>
<td>Institute of Inorganic Chemistry</td>
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### ECTS | Method of grading | Only after succ. compl. of module(s) |
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<th></th>
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### Duration | Module level | Other prerequisites |
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<tbody>
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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. 1 h)
- § 22 II Nr. 2 f)
<table>
<thead>
<tr>
<th>Module title</th>
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<tbody>
<tr>
<td>Instructions for Scientific Research</td>
<td>08-FD-WA-152-m01</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)

**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**

--

**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)
<table>
<thead>
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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

--

### 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>Collecting Data with CASSY System</td>
<td>08-FD-CAS-152-m01</td>
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**Contents**

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**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)

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. 2 f)
§ 22 II Nr. 3 f)
§ 22 II Nr. 1 h)
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<td>Microscale Experiments in Chemistry Teaching</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)

**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)
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<td>Out-Of-School Education</td>
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**Module coordinator**
holder of the Professorship of Didactics of Chemistry

**Module offered by**
Institute of Inorganic Chemistry

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**Duration**
1 semester

**Module level**
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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)
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 Mittelschule may write this thesis in the subject Didaktik einer Fächergruppe der Mittelschule (Didactics of a Group of Subjects of Mittelschule), in the subject they selected as Unterrichtsfach (subject studied with a focus on the scientific discipline) or in the subject Erziehungswissenschaften (Educational Science). Pursuant to Section 29 Subsection 1 Sentence 2 LPO I, students may also choose to write an interdisciplinary thesis.
## Final Thesis according to § 29 LPO I in Chemistry for Secondary School Teachers

<table>
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### Module coordinator

- head of the research group offering the module

### ECTS

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### Duration

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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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### Contents

German contents available but not translated yet.

Selbständige wissenschaftliche Bearbeitung eines gemäß § 29 LPO mit einer prüfungsberechtigten 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.

Die Studierenden verfügen über folgende Kompetenzen:

- Fähigkeit zur Aufgabenbewältigung in einem vorgegebenen Zeitraum.
- Sprachkompetenz bzw. Fähigkeit, die erzielten Ergebnisse angemessen schriftlich aufzubereiten und zu präsentieren.

### Courses

No courses assigned to module

### Method of assessment

<table>
<thead>
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<th>Module offered by</th>
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<tbody>
<tr>
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<td>Faculty of Chemistry and Pharmacy</td>
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### Allocation of places

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### Additional information

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### Referred to in LPO I

§ 29