Module Catalogue
for the Subject
Food Chemistry
as a Bachelor’s with 1 major
with the degree "Bachelor of Science"
(180 ECTS credits)

Examination regulations version: 2021
Responsible: Faculty of Chemistry and Pharmacy
Responsible: Institute of Pharmacy and Food Chemistry
Contents

The subject is divided into 3
Content and Objectives of the Programme 4
Abbreviations used, Conventions, Notes, In accordance with 5
Compulsory Courses 6
  Mathematics for students in Chemistry and Biology 7
  General Biology of Economic Plants from Food and Forage 8
  Principles of Inorganic Chemistry 9
  Inorganic Chemistry 1 (lab) 10
  Introduction to Physics for Students of other Disciplines 11
  Laboratory Course Physics for Students of other Disciplines 12
  Inorganic Chemistry of the Elements 13
  Analytical Chemistry (lab) 14
  Physical Chemistry for Biology Majors 15
  Organic Chemistry 1 16
  Organic Chemistry 2 17
  Organic Chemistry - laboratory course for Food Chemistry students 18
  Chemometrics 19
  Toxicology and legal studies 20
  Biochemistry 1 21
  Biochemistry 2 22
  Introduction to Instrumental Analysis for Food Chemistry Students 23
  Instrumental Analysis for Food Chemistry Students 24
  Introduction to Food Chemistry 25
  Microbiology for Food Chemistry students 26
  Microbiology of Food and Hygiene for Food Chemistry Students 27
  Food Chemistry 28
  Practical Course in Food Chemistry 29
Key Skills Area 30
  General Key Skills 31
  Subject-specific Key Skills 32
    Subject-specific Key Skills, Compulsory Courses 33
      Analysis Strategies 34
      Quality Management 35
      Introduction to Molecular Biological Analysis for Food Chemistry Students 36
Thesis 37
  Bachelor Thesis Food Chemistry 38
The subject is divided into

<table>
<thead>
<tr>
<th>section / sub-section</th>
<th>ECTS credits</th>
<th>starting page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory Courses</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>Key Skills Area</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>General Key Skills</td>
<td>5</td>
<td>31</td>
</tr>
<tr>
<td>Subject-specific Key Skills</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>Subject-specific Key Skills, Compulsory Courses</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>Thesis</td>
<td>10</td>
<td>37</td>
</tr>
</tbody>
</table>
Content and Objectives of the Programme

Bachelor's programmes lead to a first professional university degree in the subject or (in the case of subject combinations) in the subjects in question. Students pursuing a Bachelor's degree become familiar with the fundamental principles of the respective academic discipline, they acquire methodological and occupational skills as well as academic writing and research skills and they learn how to apply their knowledge and skills to make a contribution to the community. In addition, Bachelor's programmes foster the personal development of students. The assessments to be taken over the course of the programme have the objective of assessing whether students are proficient in the fundamental principles of the academic discipline in question, have acquired methodological, occupational, and transferable skills, and are prepared to transfer into the professional world. More detailed provisions are set out in the pertinent FSB (subject-specific provisions).

Master's programmes lead to a further professional and research-oriented university degree in the subject or (in the case of subject combinations) in the subjects in question. Master's programmes provide the opportunity for professional and academic specialisation and can be either ‘application-oriented’ or ‘research-oriented’ as specified in the pertinent FSB. Interdisciplinary programmes or programmes in other disciplines, consecutive Master's programmes build on the knowledge and skills previously developed by students (while studying for a Bachelor's degree) and give them the opportunity to deepen, expand, and enhance that knowledge and those skills. The assessments to be taken over the course of the programme have the objective of assessing whether students have developed the profound specialist knowledge and skills necessary for transferring into the professional world, whether they are competent to grasp their discipline, and whether they are able to work independently according to academic standards.

Both Bachelor's and Master's programmes require students to write a thesis in which they are expected to demonstrate their ability to research and write independently on a problem in the discipline in question within a given time frame and adhering to the principles of good academic practice.
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: \(\text{NUM}\) = numerical grade, \(\text{B/NB}\) = (not) successfully completed

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

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

\(\text{ASPO}2015\)

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

\(27\text{-May-2021 (2021-40)}\)

\(22\text{-Mar-2022 (2022-15)}\)

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

(150 ECTS credits)
## Module Catalogue for the Subject Food Chemistry

Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Mathematics for students in Chemistry and Biology</td>
<td>10-M-MCB-152-m01</td>
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</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dean of Studies Mathematik (Mathematics)</td>
<td>Institute of Mathematics</td>
</tr>
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<table>
<thead>
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<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
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<tr>
<td>5</td>
<td>numerical grade</td>
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<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

### Contents

Functional relations, differentiation and integration of functions in one variable, curve sketching, differentiation of functions in several variables, power series, ordinary differential equations, systems of linear equations, basic notions in statistics.

### Intended learning outcomes

The student is able to recognise and phrase simple questions from natural sciences as mathematical problems, apply basic mathematical methods to them and interpret the results.

### Courses

<table>
<thead>
<tr>
<th>(type, number of weekly contact hours, language — if other than German)</th>
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<tbody>
<tr>
<td>V (3) + Ü (2)</td>
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</tbody>
</table>

### Method of assessment

<table>
<thead>
<tr>
<th>(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>written examination (approx. 90 to 120 minutes) and written exercises (approx. 25)</td>
</tr>
</tbody>
</table>

### Allocation of places

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### Additional information

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. 1 2. Letter f) of Annex 1 of APOLmCh.

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

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Module: General Biology of Economic Plants from Food and Forage

Module title: General Biology of Economic Plants from Food and Forage
Abbreviation: 07-LMC-BIO1-152-m01

Module coordinator: holder of the Chair of Plant Physiology and Biophysics
Module offered by: Faculty of Biology

ECTS: 7
Method of grading: numerical grade
Duration: 2 semester
Module level: undergraduate
Other prerequisites: --

Contents:
The first part of the winter semester course will discuss the plant cell, the smallest unit of the plant organism, starting with its macroscopic structure before moving on to its microscopic structure. The course will point out differences and similarities between prokaryotic cells (bacteria, archaeabacteria) and euukaryotic cells (animals, plants). In the second part of the winter semester course, students will acquire the fundamental knowledge necessary to understand the form (anatomy, morphology and cytology) and function of plant organisms. The summer semester course will introduce students to the fundamental principles of botany, using the example of food and fodder crops. Taking into account their taxonomy, morphology and cytology, the course will discuss the photosynthesis as well as other physiological and genetic aspects of selected crops and their compounds as well as aspects related to the breeding of these crops. In this context, the course will point out differences that may be used, for example, for the microscopic identification of a variety of food and fodder crops.

Intended learning outcomes:
In the winter semester, students have acquired a knowledge of the structure of plant cells and their (biological) macromolecules as well as of the specific characteristics of the intracellular and extracellular structures of plant cells. In the summer semester, students have acquired the following knowledge and skills:
- Fundamental knowledge of the distinguishing characteristics, genetics, photosynthesis and physiology of representatives of the plant kingdom with special attention to crops.
- Fundamental knowledge of major anatomical and morphological plant traits as well as of the compounds of food and fodder crops.
- Fundamental knowledge of the components and functioning of microscopes.
- Fundamental preparation skills.
- Basic familiarity with methods for the microscopic examination of crops.
- Fundamental skills in the interpretation of macroscopic and histological plant preparations by light microscopy.

Courses:
V (2) + V (1) + P (4)

Method of assessment:
a) written examination (60 to 120 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes total)

Allocation of places:
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Additional information:
Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. I 2. Letter e) of Annex 1 of APOLmCh and No. 5 of Annex 2 of APOLmCh.

Referred to in LPO I (examination regulations for teaching-degree programmes):
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### Module Catalogue for the Subject

**Module title**

**Principles of Inorganic Chemistry**

**Abbreviation**

08-AC1-152-m01

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

<table>
<thead>
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<th>ECTS</th>
<th>Method of grading</th>
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<tr>
<td>8</td>
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<thead>
<tr>
<th>Duration</th>
<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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</table>

### 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

**V (4) + 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

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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
## Inorganic Chemistry 1 (lab)

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Inorganic Chemistry 1 (lab)</td>
<td>08-ACP1-152-m01</td>
</tr>
</tbody>
</table>

### Module coordinator
holder of the Chair of Anorganic Chemistry

### Module offered by
Institute of Inorganic Chemistry

### ECTS
10

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

### 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. Therefor he/she can carry out the necessary stoichiometric calculations and correctly outline the chemical processes written and verbal.

### Courses
P (12) + S (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) and Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical assignments (2 to 4 random examinations)

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 I
(examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Introduction to Physics for Students of other Disciplines</td>
<td>11-EFNF-152-m01</td>
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</tbody>
</table>

**Module coordinator**
Managing Director of the Institute of Applied Physics

**Module offered by**
Faculty of Physics and Astronomy

**ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** |
---|---|---|
7 | numerical grade | -- |

**Duration** | **Module level** | **Other prerequisites** |
---|---|---|
2 semester | undergraduate | -- |

**Contents**
Mechanics, vibration theory, thermodynamics, optics, science of electricity, Atomic and Nuclear Physics.

**Intended learning outcomes**
The students have knowledge of the principles of Physics.

**Courses** (type, number of weekly contact hours, language — if other than German)
V (4) + V (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)
written examination (60 to 120 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)
--
### Module title

**Laboratory Course Physics for Students of other Disciplines**

**Abbreviation**

11-PFNF-152-m01

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<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>Managing Director of the Institute of Applied Physics</td>
<td>Faculty of Physics and Astronomy</td>
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<th>Module level</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

### Contents

Simple experiments in the fields of mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance, Atomic and Nuclear Physics, imaging methods.

### Intended learning outcomes

The students have detected and understood physical contexts on the basis of the implementation of own experiments. They have a basic understanding of physical phenomena and know the basic ideas and ways of functioning of different measuring and imaging methods as well as their applications, especially in the field of Biomedicine.

### Courses

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of weekly contact hours</th>
<th>Language</th>
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<tbody>
<tr>
<td>P</td>
<td>(4)</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) practical assignment with oral test (approx. 15 minutes, during experiments) and b) written examination (90 minutes).

Each experiment comprises preparation, performance and evaluation. Test as well as performance of experiments can each be repeated once.

### Allocation of places

Only as part of pool of general transferable skills (ASQ): 10 places (lottery)

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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: Inorganic Chemistry of the Elements

<table>
<thead>
<tr>
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<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inorganic Chemistry of the Elements</td>
<td>08-AS1-152-m01</td>
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</table>

#### Module coordinator and Module offered by
- Lecturer of lecture "Chemie der Hauptgruppenelemente" (Chemistry of Main-group Elements)
- Institute of Inorganic Chemistry

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<th>Method of grading</th>
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<table>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

#### Contents

This module equips students with an advanced knowledge of the periodic table and selected elements. It focuses on bonding conditions, trends in the periodic table and the description and structure of elements. In addition, it introduces students to elementary organic chemistry, coordination chemistry and complex chemistry.

#### Intended learning outcomes

Students are able to characterise main group elements and transition metal elements in terms of their structure, reactivity and fabrication. They are able to identify the coordination of the atoms. In addition, they have learned how to use the periodic table, an essential tool for chemists.

#### 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 (2) + V (2)</td>
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</table>

#### Method of assessment

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<thead>
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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>
<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>
</tr>
</tbody>
</table>

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
<table>
<thead>
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<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Analytical Chemistry (lab)</td>
<td>08-ANP-152-m01</td>
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<table>
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<th>Module offered by</th>
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<tr>
<td>holder of the Chair of Anorganic Chemistry</td>
<td>Institute of Inorganic Chemistry</td>
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<table>
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<tr>
<th>Duration</th>
<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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</tbody>
</table>

**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 different analysis methods with unknown compounds.

**Intended learning outcomes**

The student is able to analyze unknown compounds using different methods. He/She is able to separate and analyze mixtures.

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

P (12) + S (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)

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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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Physical Chemistry for Biology Majors</td>
<td>08-PC-Bio-152-m01</td>
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<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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</thead>
<tbody>
<tr>
<td>lecturer of lecture &quot;Thermodynamik, Kinetik, Elektrochemie für Studierende der Biologie und Lebensmittelchemie&quot;</td>
<td>Institute of Physical and Theoretical Chemistry</td>
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<table>
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<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
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<tr>
<td>5</td>
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<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>Successful completion of the written examination serves as proof of all safety-related skills and is a prerequisite for attendance of the lab course.</td>
</tr>
</tbody>
</table>

### Contents

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

### Intended learning outcomes

Students have become familiar with the fundamental principles of thermodynamics, kinetics and electrochemistry. They are able to understand and explain fundamental processes in nature and engineering.

### Courses

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

| V (2) + Ü (1) + P (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 minutes) and assessment of practical skills during lab course (ungraded): Vor- testate/Nachtestate (pre and post-experiment exams, approx. 15 minutes each), assessment of practical assignments, log (approx. 5 to 10 pages)

Assessment offered: Once a year, winter semester

### Allocation of places

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### Additional information

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. I 2. Letter c) and No. I 1. Letter c) of Annex 1 of APOLmCh and No. 3 of Annex 2 of APOLmCh.

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

--
Module title | Abbreviation
---|---
Organic Chemistry 1 | 08-OC1-152-m01

**Module coordinator**

holder of the Professorship of Organic Chemistry

**Module offered by**

Institute of Organic Chemistry

**ECTS** | **Method of grading** | **Only after succ. compl. of module(s)**
---|---|---
5 | Numerical grade | --

**Duration** | **Module level** | **Other prerequisites**
---|---|---
1 semester | Undergraduate | --

**Contents**

This module provides students with an overview of the fundamental principles of organic chemistry. It examines the bonding situation of carbon and introduces students to the nomenclature of simple and moderately complex organic compounds. The module also discusses the fundamental principles of stereochemistry, substitution, addition and elimination reactions as well as synthesis planning.

**Intended learning outcomes**

Students know important categories of substances in organic chemistry. They are able to use different systems of nomenclature to determine simple substance names. Students are able to analyse the stereochemistry of molecules. They are able to describe and formulate some of the most important reactions in organic chemistry. For that purpose, they can analyse and categorise the characteristic reaction conditions and can use them for simple syntheses.

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

V (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**

--

**Additional information**

--

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

§ 62 I Nr. 2
### Module title
Organic Chemistry 2

### Abbreviation
08-OC2-VL-152-m01

### Module coordinator
holder of the Chair of Physically Organic Chemistry

### Module offered by
Institute of Organic Chemistry

#### ECTS
6

#### Method of grading
numerical grade

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

#### Duration
1 semester

#### Module level
undergraduate

#### Other prerequisites
--

### Contents
This module introduces students to the rules of aromaticity and discusses specific reactions of aromatics. Using the example of carbonyl compounds, it extends the students’ knowledge of substitution, elimination and addition reactions to complex reaction mechanisms. The course also focuses on oxidation and reduction reactions as well as rearrangement.

### Intended learning outcomes
Students have become familiar with the criteria for aromaticity. They can analyse the varying reactivity of carbonyl compounds. They are able to describe specific reactions of carbonyls and aromatics. For that purpose, they can plan and formulate multi-stage syntheses with complex reaction mechanisms and can transfer them to unknown reactions.

### 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
--

### Additional information
--

### 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
Organic Chemistry - laboratory course for Food Chemistry students

## Abbreviation
08-OCP1-LMC-212-m01

### Module coordinator
holder of the Chair of Organic Chemistry II

### Module offered by
Institute of Organic Chemistry

### ECTS
9

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

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<th>ECTS</th>
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</table>

### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
--

### Contents
The module offers the opportunity to practically apply the knowledge of the basic lecture(s). The students perform experiments independently in the laboratory after a safety briefing. In addition to performing the experiments, the students’ knowledge is examined in colloquia and protocols. The main focus is on the safe handling of hazardous substances, basic experimental operations in organic chemistry, single to multi-step syntheses, and analysis of the products. The accompanying seminar introduces spectroscopic methods, especially infrared spectroscopy and NMR spectroscopy.

### Intended learning outcomes
The students are able to safely handle hazardous substances. He/she can perform basic experimental operations in organic chemistry. He/she can analyze the products in terms of yield and purity and identify possible sources of error. The student will be able to relate the theoretical content developed in the lecture to the practical experiments performed in the laboratory. The students know important spectroscopic methods and can evaluate spectra as well as draw conclusions about the molecular structure.

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

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<tr>
<th>Course</th>
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<tr>
<td>S</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)

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)

Language of assessment: German and/or English

Assessment offered: Once a year, winter term

### Allocation of places
--

### Additional information
Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. I 1. Letter b) of Annex 1 of APOLmCh and No. 2 of Annex 2 of APOLmCh.

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

--
Module title | Abbreviation
--- | ---
Chemometrics | 08-LMC-Ch-212-m01

Module coordinator | Module offered by
--- | ---
holder of the Chair of Food Chemistry | Institute of Pharmacy and Food Chemistry

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</table>

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

Contents
Principles of collection of data and data processing, criteria for measurements, arrangement and organization of data, measures for data characterization, key figures (measures of location scales, dispersion measures), presentation of univariate sampling, characterization and presentation of associations, measures of associations, basics of probability theory and simple probability models, chemometric applications

Intended learning outcomes
The students master the basic principles of scientifically reasonable planning, implementation, evaluation and interpretation of chemical analysis with systematic aid of mathematical methods.

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)

written exercises (approx. 10 pages)
Assessment offered: Once a year, winter term

Allocation of places
--

Additional information
Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. II 2. Letter a) of Annex 1 of APOLmCh and No. 1 of Annex 3 of APOLmCh.

Referred to in LPO I (examination regulations for teaching-degree programmes)
--
**Module title** | **Abbreviation**  
---|---  
Toxicology and legal studies | 03-TR-152-m01  

**Module coordinator** | **Module offered by**  
lecturer of lecture "Toxikologie und Rechtskunde" | Faculty of Medicine  

**ECTS** | **Method of grading** | **Only after succ. compl. of module(s)**  
---|---|---  
3 | numerical grade | --  

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

**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**  
--  

**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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<th>Module title</th>
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<td>Biochemistry 1</td>
<td>08-BC1-152-m01</td>
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<tr>
<td>holder of the Chair of Biochemistry</td>
<td>Chair of Biochemistry</td>
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<tbody>
<tr>
<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**

--

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

§ 42 I Nr. 2
§ 62 I Nr. 2
## Module Catalogue for the Subject
### Food Chemistry
#### Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
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<td>Biochemistry 2</td>
<td>08-BC2-152-m01</td>
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<td>undergraduate</td>
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</table>

### Contents

The module imparts the basic knowledge of biochemistry by lectures and in-depth tutorials. Main topics of the module Biochemistry 2 are particularly Replication, DNA repair, transcription, mRNA maturation, translation and regulation of translation, protein targeting, nuclear transport, and protein degradation. Additionally the module conveys basic knowledge about the cellular signal transduction.

### 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

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. II 2. Letter e) and No. II 1. Letter c) of Annex 1 of APOLmCh and No. 3 of Annex 3 of APOLmCh.

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

- --
<table>
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<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Introduction to Instrumental Analysis for Food Chemistry Students</td>
<td>08-LMC-IA-152-m01</td>
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**Module coordinator**
holder of the Chair of Food Chemistry

**Module offered by**
Institute of Pharmacy and Food Chemistry

<table>
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<th>ECTS</th>
<th>Method of grading</th>
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<td>5</td>
<td>numerical grade</td>
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</table>

**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**
--

<table>
<thead>
<tr>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basics in analysis of organic molecules taking into account physical separation techniques and measurement methods.</td>
</tr>
</tbody>
</table>

**Intended learning outcomes**

The students know the principles of spectroscopy, chromatography and electrochemistry as well as the field of application of each method. They know the mathematical and statistical analysis and interpretation of spectra and chromatograms.

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

<table>
<thead>
<tr>
<th>Type</th>
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<th>Language</th>
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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 (60 to 120 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes total)

**Allocation of places**
--

**Additional information**

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. I 2. Letter a) of Annex 1 of APOLmCh and No. 1 of Annex 2 of APOLmCh.

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

--
Module title

Instrumental Analysis for Food Chemistry Students

Abbreviation

08-LMC-LMA-152-m01

Module coordinator

holder of the Chair of Food Chemistry

Module offered by

Institute of Pharmacy and Food Chemistry

ECTS

10

Method of grading

Only after succ. compl. of module(s)

(1) successfully completed

08-LMC-AC3, 08-LMC-OCP

or 08-OCP1-LMC

Duration

1 semester

Module level

undergraduate

Other prerequisites

--

Contents

Basics in analysis of food, tobacco products, cosmetic products, consumer goods and animal feed; with special focus on spectroscopic and chromatographic methods.

Intended learning outcomes

The students can plan and perform qualitative and quantitative analysis of food by spectroscopic (photometry, fluorimetry) and chromatographic (thin layer chromatography, high performance liquid chromatography and gas chromatography) methods.

Courses

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

S (1) + S (1) + P (10)

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) Vortestate and Nachtestate (pre and post-experiment exams, approx. 15 minutes), documentation and assessment of practical assignments (approx. 2 to 4 pages per analysis, no more than 60 pages total) or b) completion and written documentation (approx. 1 to 2 pages) of a theoretical assignment (approx. 30 minutes), Vortestate and Nachtestate (pre and post-experiment exams, approx. 15 minutes), documentation and assessment of practical assignments in lab notebook (approx. 2 to 4 pages per analysis, no more than 60 pages total)

Allocation of places

--

Additional information

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. I 2. Letter a) and No. I 1. Letter a) of Annex 1 of APOLmCh and No. 1 of Annex 2 of APOLmCh.

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

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<table>
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<tr>
<td>Introduction to Food Chemistry</td>
<td>08-LMC-LMCo-152-m01</td>
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**Module coordinator**
holder of the Chair of Food Chemistry

**Module offered by**
Institute of Pharmacy and Food Chemistry

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</table>

**Duration**
1 semester

**Module level**
undergraduate

**Contents**
Introduction to chemistry of food components.

**Intended learning outcomes**
The students know basic structures, properties and reactions of proteins, carbohydrates and lipids as well as their importance in food.

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

V (1) + S (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 (60 to 120 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes total) and presentation (approx. 20 minutes)

**Allocation of places**
--

**Additional information**
Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. I 2. Letter a) and No. I 1. Letter a) of Annex 1 of APOLmCh.

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

--
Module title
Microbiology for Food Chemistry students

Abbreviation
07-LMC-BIO2-152-m01

Module coordinator
holder of the Chair of Microbiology

Module offered by
Faculty of Biology

ECTS
5

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

(not) successfully completed
--

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

Contents
This module comprises a lecture and accompanying exercises. During the theoretical part, students will acquire the fundamentals of bacteriology; during exercises, these will be illustrated by help of suitable experiments. The lecture will acquaint students with the fundamental principles of the cultivation, enrichment, identification and control of bacteria. In addition, it will explore the significance of bacteria both for global nutrient cycles and as mutualists, commensals and pathogens in humans. The lecture will also discuss the significance of bacteria as producers of antibiotics, the role of bacteriophages and horizontal gene transfer. During exercises, students will apply fundamental techniques for the cultivation and isolation of bacteria and will test the efficacy of a range of sterilisation and disinfection methods. They will also apply both classical macroscopic and microscopic methods for the identification and classification of bacteria. Additional exercises will provide students with an opportunity to perform experiments on antibiotic sensitivity/resistance and horizontal gene transfer.

Intended learning outcomes
Students are familiar with the fundamental principles of bacteriology. They are familiar with simple experimental techniques for addressing scientific issues in bacteriology and are able to apply these (e.g. detection and identification of bacteria).

Courses (type, number of weekly contact hours, language — if other than German)
V (2) + 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)
Log (approx. 30 pages)
Assessment offered: Once a year, summer semester

Allocation of places
--

Additional information
Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. II 2. Letter f) and No. II 1. Letter b) of Annex 1 of APOLmCh and No. 4 of Annex 3 of APOLmCh.

Referred to in LPO I (examination regulations for teaching-degree programmes)
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<table>
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<tr>
<td>Microbiology of Food and Hygiene for Food Chemistry Students</td>
<td>03-LMC-HYG-152-m01</td>
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**Module coordinator**  
Institute of Hygiene and Microbiology  
**Module offered by**  
Faculty of Medicine

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**Duration**  
1 semester  
**Module level**  
undergraduate

**Contents**

The students will gain knowledge on food-related topics of hygiene and microbiology. This includes relevant, food-contaminating microorganisms and the infections/diseases they provoke; antimicrobial drugs/substances; hygiene management, food decay.

**Intended learning outcomes**

Students gain knowledge on food microbiology and hygiene: fundamentals of microbial systematics, morphology, cytology and physiology; knowledge on the role of pathogens (microorganisms, toxin producers, viruses, prions, parasites) for food chemistry and food technology (decay, intoxications, analytical microbiology, biotechnology); knowledge on the diagnosis and cultivation of microorganisms; knowledge on microbial inactivation (disinfection, sterilisation); fundamentals of the pathogenesis of important human pathogens and clinical consequences of microbial infection; fundamentals of medically relevant antiinfectives and the development of drug resistances.

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

V (2) + P (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 (60 to 120 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes total)

**Allocation of places**

--

**Additional information**

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. II 2. Letter f) and No. II 1. Letter b) of Annex 1 of APOLmCh and No. 4 of Annex 3 of APOLmCh.

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

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<tbody>
<tr>
<td>holder of the Chair of Food Chemistry</td>
<td>Institute of Pharmacy and Food Chemistry</td>
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<tbody>
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<td>2 semester</td>
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</table>

### Contents

Knowledge and analysis of food, tobacco products and animal feed, particularly carbohydrate and lipid-containing food and feed. Basics in knowledge of food technology processes.

### Intended learning outcomes

The students know the chemical composition of foods rich in carbohydrates, fat or proteins and the accompanying analysis. The students can develop and present a seminar on foodstuff and food technology.

### Courses

Type, number of weekly contact hours, language — if other than German:

- V (2) + 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:

- a) written examination (60 to 120 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes total)

### Allocation of places

--

### Additional information

Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. II 1. Letter a) of Annex 1 of APOLmCh.

### Referred to in LPO I

(examination regulations for teaching-degree programmes)

--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical Course in Food Chemistry</td>
<td>08-LMC-LMCP-192-m01</td>
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</table>

### Module coordinator
holder of the Chair of Food Chemistry

### Module offered by
Institute of Pharmacy and Food Chemistry

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
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</thead>
<tbody>
<tr>
<td>17</td>
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<td>08-LMC-LMA</td>
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</table>

### Course level
undergraduate

### Duration
2 semester

### Other prerequisites
--

### Contents
Basics in analysis of food, tobacco products and animal feeds including the interpretation of data with statistical methods. Special focus on food and feed containing carbohydrates and lipids.

### Intended learning outcomes
The students can perform the analysis of particular carbohydrate-containing, fat-containing and protein-containing foods. They can choose an appropriate methods, analyze different foods, verify the accuracy of their analysis and interpret their results in the light of current literature.

### Courses (type, number of weekly contact hours, language — if other than German)
P (12) + P (12) + 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 (60 to 120 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes total)

### Allocation of places
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### Additional information
Pursuant to Section 2 Subsection 2 Sentence 2 Verordnung über die Ausbildung und Prüfung der Staatlich geprüften Lebensmittelchemikerinnen und Lebensmittelchemiker (Regulation on the training and examination of state-certified food chemists, APOLmCh) in conjunction with No. II 1. Letter a) of Annex 1 of APOLmCh.

### Referred to in LPO I (examination regulations for teaching-degree programmes)
--
Key Skills Area
(20 ECTS credits)
General Key Skills
(5 ECTS credits)

Students may select any of the modules offered as part of the pool of general transferable skills (ASQ) of JMU.
Subject-specific Key Skills
(15 ECTS credits)
Subject-specific Key Skills, Compulsory Courses
(15 ECTS credits)
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Analysis Strategies</td>
<td>08-LMC-FSQ1-152-m01</td>
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<tr>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

### Contents

The occupational profile of a Food Chemist serving as basis for the degree program food chemistry. General strategies for qualitative and quantitative analyses. Calibration strategies. Accuracy and quality of chemical analysis. Interpretation of measured data with statistical methods.

### Intended learning outcomes

The students know the basics of planning, performing and analysis of analytical methods, including the interpretation of the data using statistical methods as well as the validation of their results.

### Courses

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

<table>
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<tr>
<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>
<td>written exercises (approx. 10 pages) Assessment offered: Once a year, winter semester</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)
<table>
<thead>
<tr>
<th>Module title</th>
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<td>Quality Management</td>
<td>08-LMC-FSQ2-192-m01</td>
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</table>

### Contents

Quality management in chemical laboratories.

### Intended learning outcomes

The students can apply the basic principles of industrial quality management and can develop and apply a standard operating procedure.

### 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)

written exercises (approx. 10 pages)
Assessment offered: Once a year, summer semester

### 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 title**  
Introduction to Molecular Biological Analysis for Food Chemistry Students

**Abbreviation**  
08-LMC-MBA-192-m01

**Module coordinator**  
holder of the Chair of Food Chemistry

**Module offered by**  
Institute of Pharmacy and Food Chemistry

**ECTS**  
5

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

**Duration**  
1 semester

**Module level**  
undergraduate

**Other prerequisites**  
--

### Contents

Basics in methods in molecular biology - theory and practice.

### Intended learning outcomes

The students can perform basic molecular biology techniques for DNA isolation, polymerase chain reaction, agarose gel electrophoresis and restriction enzyme digestion and they can interpret molecular biological data.

### Courses

<table>
<thead>
<tr>
<th>Type</th>
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<th>Language</th>
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<tbody>
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<td></td>
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<tr>
<td>S</td>
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</table>

**Method of assessment**

Module is creditable for bonus

a) Vortestate and Nachtestate (pre and post-experiment exams, approx. 15 minutes), documentation and assessment of practical assignments (approx. 2 to 4 pages per analysis, no more than 60 pages total) or b) completion and written documentation (approx. 1 to 2 pages) of a theoretical assignment (approx. 30 minutes), Vortestate and Nachtestate (pre and post-experiment exams, approx. 15 minutes), documentation and assessment of practical assignments in lab notebook (approx. 2 to 4 pages per analysis, no more than 60 pages total)

Assessment offered: usually once a year, winter semester

**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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Thesis
(10 ECTS credits)
<table>
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<td>Bachelor Thesis Food Chemistry</td>
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<tbody>
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<td>undergraduate</td>
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**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)

No courses assigned to module

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

Bachelor’s thesis

**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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