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

Examination regulations version: 2011
Responsible: Faculty of Chemistry and Pharmacy
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Content and Objectives of the Programme

No translation available.
Abbreviations used

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

Term: SS = summer semester, WS = winter semester

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

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

Other: A = thesis, LV = course(s), PL = assessment(s), TN = participants, VL = prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

ASPO2009

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

16-Nov-2011 (2011-122)

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

(118 ECTS credits)
Module title: Physical Chemistry 2 for Biochemistry Majors: Thermodynamics, Kinetics, Electrochemistry
Abbreviation: 08-PC2-BC-092-m01

Module coordinator:
lector of lecture "Thermodynamik, Kinetik, Elektrochemie"

Module offered by:
Institute of Physical and Theoretical Chemistry

ECTS: 15
Method of grading: Only after succ. compl. of module(s)

Duration: 1 semester
Module level: undergraduate
Other prerequisites: By way of exception, additional prerequisites are listed in the section on assessments.

Contents:
This module introduces students to the principles of thermodynamics. It focuses on the laws of thermodynamics, chemical equilibria, ideal and real gasses/solutions/mixed phases and electrochemistry. In addition to thermodynamic processes, it discusses the fundamental principles of kinetics. The module gives students the opportunity to apply in practice the knowledge they have gained through the related lecture(s). After a safety briefing, the students autonomously conduct experiments in the laboratory. In addition to those experiments, students will be expected to take oral tests and write lab reports to demonstrate their knowledge.

Intended learning outcomes:
Students are able to explain the laws of thermodynamics. They are able to describe thermodynamic aspects of solutions, gases, mixed phases and electrochemical reactions. Students are able to interpret the kinetic aspects of chemical reactions. They are able to connect the theoretical principles of thermodynamics, kinetics, electrochemistry and spectroscopy with practical laboratory experiments. They are able to analyse the resulting measurements.

Courses:
This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 08-PC2-BC-2-092: P (no information on SWS (weekly contact hours) and course language available)
- 08-PC2-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment:
Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-PC2-BC-2-092: Physical Chemistry 2 for Biochemistry Majors: Thermodynamics, Kinetics, Electrochemistry
- 6 ECTS, Method of grading: (not) successfully completed
- Vortestate (pre-experiment exams, approx. 15 minutes each), assessment of practical performance (log approx. 5 to 10 pages), Nachtestate (post-experiment exams, approx. 15 minutes each)
- Assessment offered: once a year, winter semester

Assessment in module component 08-PC2-1-092: Thermodynamics, Kinetics, Electrochemistry
- 9 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
- Other prerequisites: Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).
### 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 (1) 1. Chemie *"Allgemeine und Anorganische Chemie"; "Physikalische und Analytische Chemie"*
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Introduction to Physics for Students of Non-physics-related Minor Subjects</td>
<td>11-EFNF-072-m01</td>
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**Module coordinator**
Managing Director of the Institute of Applied Physics

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

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<th>ECTS</th>
<th>Method of grading</th>
<th>Other prerequisites</th>
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<tbody>
<tr>
<td>7</td>
<td>numerical grade</td>
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</table>

**Duration**
2 semester

**Module level**
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**
V + V (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (approx. 120 minutes)

**Allocation of places**
Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.

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

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<table>
<thead>
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<td>Practical Course Physics for Students of Non-physics-related Minor Subjects</td>
<td>11-PFNF-072-m01</td>
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<tr>
<td>Managing Director of the Institute of Applied Physics</td>
<td>Faculty of Physics and Astronomy</td>
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<tr>
<th>Duration</th>
<th>Module level</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**Contents**
Mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance, Atomic and Nuclear Physics.

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

**Courses**
(P no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
(a) oral test (approx. 15 minutes) during experiment and (b) ungraded written examination (approx. 90 minutes)

**Allocation of places**
Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.

**Additional information**
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**Referred to in LPO I**
(examination regulations for teaching-degree programmes)
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# Module Catalogue for the Subject
## Biochemistry
### Bachelor’s with 1 major, 180 ECTS credits

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<th>Module title</th>
<th>Abbreviation</th>
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<td>Physical Chemistry 1</td>
<td>08-PC1-092-m01</td>
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<th>Module offered by</th>
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</thead>
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<tr>
<td>lecturer of lecture “Grundlagen der Quantenmechanik and Spektroskopie” (Principles of Quantum Mechanics and Spectroscopy)</td>
<td>Institute of Physical and Theoretical Chemistry</td>
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<td>8</td>
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<thead>
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<th>Module level</th>
<th>Other prerequisites</th>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).</td>
</tr>
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## Contents
This module introduces students to the fundamental principles of quantum mechanics. It analyses molecules on the basis of the following models: particle in a box, harmonic oscillator and rigid rotor. As regards spectroscopy, the module focuses on vibrational spectroscopy, angular momentum quantisation, microwave spectroscopy and UV-VIS spectroscopy. In addition, the module discusses linear operators, eigenvalue problems, matrix representation, differential equations, Fourier transform and orthogonal functions as mathematical bases of the topics listed above.

## Intended learning outcomes
Students are able to explain key models of quantum mechanics and to apply them to molecules. They are able to describe different spectroscopic methods. In addition, students know how to apply the mathematical bases of quantum mechanics.

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

V + Ü + V + Ü (no information on SWS (weekly contact hours) and course language available)

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

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)

## Allocation of places
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## Additional information
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## Referred to in LPO I
(examination regulations for teaching-degree programmes)
--
Module title: General Biology for students of biochemistry
Abbreviation: 07-1A1ZO-BC-092-m01

Module coordinator: Dean of Studies Biologie (Biology)
Module offered by: Faculty of Biology

ECTS: 5
Method of grading: numerical grade
Duration: 1 semester
Module level: undergraduate
Other prerequisites: --

Contents:
The first part of the course will acquaint students with the elementary building blocks of life as well as biological categories. Building on this knowledge, the course will then discuss the cell, the smallest unit of life, 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 eukaryotic cells (animals, plants). The second part will address one of the central issues of biology: evolution. Fundamental mechanisms and hypotheses will be discussed and students will be introduced to major phylogenetic reconstruction methods. Using the examples of plants and animals, the subsequent module components will introduce students to the phylogenetic diversity of eukaryotes. At the level of groups in the plant and animal kingdoms, students will acquire the fundamental knowledge necessary to understand the forms and functions of animal and plant organisms, with morphology and cytology being discussed in an evolutionary and ecological context. The contents of the module are relevant for biological disciplines at all levels of biological organisation.

Intended learning outcomes:
- Knowledge of the structures of prokaryotic and eukaryotic cells and their (biological) macromolecules.
- Knowledge of the specific characteristics of the intracellular and extracellular structures of prokaryotes as well as animal and plant cells.
- Ability to recognise evolution as the driving force behind the phylogeny of species.
- Familiarity with the concepts of phylogenetic relationships between plants/animals.
- Familiarity with the distinguishing characteristics and major representatives of groups in the plant and animal kingdoms.
- Ability to select those plant and animal organisms that are most suitable for particular scientific issues.
- Familiarity with the components and functioning of microscopes.

Courses:
V + V + V + V (no information on SWS (weekly contact hours) and course language available)

Method of assessment:
4 written examinations (3 examinations: 60 minutes each; 1 examination: 30 minutes; including multiple choice questions), weighted 3:3:3:1

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

Bioanalytics

Abbreviation

08-BAN-092-m01

Module coordinator

holder of the Chair of Biochemistry

Module offered by

Chair of Biochemistry

ECTS

8

Method of grading

numerical grade

Only after succ. compl. of module(s)

Duration

1 semester

Module level

undergraduate

Other prerequisites

--

Contents

The module imparts the theoretical and practical fundamentals of bioanalysis by lectures and both theoretical and practical exercises.

Intended learning outcomes

After attending the module events the student has basic knowledge of bioanalysis and is able to apply the contents in practical experiments.

Courses

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

• 08-BAN-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)

• 08-BAN-2-092: Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-BAN-1-092: Principles of Bioanalytics Principles of Bioanalytics

• 3 ECTS, Method of grading: numerical grade

• a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.

• Language of assessment: German or English

Assessment in module component 08-BAN-2-092: Bioanalytics (practical course)

• 5 ECTS, Method of grading: (not) successfully completed

• a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes) Students will be informed about the method and length of the assessment prior to the course.

• Assessment offered: once a year, summer semester

• Language of assessment: German or English

Allocation of places

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Additional information

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

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Module title | Abbreviation
---|---
Biochemistry for Biology Majors | 08-BCBC-092-m01

Module coordinator | Module offered by
---|---
holder of the Chair of Biochemistry | Chair of Biochemistry

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

Duration | Module level | Other prerequisites
---|---|---
2 semester | undergraduate | By way of exception, additional prerequisites are listed in the section on assessments.

Contents

Comprising lectures and exercises, this module acquaints students with the fundamental principles of biochemistry. Practical exercises give students the opportunity to learn the fundamental principles of conducting biochemical experiments.

Intended learning outcomes

Students have become familiar with the fundamental principles of biochemistry. They are able to describe the key biochemical processes in cellular systems. Students have become proficient in essential methods in biochemistry.

Courses

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- **08-BC-1-092**: V + Ü + V + Ü (no information on SWS (weekly contact hours) and course language available)
- **08-BCBCP-1-092**: Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component **08-BC-1-092**: Principles of Biochemistry Principles of Biochemistry Principles of Biochemistry Principles of Biochemistry

- 6 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
- Other prerequisites: Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).

Assessment in module component **08-BCBCP-1-092**: Biochemistry for Biology Majors (Exercises)

- 5 ECTS, Method of grading: (not) successfully completed
- a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes) Students will be informed about the method and length of the assessment prior to the course.
- Assessment offered: once a year, summer semester

Allocation of places

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Additional information

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<td>Module title</td>
<td>Abbreviation</td>
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<tr>
<td>Bachelor's Thesis Colloquium</td>
<td>08-KOLL-BC-092-m01</td>
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<th>Module offered by</th>
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<tr>
<td>chairperson of examination committee Biochemie (Biochemistry)</td>
<td>Chair of Biochemistry</td>
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<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
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<td>1 semester</td>
<td>undergraduate</td>
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### Contents

In the Defense the student is presenting the results of her / his Bachelor-Thesis and is defending them in a subsequent discussion.

### Intended learning outcomes

The student is able to defend the results of her/his Bachelor's Thesis in a scientific discussion.

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

K (no information on SWS (weekly contact hours) and course language available)

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

final colloquium (approx. 30 minutes)
Language of assessment: German 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>
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<th>Module title</th>
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<tr>
<td>Mathematics for students in Chemistry and Biology</td>
<td>10-M-MCB-101-m01</td>
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<tr>
<td>Dean of Studies Mathematik (Mathematics)</td>
<td>Institute of Mathematics</td>
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<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>
<td>Registration for the exercise must be made via SB@home at the beginning of the course or as announced by the lecturer in accordance with the specified registration deadlines. Certain prerequisites must be met to qualify for admission to assessment (e.g. successful completion of a certain percentage of exercises). The lecturer will inform students about the respective details at the beginning of the course. Registration for the exercise will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew and have to register anew, too.</td>
</tr>
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**Contents**

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

**Intended learning outcomes**

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

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 to 120 minutes)

**Allocation of places**

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**Additional information**

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

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### Module Catalogue for the Subject Biochemistry

**Bachelor’s with 1 major, 180 ECTS credits**

<table>
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<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<td>Organic Chemistry 2</td>
<td>08-OC2-102-m01</td>
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<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>holder of the Chair of Physically Organic Chemistry</td>
<td>Institute of Organic Chemistry</td>
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<th>Other prerequisites</th>
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<tbody>
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<td>Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).</td>
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</table>

### Contents

This module introduces students to the rules of aromaticity and discusses specific reactions of aromatics. Using the example of carbonyl compounds, it extends the students' knowledge of substitution, elimination and addition reactions to complex reaction mechanisms. The course also focuses on oxidation and reduction reactions as well as rearrangement. In addition, it introduces students to the spectroscopic methods of infrared spectroscopy, mass spectrometry and NMR spectroscopy.

### Intended learning outcomes

Students have become familiar with the criteria for aromaticity. They can analyse the varying reactivity of carbonyl compounds. They are able to describe specific reactions of carbonyls and aromatics. For that purpose, they can plan and formulate multi-stage syntheses with complex reaction mechanisms and can transfer them to unknown reactions. Students are able to describe important spectroscopic methods, to evaluate a spectrum and to draw conclusions regarding the molecular structure.

### Courses

(V + V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

(a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or (b) oral examination of one candidate each (approx. 20 minutes) or (c) oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English

### Allocation of places

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### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)
Module title: Structural Biology
Abbreviation: 03-5S2ST-BC-112-m01

Module coordinator: holder of the Chair of Structural Biology
Module offered by: Faculty of Medicine

ECTS: 10
Method of grading: numerical grade
Duration: 1 semester
Module level: undergraduate

Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.

Contents
This module provides a brief introduction to crystallography and commonly used biophysical techniques as well as the fundamental principles of macromolecular architectures. Building on this, the structure and function of selected biological macromolecules are presented. In small groups, participants will analyse one specific macromolecule in silico with respect to its structure and biological function and will present their results in a talk. The various macromolecules in their entirety reflect a number of important biological problems.

Intended learning outcomes
On the basis of individually assigned model proteins, the students will acquire the ability to explore common problems in structural biology and to analyse structure-function relationships. They will also acquire skills in the oral presentation of scientific results as well as in the in silico analysis of biological macromolecules.

Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment
a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.
Language of assessment: German or English

Allocation of places
--

Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
--
Module title | Abbreviation
--- | ---
Inorganic Chemistry 1 | 08-AC1-BC-111-m01

Module coordinator | Module offered by
lecturer of lecture "Experimentalchemie" (Experimental Chemistry) | Institute of Inorganic Chemistry

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<th>ECTS</th>
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<td>16</td>
<td>numerical grade</td>
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Duration | Module level | Other prerequisites
1 semester | undergraduate | By way of exception, additional prerequisites are listed in the section on assessments.

Contents
This module provides students with an overview of the fundamental principles of chemistry. It focuses on particles, metals, acid-base reactions, the periodic table, chemical equilibrium and complexometry. In addition, the module introduces fundamental models of chemistry and principles of inorganic chemistry. It includes practical exercises based on the lecture on experimental chemistry and its extension. After a safety briefing, the students autonomously conduct experiments in the laboratory. The course focuses on laboratory safety, simple lab techniques, the synthesis of simple substances and analyses of unknown substances. In addition, students have the opportunity to advance their laboratory knowledge.

Intended learning outcomes
Students are able to explain the principles of the periodic table and to extract information from it. They are able to explain basic models of the structure of matter. They have developed the ability to use the language of chemical formulas to describe chemical reactions and to interpret them by identifying the type of reaction. Students are able to describe the main quantitative and qualitative analytical methods and their application areas. They are able to identify fundamental problems in chemistry and perform experiments to solve them. They have developed the ability to perform the necessary stoichiometric calculations and describe the chemical processes in an appropriate manner, both in written and oral form.

Courses (type, number of weekly contact hours, language — if other than German)
This module comprises 3 module components. Information on courses will be listed separately for each module component.

- 08-AC1-BC-2-092: P (no information on SWS (weekly contact hours) and course language available)
- 08-AC1-BC-3-092: V (no information on SWS (weekly contact hours) and course language available)
- 08-AC1-1-102: V + V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-AC1-BC-2-092: Practical course of Inorganic Chemistry 1 for Biochemistry Majors
- 4 ECTS, Method of grading: (not) successfully completed
- Vorleistung (pre-experiment exams, approx. 15 minutes each), assessment of practical performance (log approx. 5 to 10 pages), Nachleistung (post-experiment exams, approx. 15 minutes each)
- Assessment offered: once a year, winter semester

Assessment in module component 08-AC1-BC-3-092: Accompanying lecture to the practical course of Inorganic Chemistry 1 for Biochemistry Majors
- 2 ECTS, Method of grading: numerical grade
- 2 written examinations (approx. 45 minutes each), weighted 1:1

Assessment in module component 08-AC1-1-102: Principles of Inorganic Chemistry
- 10 ECTS, Method of grading: numerical grade
Module Catalogue for the Subject
Biochemistry
Bachelor's with 1 major, 180 ECTS credits

- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: German or English
- Other prerequisites: Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).

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<tr>
<th>Additional information</th>
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<tr>
<td>§ 42 (1) 1. Chemie &quot;Allgemeine und Anorganische Chemie&quot; und &quot;Physikalische und Analytische Chemie&quot;</td>
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<tr>
<td>§ 62 (1) 1. Chemie &quot;Allgemeine und Anorganische Chemie&quot;; &quot;Physikalische und Analytische Chemie&quot;</td>
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</table>
Module title
Molecular Biology

Abbreviation
08-BC-MOL-111-m01

Module coordinator
holder of the Chair of Biochemistry

Module offered by
Chair of Biochemistry

ECTS
6

Method of grading
numerical grade

Only after succ. compl. of module(s)

Module component
08-BC (module component 08-BC-1 only)

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

Contents
The module covers specific topics of molecular physiology and functional biochemistry in lectures and exercises. An additional lecture conveys the subject field of genetic engineering and biosafety.

Intended learning outcomes
After attending the module events, students have sound knowledge in molecular biology. The students know the necessary infrastructure and usage rules for the different security levels of genetic engineering facilities. They have mastered the basics of genetic engineering in theory and are able to describe relevant examples of the use of gene technology and to explain the associated safety issues.

Courses
This module comprises 2 module components. Information on courses will be listed separately for each module component.
- 03-GTBS-1-092: V (no information on SWS (weekly contact hours) and course language available)
- 08-BC-MOL-1-111: V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment
Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 03-GTBS-1-092: Genetic Engineering and Biosafety
- 1 ECTS, Method of grading: (not) successfully completed
- written examination (approx. 30 minutes)

Assessment in module component 08-BC-MOL-1-111: Molecular Biology Lab
- 5 ECTS, Method of grading: numerical grade
- a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.
- Language of assessment: German 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)
--
Organic Chemistry - laboratory course for students of biochemistry  
o8-OC3P-112-m01

Module coordinator  
holder of the Chair of Organic Chemistry II

Module offered by  
Institute of Organic Chemistry

ECTS  
7

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

(08-OC1 and 08-AC1-BC (module component 08-AC1-BC-2 only)

Duration  
1 semester

Module level  
undergraduate

Other prerequisites  
--

Contents  
This module gives students the opportunity to apply in practice the knowledge they have gained through the related lecture(s). After a safety briefing, the students autonomously conduct experiments in the laboratory. In addition to those experiments, students will be expected to take oral tests and write lab reports to demonstrate their knowledge. The course focuses on the safe handling of hazardous substances, simple experimental unit operations of organic chemistry, simple to multi-level syntheses and the analysis of the products.

Intended learning outcomes  
Students know how to safely handle hazardous substances. They are able to conduct simple experimental operations of organic chemistry. They are able to analyse the yield and purity of the products and identify possible error sources. They are able to connect the theoretical aspects covered in the lecture with practical experiments in the laboratory.

Courses  
P (no information on SWS (weekly contact hours) and course language available)

Method of assessment  
Vortestate (pre-experiment exams, approx. 15 minutes each), assessment of practical performance (log approx. 5 to 10 pages), Nachtestate (post-experiment exams, approx. 15 minutes each)

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 | Abbreviation
---|---
Organic Chemistry 1 | 08-OC1-092-m01

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

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<th>Duration</th>
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<td>Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).</td>
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</tbody>
</table>

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

(V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)

Allocation of places

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Additional information

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

§ 62 (1) 2. Chemie "Organische und Bioorganische Chemie"
Compulsory Electives

(30 ECTS credits)
Module title
Pathobiochemistry

Abbreviation
03-PBC-092-m01

Module coordinator
holder of the Chair of Clinical Biochemistry and Pathobiochemistry

Module offered by
Faculty of Medicine

ECTS: 5

Method of grading
Numerical grade

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

Duration: 1 semester

Module level: Undergraduate

Other prerequisites: --

Contents
Fundamentals of selected topics in pathobiochemistry and pathophysiology.

Intended learning outcomes
Students are familiar with the fundamentals of pathobiochemistry and pathophysiology.

Courses
This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 03-PBC-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 03-PBC-2-092: P (no information on SWS (weekly contact hours) and course language available)

Method of assessment
Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 03-PBC-1-092:
- 2 ECTS, Method of grading: numerical grade
- Written examination (approx. 90 minutes)
- Language of assessment: German or English

Assessment in module component 03-PBC-2-092:
- 3 ECTS, Method of grading: (not) successfully completed
- Assessment of practical performance, Nachtestate (post-experiment exams: examination talks, approx. 15 minutes each), logs (approx. 20 pages)
- Assessment offered: once a year, winter semester
- Language of assessment: German or English

Allocation of places
Information on the allocation of places will be listed separately for each module component.

- 03-PBC-1-092: --
- 03-PBC-2-092: Biochemie (Biochemistry) Bachelor's: 6 places. Selection process Biochemie (Biochemistry) Bachelor's: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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<th>Module title</th>
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<td>chairperson of examination committee Biochemie (Biochemistry)</td>
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<td>1 semester</td>
<td>undergraduate</td>
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**Contents**

Delved practice in a specific research topic; presentation of the results in a written protocol.

**Intended learning outcomes**

The student is able to deeply acquaint himself/herself with a specific research topic, and to present the results in a written protocol.

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

Ü (no information on SWS (weekly contact hours) and course language available)

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

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes) Students will be informed about the method and length of the assessment prior to the course.

Language of assessment: German 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)

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<td>1 semester</td>
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**Contents**
Delved practice in a specific research topic; presentation of the results in a written protocol.

**Intended learning outcomes**
The student is able to deeply acquaint himself/herself with a specific research topic, and to present the results in a written protocol.

**Courses**
(No information on SWS (weekly contact hours) and course language available)

**Method of assessment**
(a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes) Students will be informed about the method and length of the assessment prior to the course.

Language of assessment: German or English

**Allocation of places**
--

**Additional information**
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**Referred to in LPO I**
(examination regulations for teaching-degree programmes)
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Module title | Abbreviation
--- | ---
Cell biology | 03-ZBP-092-m01

Module coordinator: holder of the Chair of Medical Radiation and Cell Research
Module offered by: Faculty of Medicine

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<td>1 semester</td>
<td>undergraduate</td>
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Contents

Becoming familiar with basic cell biological principles via hands-on training and seminars. Major topics are the structural organisation of eukaryotic cells, cell-cell and cell-matrix interactions, proliferation, differentiation and apoptosis.

Intended learning outcomes

Problem-oriented handling of eukaryotic cells under sterile conditions and understanding of principles of techniques for the analysis of cells. Understanding the molecular basis of cell biology and cellular malfunctions and their significance for disease development. Independent extraction of relevant information and presentation of selected examples of current literature.

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

P + S (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 60 minutes)
Language of assessment: German or English

Allocation of places

Biochemie (Biochemistry) Bachelor’s: 12 places. Selection process Biochemie (Biochemistry) Bachelor’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

Additional information

Referred to in LPO I (examination regulations for teaching-degree programmes)
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<td>Molecular Tumor Biology</td>
<td>03-MTUB-092-m01</td>
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<td>holder of the Chair of Physiological Chemistry</td>
<td>Faculty of Medicine</td>
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<td>1 semester</td>
<td>undergraduate</td>
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**Contents**

Practical introduction to model systems (cell culture, animal models) and experimental methods of molecular tumour research. Reading and presentation of original research articles.

**Intended learning outcomes**

Students are familiar with tumour models and experimental techniques in molecular cancer research, and they are able to apply this knowledge in practice.

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

Ü (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.

Assessment offered: once a year, winter semester

Language of assessment: German, English

**Allocation of places**

Number of places: 12. Selection process Biochemie (Biochemistry) Bachelor’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available. Selection process Biochemie (Biochemistry) Master’s: allocation by lot.

**Additional information**

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

---
Module title | Abbreviation
--- | ---
Human genetics for students of biochemistry | 03-4S1HG-BC-092-m01

Module coordinator | Module offered by
holder of the Chair of Human Genetics | Faculty of Medicine

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

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

Contents
Fundamentals of and analytical methods in human and vertebrate cytogenetics. Characterisation of the normal human karyotype and chromosome aberrations. Introduction to chromosome evolution.

Intended learning outcomes
Students who complete this module will acquire the theoretical basis of and practical experience in human cytogenetics. They will learn how to prepare and identify human chromosomes and critically interpret cytogenetic findings.

Courses
This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 03-4S1HG-BC-1HZ-092: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 03-4S1HG-BC-2HZ-092: S (no information on SWS (weekly contact hours) and course language available)

Method of assessment
Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 03-4S1HG-BC-1HZ-092: Human cytogenetics for students of biochemistry

- 3 ECTS, Method of grading: numerical grade
- 2 written examinations (multiple choice): mid-semester examination (approx. 15 minutes), end-of-semester examination (approx. 20 minutes), weighted 1:1

Assessment in module component 03-4S1HG-BC-2HZ-092: Human cytogenetics for students of biochemistry (Seminar)

- 2 ECTS, Method of grading: (not) successfully completed
- presentation (approx. 20 to 30 minutes)

Allocation of places
Biochemie (Biochemistry) Bachelor’s: 4 places. Selection process Biochemie (Biochemistry) Bachelor’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

Additional information
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<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Bioinformatics for advanced Students in Biochemistry</td>
<td>07-4BFMZ4-BC-092-m01</td>
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<tr>
<td>holder of the Chair of Bioinformatics</td>
<td>Faculty of Biology</td>
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<td>undergraduate</td>
<td>Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.</td>
</tr>
</tbody>
</table>

**Contents**

The module will introduce students to the practice of bioinformatics and will cover the following topics: sequence analysis, structure analysis, genome analysis, cellular and metabolic networks as well as gene regulation.

**Intended learning outcomes**

Students are able to use appropriate bioinformatic algorithms to address simple problems as well as to interpret their results.

**Courses**

| V + Ü (no information on SWS (weekly contact hours) and course language available) |

**Method of assessment**

| log (approx. 10 to 20 pages) |

Assessment offered: once a year, summer semester

Language of assessment: German or English

**Allocation of places**

Biochemie (Biochemistry) Bachelor’s: 4 places. Selection process Biochemie (Biochemistry) Bachelor’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

**Additional information**

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

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Module title | Abbreviation
---|---
Organic Chemistry 4 | 08-OC4-102-m01

<table>
<thead>
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<tr>
<td>holder of the Chair of Organic Chemistry II</td>
<td>Institute of Organic Chemistry</td>
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<tr>
<td>1 semester</td>
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<td>By way of exception, additional prerequisites are listed in the section on assessments.</td>
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</table>

Contents

This module focuses on heterocyclic compounds, dyes, naturally occurring substances, biopolymers and protecting group techniques. Students enhance their experimental skills by working with special hazardous substances, using complicated working and synthesis techniques as well as extensive purification methods and performing elaborate product analyses.

Intended learning outcomes

Students are able to name important heteroaromatics and to formulate their reactions and syntheses. They are able to characterise and categorise dyes. Students are able to describe the structure and selective synthesis of proteins. In addition, they are able to describe the structure of the DNA, carbohydrates, fats, terpenes and steroids. Students know how to safely and responsibly handle special hazardous substances. They are able to perform complex syntheses, purification methods and product analyses. They are able to use specialist literature to plan experiments.

Courses

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 08-OC4-1-102: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 08-OC4-2-102: P (no information on SWS (weekly contact hours) and course language available)

Method of assessment

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-OC4-1-102: Organic Chemistry 4

- 5 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
- Language of assessment: German or English
- Only after successful completion of module components: 08-OC1 or 08-OC1-GHR
- Other prerequisites: Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).

Assessment in module component 08-OC4-2-102: Organic Chemistry - advanced laboratory course for students of chemistry

- 5 ECTS, Method of grading: (not) successfully completed
- pre/post-experiment examination talks (Vor-/Nachtestate, approx. 15 minutes each), log (approx. 5 to 10 pages)
- Assessment offered: once a year, winter semester
- Language of assessment: German, English
- Only after successful completion of module components: 08-OC3 (module component 08-OC3-2 only) or 08-OC3P

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<tr>
<td>Additional information</td>
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<th>(examination regulations for teaching-degree programmes)</th>
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<td>§ 62 (1) 2. Chemie &quot;Organische und Bioorganische Chemie&quot;</td>
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Module Catalogue for the Subject Biochemistry
Bachelor’s with 1 major, 180 ECTS credits

<table>
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<tr>
<th>Module title</th>
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<td>Immunology for students of biochemistry</td>
<td>03-4S1IM-BC-112-m01</td>
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<tr>
<td>holder of the Professorship of Immunogenetics</td>
<td>Faculty of Medicine</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>By way of exception, additional prerequisites are listed in the section on assessments.</td>
</tr>
</tbody>
</table>

Contents

This module gives an introduction to immunology. The following questions will be addressed: How does the body recognise and eliminate pathogens and tumour cells? How can the immune system damage its own body (allergies, autoimmunity)? Organs, cells and molecules of the immune system will be presented with an emphasis on genetic and molecular mechanisms of recognition and elimination of foreign substances by the immune system. The most important immunological techniques will be introduced and applied.

Intended learning outcomes

The students acquire a practical knowledge of cellular and molecular techniques for the analysis of the immune system. They are familiar with the mechanisms of self and non-self discrimination by the adaptive and innate immune systems. They acquire a fundamental knowledge of lymphocyte development as well as major immune effector cell functions and molecules.

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 03-4S1IM-BC-1-112: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 03-4S1IM-BC-2-112: P (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 03-4S1IM-BC-1-112: Introduction into Immunology (Lecture and Practice)

- 2 ECTS, Method of grading: numerical grade
- written examination (approx. 30 minutes)
- Language of assessment: German or English
- Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.

Assessment in module component 03-4S1IM-BC-2-112: Immunology (Laboratory Course)

- 3 ECTS, Method of grading: (not) successfully completed
- log (approx. 10 to 20 pages)
- Assessment offered: once a year, summer semester
- Language of assessment: German or English
- Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.

Allocation of places

Biochemie (Biochemistry) Bachelor’s: 16 places. Selection process Biochemie (Biochemistry) Bachelor’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of
subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

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<th>Additional information</th>
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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Virology 1

**Module title**
Virology 1

**Abbreviation**
03-4S1VL-112-m01

**Module coordinator**
holder of the Chair of Virology

**Module offered by**
Faculty of Medicine

**ECTS**
5

**Method of grading**
umerical grade

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

**Module level**
undergraduate

**Other prerequisites**
By way of exception, additional prerequisites are listed in the section on assessments.

**Contents**
The module provides an introduction to virology. The following questions will be addressed: What is a virus? What is the difference between viruses and bacteria? Which viruses exist? What are their replication strategies? How do antiviral compounds act? What is the concept of prion diseases? In addition, the module will discuss fundamental techniques in virology.

**Intended learning outcomes**
Students have developed a fundamental knowledge in molecular virology concerning the structure and replication of viruses, virus-host cell interactions and mechanisms of action of antiviral compounds. They have developed a knowledge of the application of cell and molecular techniques of virological basic science.

**Courses**
This module comprises 2 module components. Information on courses will be listed separately for each module component.

- **03-4S1VL-1-112:** Virology (Basic Virology)
  - 2 ECTS, Method of grading: numerical grade
  - methods of assessment: a) written examination (approx. 45 to 60 minutes) or b) log (approx. 10 to 20 pages) or c) oral examination of one candidate each (approx. 30 minutes) or d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or e) presentation (approx. 20 to 30 minutes); students will be informed about the method and length of the assessment prior to the course
  - Language of assessment: German or English

- **03-4S1VL-3-112:** Virology (Laboratory Course)
  - 3 ECTS, Method of grading: (not) successfully completed
  - methods of assessment: a) written examination (approx. 45 to 60 minutes) or b) log (approx. 10 to 20 pages) or c) oral examination of one candidate each (approx. 30 minutes) or d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or e) presentation (approx. 20 to 30 minutes); students will be informed about the method and length of the assessment prior to the course
  - Language of assessment: German or English

**Allocation of places**
Biologie (Biology) Bachelor’s: 18 places. Biochemie (Biochemistry) Bachelor’s: 18 places. Selection process: By way of exception, additional prerequisites are listed in the section on assessments.
places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available. Selection process Biologie (Biology) Bachelor's: Should the number of applications exceed the number of available places, places will be allocated as follows: Places will primarily be allocated to students of the Bachelor’s degree subject Biologie (Biology) with 180 ECTS credits. Should the module be used in other subjects, there will be two quotas: 95% of places will be allocated to students of the Bachelor’s degree subject Biologie (Biology) with 180 ECTS credits and 5% of places (a minimum of one participant in total) will be allocated to students of the Bachelor’s degree subject Biologie (Biology) with 60 ECTS credits and to students of the Bachelor’s degree subjects Computational Mathematics and Mathematik (Mathematics), each with 180 ECTS credits, as part of the application-oriented subject Biologie (Biology) (as well as potentially to students of other ‘importing’ subjects). Should the number of places available in one quota exceed the number of applications, the remaining places will be allocated to applicants from the other quota. Should there be, within one module component, several courses with a restricted number of places, there will be a uniform regulation for the courses of one module component. In this case, places on all courses of a module component that are concerned will be allocated in a standardised procedure. In this procedure, applicants who already have successfully completed at least one other module component of the respective module will be given preferential consideration. A waiting list will be maintained and places re-allocated as they become available. Selection process group 1 (95%): Places will primarily be allocated according to the applicants' previous academic achievements. For this purpose, applicants will be ranked according to the number of ECTS credits they have achieved and their average grade of all assessments taken during their studies or of all module components in the subject of Biologie (Biology) (excluding Chemie (Chemistry), Physik (Physics), Mathematik (Mathematics)) at the time of application. This will be done as follows: First, applicants will be ranked, firstly, according to their average grade weighted according to the number of ECTS credits (qualitative ranking) and, secondly, according to their total number of ECTS credits achieved (quantitative ranking). The applicants' position in a third ranking will be calculated as the sum of these two rankings, and places will be allocated according to this third ranking. Among applicants with the same ranking, places will be allocated according to the qualitative ranking or otherwise by lot. Selection process group 2 (5%): Places will be allocated according to the following quotas: Quota 1 (50% of places): total number of ECTS credits already achieved in modules/module components of the Faculty of Biology; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25% of places): number of subject semesters; among applicants with the same number of subject semesters, places will be allocated by lot. Should the module be used only in the Bachelor’s degree subject Biologie (Biology) with 180 ECTS credits, places will be allocated according to the selection process of group 1.

Additional information

Referred to in LPO I (examination regulations for teaching-degree programmes)
Module title | Abbreviation
---|---
Molecular Biology Lab | 08-BC-MOLP-111-m01

Module coordinator | Module offered by
holder of the Chair of Biochemistry | Chair of Biochemistry

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

Contents
The module provides practical skills in the fields of recombinant engineering and characterization of macromolecular complexes, current biomolecular techniques, analysis of biochemical processes in vivo, and up-to-date imaging techniques.

Intended learning outcomes
The student has knowledge of molecular biology and is able to apply the contents in practical experiments.

Courses (type, number of weekly contact hours, language — if other than German)
Ü (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.

Assessment offered: once a year, winter semester

Language of assessment: German or English

Allocation of places
Biochemie (Biochemistry) Bachelor’s: 24 places. Chemie (Chemistry) Master’s: 6 places. Selection process Biochemie (Biochemistry) Bachelor’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available. Selection process Chemie (Chemistry) Master’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): grade of module 08-BC; among applicants with the same grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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# Module Catalogue for the Subject Biochemistry
## Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
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<td>Specific Microbiology 2 for Students in Biochemistry</td>
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<td>holder of the Chair of Microbiology</td>
<td>Faculty of Biology</td>
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<td>1 semester</td>
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<td>By way of exception, additional prerequisites are listed in the section on assessments.</td>
</tr>
</tbody>
</table>

## Contents

In this module, students will acquire an in-depth insight into approaches and methods in microbiology.

## Intended learning outcomes

Students have acquired knowledge about general strategies and methods of microbiology. They are able to independently perform scientific laboratory work.

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 07-5S2MZ2-BC-2-111: S (no information on SWS (weekly contact hours) and course language available)
- 07-5S2MZ2-BC-1-111: V + Ü (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

### Assessment in module component 07-5S2MZ2-BC-2-111: Seminar Molecular Microbiology for Students in Biochemistry

- 3 ECTS, Method of grading: (not) successfully completed
- presentation (approx. 20 to 30 minutes)
- Assessment offered: once a year, winter semester

### Assessment in module component 07-5S2MZ2-BC-1-111: Molecular Microbiology for Students in Biochemistry

Molecular Microbiology for Students in Biochemistry

- 7 ECTS, Method of grading: numerical grade
- a) written examination (approx. 60 minutes) or b) log (approx. 10 to 20 pages) or c) oral examination of one candidate each (approx. 30 minutes) or d) oral examination in groups of up to 3 candidates (approx. 60 minutes) or e) presentation (approx. 20 to 30 minutes)
- Language of assessment: German or English
- Other prerequisites: Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.

## Allocation of places

Biochemie (Biochemistry) Bachelor’s: 6 places. Selection process Biochemie (Biochemistry) Bachelor’s: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

## Additional information

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<table>
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Thesis

(12 ECTS credits)
# Bachelor Thesis in Biochemistry

**Module title**: Bachelor Thesis in Biochemistry  
**Abbreviation**: 08-BA-BC-092-m01

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**Module coordinator**: chairperson of examination committee Biochemie (Biochemistry)  
**Module offered by**: Chair of Biochemistry

**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

**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 thesis  
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: 10 weeks.  
Referred to in LPO I (examination regulations for teaching-degree programmes)

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Subject-specific Key Skills
(15-17 ECTS credits)
<table>
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<tbody>
<tr>
<td>Mathematical Biology and Biostatistics</td>
<td>07-2BM-072-m01</td>
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<td>Faculty of Biology</td>
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<td>undergraduate</td>
<td>Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course.</td>
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</tbody>
</table>

**Contents**

Fundamental principles of the most important mathematical and statistical methods in biology.

**Intended learning outcomes**

Students will have acquired fundamental skills in the evaluation of experiments, the interpretation of readings and numbers as well as the mathematical description of biological processes.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 45 minutes) including multiple choice questions

**Allocation of places**

Only as part of "spezielles Studienangebot": 30 places.

**Additional information**

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

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<table>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**Contents**

Fundamental principles of bioinformatics.

**Intended learning outcomes**

Students are proficient in methods for the analysis of DNA and protein databases.

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 07-3A3Bl-1B-072: V (no information on SWS (weekly contact hours) and course language available)
- 07-3A3Bl-2B-072: S (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

**Assessment in module component 07-3A3Bl-1B-072: Bioinformatics (Lecture)**

- 1 ECTS, Method of grading: numerical grade
- written examination (approx. 20 minutes)

**Assessment in module component 07-3A3Bl-2B-072: Bioinformatics (Seminar)**

- 1 ECTS, Method of grading: (not) successfully completed
- term paper (approx. 5 to 10 pages)

**Allocation of places**

Only as part of Biochemistry Master's: 5 places. Places will be allocated by lot.

**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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</thead>
<tbody>
<tr>
<td>Contemporary Research in Biochemistry</td>
<td>03-FOR-BC-092-m01</td>
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<th>Module offered by</th>
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<tr>
<td>holder of the Chair of Biochemistry</td>
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<tbody>
<tr>
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</table>

**Contents**

Presentation of current research results in the Biocentre colloquium and discussion of recent literature.

**Intended learning outcomes**

Students are introduced to the topics of current research in the life sciences.

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

V + S (no information on SWS (weekly contact hours) and course language available)

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

attendance of 80% of talks

**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>
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<tr>
<td>Managing Director of the Institute of Physiology</td>
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<tr>
<td>1 semester</td>
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</table>

**Contents**

Neurophysiology, cardiac/circulatory function, kidney, blood, respiration, acid/base homeostasis, endocrinology, nutrition and digestion, liver function.

**Intended learning outcomes**

Students are familiar with the fundamental principles of human physiology.

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

V (no information on SWS (weekly contact hours) and course language available)

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

Written examination (30 multiple choice questions)

**Allocation of places**

--

**Additional information**

--

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

--
### Module Catalogue for the Subject Biochemistry

**Bachelor's with 1 major, 180 ECTS credits**

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Laboratory animal sciences</td>
<td>03-VTK-092-m01</td>
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**Module coordinator**

Animal Welfare Officer of the University of Würzburg

**Module offered by**

Faculty of Medicine

<table>
<thead>
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<th>ECTS</th>
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<tr>
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</table>

**Duration**

1 semester

**Module level**

undergraduate

**Other prerequisites**

Admission prerequisite to assessment: regular attendance of lab course as specified at the beginning of the course.

### Contents

Theoretical and practical basic knowledge of animal welfare legislation, animal welfare ethics and laboratory animal science.

### Intended learning outcomes

Students have the expertise to carry out or participate in animal experiments according to the guidelines of FELASA (Cat. B).

### Courses

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

V + P *(no information on SWS (weekly contact hours) and course language available)*

### Method of assessment

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

Written examination *(approx. 60 minutes)*

### Allocation of places

--

### Additional information

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

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## Module Catalogue for the Subject Biochemistry

### Bachelor's with 1 major, 180 ECTS credits

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### Contents

Students complete a placement at a non-university research/diagnostic institution or a business. Contents to be determined by the host institution. The contents of the placement should correspond to the contents of a lab course offered in the context of the Bachelor's programme in Biochemistry (180 ECTS credits); please consult with the competent coordinator in advance.

### Intended learning outcomes

Students are acquainted with the structures of non-university institutions and possess specific professional skills.

### Courses

(P (no information on SWS (weekly contact hours) and course language available))

### Method of assessment

(a) written examination (approx. 60 to 90 minutes) or (b) log (approx. 20 pages) or (c) oral examination of one candidate each (approx. 20 minutes) or (d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or (d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.

Language of assessment: German 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>
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<tr>
<td>Toxicology and legal studies</td>
<td>03-TR-072-m01</td>
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<th>Module offered by</th>
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<td>lecturer of lecture &quot;Toxikologie und Rechtskunde&quot;</td>
<td>Faculty of Medicine</td>
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</table>

**Contents**

Basics of legal regulations for chemists (handling and transportation of hazardous materials), fundamentals of toxicology.

**Intended learning outcomes**

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

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

V + V (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 minutes)

**Allocation of places**

--

**Additional information**

--

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

--
### Module Catalogue for the Subject
Biochemistry

Bachelor's with 1 major, 180 ECTS credits

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<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<td>Philosophy 2</td>
<td>06-B-P2TF2-102-m01</td>
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<td>holder of the Chair of Theoretical Philosophy</td>
<td>Institute of Philosophy</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>Admission prerequisite to assessment: regular attendance of seminar (a maximum of 2 incidents of unexcused absence).</td>
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</tbody>
</table>

**Contents**

Introduction to the theory of intellectual disciplines; philosophical bases of the humanities and the social sciences.

**Intended learning outcomes**

Intended learning outcomes: Content-related outcomes: - insight into the relationship of philosophy to individual intellectual disciplines - ability to reflect on the historical and intellectual origins of our knowledge culture - ability to organise topics into overarching historical, social, and political schemata - insight into the scope and limits of various intellectual disciplines - knowledge of, and ability to criticise, basic assumptions in systems of thought, culture, and knowledge Formal outcomes (skills to be tested in the assessment): - ability to analyse philosophical texts and issues - ability to organise concepts and philosophical positions into overarching intellectual schemata - ability to present philosophical positions in a structured and linguistically appropriate manner

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

V + S (no information on SWS (weekly contact hours) and course language available)

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

written examination (approx. 90 minutes)

**Allocation of places**

Only as part of pool of general key skills (ASQ): maximum 20 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot.

**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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<td>Introductory Neurobiology for students of biomedicine</td>
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<td>holder of the Chair of Clinical Neurobiology</td>
<td>Faculty of Medicine</td>
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<td>Admission prerequisite to assessment: regular attendance of courses (lectures excluded) as specified at the beginning of the course.</td>
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</tbody>
</table>

**Contents**

General fundamentals of neuroanatomy, important methods in neurobiology, diseases of the nervous system: symptoms, diagnosis, therapeutic options, discussion of novel research results.

**Intended learning outcomes**

Students who successfully completed this module have acquired a fundamental knowledge about the structure and function of the nervous system. Giving oral presentations, they have developed the ability to critically reflect and discuss current scientific research results in the context of the field of neurobiology.

**Courses**

(V + S + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

Methods of assessment: a) written examination (45 to 60 minutes) or b) log (10 to 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or e) presentation (20 to 30 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

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<table>
<thead>
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<th>Module title</th>
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<tr>
<td>Practical Course - external, abridged</td>
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<th>Module offered by</th>
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<tr>
<td>chairperson of examination committee Biochemie (Biochemistry)</td>
<td>Chair of Biochemistry</td>
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**Contents**

Students complete a placement at a non-university research/diagnostic institution or a business. Contents to be determined by the host institution. The contents of the placement should correspond to the contents of a lab course offered in the context of the Bachelor’s programme in Biochemistry (180 ECTS credits); please consult with the competent coordinator in advance.

**Intended learning outcomes**

Students are acquainted with the structures of non-university institutions and possess specific professional skills.

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

P (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.

Language of assessment: German or English

**Allocation of places**

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**Additional information**

--

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

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### Practical Course - abroad

<table>
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<th>Abbreviation</th>
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<td>Practical Course - abroad</td>
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<td>chairperson of examination committee Biochemie (Biochemistry)</td>
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</table>

**Contents**

The internship is carried out at universities abroad and can be embedded within offered study programs (e.g. Erasmus). The content requirements should comply with those of the electives of the Biochemistry Bachelor program at the University of Würzburg (what has to be ascertained in advance under discussion with the module coordinator).

**Intended learning outcomes**

The students are familiar with working methods at universities abroad. Besides professional competences they have also acquired language and social skills.

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

<table>
<thead>
<tr>
<th>Type</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 (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.

Language of assessment: German or English

**Allocation of places**

--

**Additional information**

--

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

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### Module title
Practical Course - abroad, abridged

### Abbreviation
08-APK-111-m01

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### Contents
The internship is carried out at universities abroad and can be embedded within offered study programs (e.g. Erasmus). The content requirements should comply with those of the electives of the Biochemistry Bachelor program at the University of Würzburg (what has to be ascertained in advance under discussion with the module coordinator).

### Intended learning outcomes
The students are familiar with working methods at universities abroad. Besides professional competences they have also acquired language and social skills.

### Courses
*P (no information on SWS (weekly contact hours) and course language available)*

### Method of assessment
*P (no information on SWS (weekly contact hours) and course language available)*

*a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.*

Language of assessment: German 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>

**Contents**

The lab course is carried out in a working group with biochemical and / or molecular biology research orientation at the University of Würzburg. The contents of the lab course have to be defined in advance in consultation with the module responsible. The lab course allows intensive training in biochemistry, molecular biology and / or bioinformatics research methods. The experiments and their results are documented in a written protocol.

**Intended learning outcomes**

After attending the lab course, the student has advanced methodological knowledge. He/She is able to transfer the methods used in this course on other issues and to assess their applicability. He/She is trained in scientifically correct documentation and discussion of experimentation and results.

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

P (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.

Language of assessment: German 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)

--
## Module title

### Practical lab course, abridged

### Abbreviation

08-LPK-111-m01

## Module coordinator

Chairperson of examination committee Biochemie (Biochemistry)

## Module offered by

Chair of Biochemistry

## ECTS

5

## Method of grading

Only after successfully completed module(s)

## Duration

1 semester

## Module level

Undergraduate

## Other prerequisites

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## Contents

The lab course is carried out in a working group with biochemical and/or molecular biology research orientation at the University of Würzburg. The contents of the lab course have to be defined in advance in consultation with the module responsible. The lab course allows intensive training in biochemistry, molecular biology and/or bioinformatics research methods. The experiments and their results are documented in a written protocol.

## Intended learning outcomes

After attending the lab course, the student has advanced methodological knowledge. He/She is able to transfer the methods used in this course on other issues and to assess their applicability. He/She is trained in scientifically correct documentation and discussion of experimentation and results.

## Courses

No information on SWS (weekly contact hours) and course language available

## Method of assessment

- Written examination (approx. 60 to 90 minutes)
- Log (approx. 20 pages)
- Oral examination of one candidate each (approx. 20 minutes)
- Oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes)
- Presentation (approx. 30 minutes)

Language of assessment: German 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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Bachelor's with 1 major Biochemistry (2011)
### Module title
Scientific lecturing 1

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>08-WIRE1-111-m01</th>
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</table>

### Module coordinator
Chairperson of examination committee Biochemie (Biochemistry)

### Module offered by
Chair of Biochemistry

### ECTS
5

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

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### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
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### Contents
The module offers the opportunity to learn correct presenting and mediating scientific questions by giving a tutorial attendant to a lecture at the faculty of chemistry and pharmacy.

### Intended learning outcomes
The students are able to adequately prepare and present scientific questions, and to guide students in lower semesters.

### Courses
(No information on SWS (weekly contact hours) and course language available)

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### Method of assessment
(No information on SWS (weekly contact hours) and course language available)

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<th>preparation of materials for demonstrations and exercises</th>
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Language of assessment: German or English

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

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**Contents**

The module offers the opportunity to learn correct presenting and mediating scientific questions by giving a tutorial attendant to a lecture at the faculty of chemistry and pharmacy.

**Intended learning outcomes**

The students are able to adequately prepare and present scientific questions, and to guide students in lower semesters.

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

Ü (no information on SWS (weekly contact hours) and course language available)

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

preparation of materials for demonstrations and exercises
Language of assessment: German 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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### Contemporary Research in Biochemistry 1

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<td>Contemporary Research in Biochemistry 1</td>
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### Contents

In the course of the module current results of local, national or international research groups are presented in a lecture series. The methods are described and the results are integrated into the context of current literature.

### Intended learning outcomes

After attending the module events, students have knowledge of the current progress of biochemical research. They can understand the discussed issues and summarize and reflect the contents in a short talk.

### Courses

V + S (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

presentation (approx. 10 minutes)
Language of assessment: German 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)

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### Module Catalogue for the Subject Biochemistry

**Bachelor’s with 1 major, 180 ECTS credits**

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**Module coordinator**
holder of the Chair of Biochemistry

**Module offered by**
Chair of Biochemistry

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**Contents**

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**Intended learning outcomes**

After attending the module events, students have knowledge of the current progress of biochemical research. They can understand the discussed issues and summarize and reflect the contents in a short talk.

**Courses**

V + S (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

presentation (approx. 10 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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

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**Contents**

In the course of the module current results of local, national or international research groups are presented in a lecture series. The methods are described and the results are integrated into the context of current literature.

**Intended learning outcomes**

After attending the module events, students have knowledge of the current progress of biochemical research. They can understand the discussed issues and summarize and reflect the contents in a short talk.

**Courses**

V + S (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

presentation (approx. 10 minutes)

Language of assessment: German or English

**Allocation of places**

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**Additional information**

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

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### Contents

The student attends a biochemistry-related project pre-agreed by the module responsible, subsequently reporting about the outcome.

### Intended learning outcomes

The student acquires specific biochemistry-related skills and is able to reflect about the project in a final report.

### Courses

S (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

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

short log (approx. 1 page)

Language of assessment: German 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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## Biochemical Practical Seminar 2

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<td>Biochemical Practical Seminar 2</td>
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### Module coordinator
Chairperson of examination committee Biochemie (Biochemistry)

### Module offered by
Chair of Biochemistry

### ECTS Method of grading Only after succ. compl. of module(s)
1 (not) successfully completed --

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

### Contents
The student attends a biochemistry-related project pre-agreed by the module responsible, subsequently reporting about the outcome.

### Intended learning outcomes
The student acquires specific biochemistry-related skills and is able to reflect about the project in a final report.

### Courses
S (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
short log (approx. 1 page)
Language of assessment: German or English

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

The student attends a biochemistry-related project pre-agreed by the module responsible, subsequently reporting about the outcome.

**Intended learning outcomes**

The student acquires specific biochemistry-related skills and is able to reflect about the project in a final report.

**Courses**

S (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

short log (approx. 1 page)
Language of assessment: German 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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<tr>
<td>holder of the Chair of Organic Chemistry II</td>
<td>Institute of Organic Chemistry</td>
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</table>

**Contents**

This module discusses biologically important bonding classes, their reactions and syntheses, working with special hazardous substances, complicated working and synthesis techniques, purification methods and product analysis.

**Intended learning outcomes**

Students are able to name important heteroaromatics and to formulate their reactions and syntheses. They are able to characterise and categorise dyes. Students are able to describe the structure and selective synthesis of proteins. In addition, they are able to describe the structure of the DNA, carbohydrates, fats, terpenes and steroids.

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

V + Ü (no information on SWS (weekly contact hours) and course language available)

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

a) written examination (approx. 90 to 180 minutes) or b) oral examination of one candidate each (approx. 20 to 30 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) log (approx. 20 pages) or e) presentation (approx. 30 minutes). Students will be informed about the type and length of assessment prior to the course.

Language of assessment: German 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>
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<td>Information Literacy for Students of the Natural Sciences (Basic Level)</td>
<td>41-IK-NW1-101-m01</td>
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**Module coordinator**

- head of University Library

**Module offered by**

- University Library

**ECTS**

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**Duration**

- 1 semester

**Module level**

- undergraduate

**Contents**

Information literacy in an academic context:

- Search strategies and tools.
- Using the library’s electronic resources.
- Resources for natural sciences: databases and journals.
- Online searches and search engines.
- Overview of additional resources (eLearning etc.).
- Reference management. Some sections of the module will focus on particular disciplines (wherever possible, on disciplines in the natural sciences).

**Intended learning outcomes**

Students know what information is needed for what purpose. They are able to locate information that is relevant within their discipline and beyond in a variety of resources and to evaluate this information. They recognise the difference in quality between information they have retrieved from specific, restricted access resources (databases) and information they have found on the free web. Students are able to manage and process the information they have found, using reference management software and eLearning tools. The module aims to equip students with the skills needed to find information and literature that is relevant to the topics of their Bachelor’s theses.

**Courses**

- Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

- a) written examination (approx. 60 minutes) or b) preparing and delivering a presentation with slides (approx. 10 minutes or approx. 5 minutes and approx. 1 page) or c) completing exercises (approx. 10 exercises) or d) presentation without slides (approx. 20 to 30 minutes) or e) preparing and delivering a presentation with slides (approx. 5 minutes) and completing exercises (approx. 5 exercises) or f) presentation without slides (approx. 10 to 15 minutes) and completing exercises (approx. 5 exercises)

**Allocation of places**

Number of places: 5-50. There is a restricted number of places. If necessary, places will be allocated as follows: Students of the degree programmes of the respective subject-specific focuses will be given preferential consideration. The remaining places, if and when any become available, will be allocated to students of the other natural sciences degree programmes. In each of the above-mentioned groups, 30% of places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. The remaining 70% of places will each be allocated by lot.

**Additional information**

- --

**Referred to in LPO I**

(Examination regulations for teaching-degree programmes)
**Module title**
Information Literacy for Students of the Natural Sciences (Advanced Level)

**Abbreviation**
41-IK-NW2-101-m01

**Module coordinator**
head of University Library

**Module offered by**
University Library

**ECTS**
2

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

**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**
Knowledge and skills equivalent to those achieved in the basic module desirable.

### Contents

Information literacy in an academic context:
- More in-depth discussion of selected topics that were covered in the level one module, e.g. searching subject-specific databases.
- Publishing and information practices in the natural sciences.
- Subject-specific information retrieval tools, e.g. classifications and thesauri.
- New web-based information and communication technologies.
- Searching for subject-specific facts (e.g. substances and physical data).
- Information search skills for the workplace.
- Copyright and citations.
- Electronic publishing. Some sessions will focus on particular disciplines (wherever possible, on disciplines in the natural sciences).

### Intended learning outcomes

Students have developed a differentiated understanding of the publishing and information practices in their discipline and are familiar with the possibilities offered by electronic publishing. They are able to use electronic tools to locate subject-specific facts in a variety of resources. Students are able to work with subject-specific information retrieval tools as well as to use new web-based technologies to share information. They have developed an understanding of the legal framework surrounding publications, information, and communication in an academic context and are able to use information responsibly.

### Courses

Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

a) written examination (approx. 60 minutes) or b) preparing and delivering a presentation with slides (approx. 10 minutes or approx. 5 minutes and approx. 1 page) or c) completing exercises (approx. 10 exercises) or d) presentation without slides (approx. 20 to 30 minutes) or e) preparing and delivering a presentation with slides (approx. 5 minutes) and completing exercises (approx. 5 exercises) or f) presentation without slides (approx. 10 to 15 minutes) and completing exercises (approx. 5 exercises)

### Allocation of places

Number of places: 10 to 50. There is a restricted number of places. If necessary, places will be allocated as follows: Students of the degree programmes of the respective subject-specific focuses will be given preferential consideration. The remaining places, if and when any become available, will be allocated to students of the other natural sciences degree programmes. In each of the above-mentioned groups, 30% of places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. The remaining 70% of places will each be allocated by lot.

### Additional information

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

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