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: 2009
Responsible: Faculty of Chemistry and Pharmacy
Contents

The subject is divided into 3

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Content and Objectives of the Programme
No translation available.
Abbreviations used

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

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

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

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

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

Conventions

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

Notes

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

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

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

In accordance with

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

\text{ASPO2009}

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

\text{3-Aug-2010 (2010-41)}

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 | Abbreviation
--- | ---
Structural Biology 1 | 03-5S2ST-092-m01

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

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<th>Module level</th>
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<tr>
<td>1 semester</td>
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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 (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. 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 (groups of up to 3 candidates, approx. 60 minutes) or e) presentation (approx. 20 to 30 minutes)

Allocation of places

--

Additional information

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Referred to in LPO 1 (examination regulations for teaching-degree programmes)

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Module title
Inorganic Chemistry 1

Abbreviation
08-AC1-BC-092-m01

Module coordinator
Lecturer of lecture "Experimentalchimie" (Experimental Chemistry)

Module offered by
Institute of Inorganic Chemistry

ECTS
16

Method of grading
Numerical grade

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

Duration
1 semester

Module level
Undergraduate

Other prerequisites
--

Contents


Intended learning outcomes

German intended learning outcomes available but not translated yet.


Courses

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-AC1-1-072: V + 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-AC1-BC-2-092: Practical course of Inorganic Chemistry 1 for Biochemistry Majors

- 4 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-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-AC1-1-072:** Principles of Inorganic Chemistry

- 10 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: 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)
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<thead>
<tr>
<th><strong>Module title</strong></th>
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<td>Organic Chemistry - laboratory course for students of biochemistry</td>
<td>08-OC3P-092-m01</td>
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<tr>
<th><strong>Module coordinator</strong></th>
<th><strong>Module offered by</strong></th>
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<tbody>
<tr>
<td>holder of the Chair of Organic Chemistry II</td>
<td>Institute of Organic Chemistry</td>
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<td>undergraduate</td>
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**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

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

**Method of assessment**

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

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**

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<th>Module title</th>
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<td>Physical Chemistry 2 for Biochemistry Majors: Thermodynamics, Kinetics,</td>
<td>o8-PC2-BC-092-m01</td>
</tr>
<tr>
<td>Electrochemistry</td>
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**Module coordinator**

- lecturer of lecture "Thermodynamik, Kinetik, Elektrochemie"

**Module offered by**

- Institute of Physical and Theoretical Chemistry

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</table>

**Duration**

- 1 semester

**Module level**

- undergraduate

**Other prerequisites**

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

### Contents

German contents available but not translated yet.


### Intended learning outcomes

German intended learning outcomes available but not translated yet.


### Courses

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

- o8-PC2-BC-2-092: P (no information on SWS (weekly contact hours) and course language available)
- o8-PC2-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

- Assessment in module component o8-PC2-BC-2-092: Physical Chemistry 2 for Biochemistry Majors: Thermodynamics, Kinetics, Electrochemistry
  - 6 ECTS, Method of grading: (not) successfully completed
  - Vor- und Nachtesten (pre-experiment exams, approx. 15 minutes each), assessment of practical performance (log approx. 5 to 10 pages), Nachtesten (post-experiment exams, approx. 15 minutes each)
  - Assessment offered: once a year, winter semester

- Assessment in module component o8-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

Additional information

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

§ 62 (1) 1. Chemie "Allgemeine und Anorganische Chemie"; "Physikalische und Analytische Chemie"
<table>
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<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<td>Introduction to Physics for Students of Non-physics-related Minor Subjects</td>
<td>11-EFNF-072-m01</td>
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<td>Faculty of Physics and Astronomy</td>
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<tr>
<td>2 semester</td>
<td>undergraduate</td>
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**Contents**

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

**Intended learning outcomes**

The students have knowledge of the principles of Physics.

**Courses**

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

| V + 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. 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>
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<th>Module title</th>
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<tr>
<td>Practical Course Physics for Students of Non-physics-related Minor Subjects</td>
<td>11-PFNF-072-m01</td>
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<table>
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<tr>
<td>Mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance, Atomic and Nuclear Physics.</td>
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<th>Intended learning outcomes</th>
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<tr>
<td>The students have knowledge of the principles of Physics.</td>
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<td>P (no information on SWS (weekly contact hours) and course language available)</td>
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<tr>
<th>Method of assessment</th>
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<tbody>
<tr>
<td>a) oral test (approx. 15 minutes) during experiment and b) ungraded written examination (approx. 90 minutes)</td>
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<td>Only as part of pool of general key skills (ASQ): 10 places. Places will be allocated by lot.</td>
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<td>(examination regulations for teaching-degree programmes)</td>
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</table>
### Module title

**Organic Chemistry 2**

### Abbreviation

08-OC2-092-m01

### Module coordinator

Holder of the Chair of Physically Organic Chemistry

### Module offered by

Institute of Organic Chemistry

### ECTS

9

### Method of grading

Numerical grade

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

--

### Duration

1 semester

### Module level

Undergraduate

### Other prerequisites

--

### Contents

German contents available but not translated yet.


### Intended learning outcomes

German intended learning outcomes available but not translated yet.


### Courses

| type, number of weekly contact hours, language — if other than German |
| V + Ü + 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)

a) 1 to 3 written examinations (1 written examination: 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) 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)

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<th>Module title</th>
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<td>Physical Chemistry 1</td>
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<td>Institute of Physical and Theoretical Chemistry</td>
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<tr>
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<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>

**Contents**

German contents available but not translated yet.


**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Die Studierenden sind in der Lage, grundlegende Modelle der Quantenmechanik zu erklären und bei Molekülen anzuwenden. Er/Sie kann unterschiedliche spektroskopische Methoden darstellen. Die Studierenden können die mathematischen Grundlagen der elementaren der Quantenmechanik anwenden.

**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)

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### 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

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

### 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, archaebacteria) 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
--

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

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Module title | Abbreviation
---|---
Bioanalytics | 08-BAN-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) |
---|---|---|
8 | numerical grade | -- |

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

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 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>Biochemistry for Biology Majors</td>
<td>08-BCBC-092-m01</td>
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<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>holder of the Chair of Biochemistry</td>
<td>Chair of Biochemistry</td>
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<tr>
<th>ECTS</th>
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<th>Only after succ. compl. of module(s)</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
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<tbody>
<tr>
<td>2 semester</td>
<td>undergraduate</td>
<td>By way of exception, additional prerequisites are listed in the section on assessments.</td>
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</tbody>
</table>

## Contents

German contents available but not translated yet.


## Intended learning outcomes

German intended learning outcomes available but not translated yet.


## 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
### Module Catalogue for the Subject Biochemistry

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

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<tr>
<th>Allocation of places</th>
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<tr>
<th>Additional information</th>
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<table>
<thead>
<tr>
<th>Referred to in LPO I</th>
<th>(examination regulations for teaching-degree programmes)</th>
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<table>
<thead>
<tr>
<th>Module title</th>
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<tbody>
<tr>
<td>Molecular Biology</td>
<td>08-BC-MOL-092-m01</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

### 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.

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

**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)

### Allocation of places

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### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)

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<td>Bachelor's Thesis Colloquium</td>
<td>08-KOLL-BC-092-m01</td>
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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**

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

**Method of assessment**

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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<td>Mathematics for students in Chemistry and Biology</td>
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<tr>
<td>Dean of Studies Mathematik (Mathematics)</td>
<td>Institute of Mathematics</td>
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<th>Other prerequisites</th>
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<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>
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</tbody>
</table>

**Contents**

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

**Intended learning outcomes**

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

**Courses**

(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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<td>08-OC1-092-m01</td>
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<tbody>
<tr>
<td>holder of the Professorship of Organic Chemistry</td>
<td>Institute of Organic Chemistry</td>
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<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>
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</table>

**Contents**

German contents available but not translated yet.

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

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

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**

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

(30 ECTS credits)
Module title | Abbreviation
---|---
Pathobiochemistry | 03-PBC-092-m01

Module coordinator | Module offered by
holder of the Chair of Clinical Biochemistry and Pathobiochemistry | Faculty of Medicine

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

Contents

Fundamentals of selected topics in pathobiochemistry and pathophysiology.

Intended learning outcomes

Students are familiar with the fundamentals of pathobiochemistry and pathophysiology.

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-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 (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-PBC-1-092: Basics in Pathobiochemistry Basics in Pathobiochemistry

- 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: Pathobiochemistry Practical Course

- 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-assigned as they become available.

Additional information

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<table>
<thead>
<tr>
<th>Module title</th>
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<tr>
<td>Advanced lab</td>
<td>08-AVP5-BC-092-m01</td>
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**Module coordinator**

chairperson of examination committee Biochemie (Biochemistry)

**Module offered by**

Chair of Biochemistry

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

**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 I**

(examination regulations for teaching-degree programmes)

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<td>Advanced lab</td>
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### ECTS
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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
 Ü (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
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### Additional information
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### Referred to in LPO I
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<table>
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<td>Cell biology</td>
<td>03-ZBP-092-m01</td>
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<td>holder of the Chair of Medical Radiation and Cell Research</td>
<td>Faculty of Medicine</td>
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</table>

**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**

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

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Module title | Molecular Tumor Biology 03-MTUB-092-m01
---|---
Module coordinator | holder of the Chair of Physiological Chemistry
Module offered by | Faculty of Medicine
ECTS | 5
Method of grading | numerical grade
Duration | 1 semester
Module level | undergraduate
Other prerequisites | --

Contents
Practical introduction to model systems (cell culture, animal models) and experimental methods of molecular tumor 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)
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## Module Title

### Immunology 1

<table>
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<tr>
<th>Module Title</th>
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<td>Immunology 1</td>
<td>03-4S1IM-101-m01</td>
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### Module Coordinator

Holder of the Professorship of Immunogenetics

### Module Offered By

Faculty of Medicine

### ECTS

5

### Method of Grading

Numerical grade

### Other Prerequisites

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

### 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

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

- **03-4S1IM-1IM-101**: V + Ü (no information on SWS (weekly contact hours) and course language available)
- **03-4S1IM-2IM-101**: 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 03-4S1IM-1IM-101: Introduction to Immunology**

- 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-2IM-101: Practical Course Immunology**

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

Biologie (Biology) Bachelor's: 16 places. Biochemie (Biochemistry) Bachelor's: 18 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 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. Quota 3 (25% of places): allocation 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: Virology 1

Abbreviation: 03-4S1VL-101-m01

Module coordinator: holder of the Chair of Virology

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: 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 3 module components. Information on courses will be listed separately for each module component.

- 03-4S1VL-1-101: V (no information on SWS (weekly contact hours) and course language available)
- 03-4S1VL-2-101: S (no information on SWS (weekly contact hours) and course language available)
- 03-4S1VL-3-101: 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 03-4S1VL-1-101: General Virology

- 1 ECTS, Method of grading: numerical grade
- written examination (approx. 20 minutes)
- Language of assessment: German or English

Assessment in module component 03-4S1VL-2-101: General Virology - Seminar

- 1 ECTS, Method of grading: (not) successfully completed
- presentation (approx. 20 to 30 minutes)
- Language of assessment: German or English

Assessment in module component 03-4S1VL-3-101: Practical Course Virology

- 3 ECTS, Method of grading: numerical grade
- written examination (approx. 20 minutes) or oral examination (approx. 20 minutes)
- Language of assessment: German or English
- Only after successful completion of module components: Successful completion of module components 03-4S1VL-1 and 03-4S1VL-2 is a prerequisite for participation in module component 03-4S1VL-3.
- Other prerequisites: Admission prerequisite to assessment: regular attendance of lab course as specified at the beginning of the course.

Allocation of places

Biologie (Biology) Bachelor’s: 18 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 gra-
de 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 ECTS credits achieved, places will be allocated by lot. Quota 3 (25% of places): allocation 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

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

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Module title | Abbreviation
---|---
Human genetics for students of biochemistry | 03-45sHG-BC-092-m01

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

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
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<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
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</tbody>
</table>

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.
- 03-45sHG-BC-1HZ-092: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 03-45sHG-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 03-45sHG-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 03-45sHG-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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Referred to in LPO I (examination regulations for teaching-degree programmes)
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<table>
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<td>Molecular Biology Lab</td>
<td>08-BC-MOLP-092-m01</td>
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<th>Module offered by</th>
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</thead>
<tbody>
<tr>
<td>holder of the Chair of Biochemistry</td>
<td>Chair of Biochemistry</td>
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<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
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<td>08-BC (module component 08-BC-1 only)</td>
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<tr>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**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**

(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.

Assessment offered: once a year, winter semester

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**

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

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Module title

Bioinformatics for advanced Students in Biochemistry

Abbreviation

07-4BFMZ4-BC-092-m01

Module coordinator

holder of the Chair of Bioinformatics

Module offered by

Faculty of Biology

ECTS

5

Method of grading

Only after succ. compl. of module(s)

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

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)

--
Specific Microbiology 2 for Students in Biochemistry

<table>
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<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>specific Microbiology 2</td>
<td>07-5S2MZ2-BC-092-m01</td>
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Module coordinator: holder of the Chair of Microbiology

Module offered by: Faculty of Biology

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<th>Duration</th>
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<tbody>
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<td>5</td>
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<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>

Duration: 1 semester

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

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

- 07-5S2MZ2-1MI-BC-092: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 07-5S2MZ2-2MI-BC-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 07-5S2MZ2-1MI-BC-092: Molecular Microbiology for Students in Biochemistry

- 4 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.

Assessment in module component 07-5S2MZ2-2MI-BC-092: Seminar Molecular Microbiology for Students in Biochemistry

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

Allocation of places

Biochemistry (Biochemistry) Bachelor’s: 12 places. Selection process Biochemistry (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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<tr>
<th>Additional information</th>
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<tbody>
<tr>
<td>Referred to in LPO I</td>
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<tr>
<td>(examination regulations for teaching-degree programmes)</td>
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</tbody>
</table>
Module title: Organic Chemistry 4  
Abbreviation: 08-OC4-101-m01

Module coordinator: holder of the Chair of Organic Chemistry II  
Module offered by: Institute of Organic Chemistry

ECTS: 10  
Method of grading: numerical grade  
Only after succ. compl. of module(s): 08-AC1 (module component 08-AC1-2 only) or 08-AC1-BC (module component 08-AC1-BC-2 only) or 08-AN1 (module component 08-AN1-2 only)

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

Contents:

German contents available but not translated yet.


Intended learning outcomes:

German intended learning outcomes available but not translated yet.


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

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

- 08-OC4-2-101: P (no information on SWS (weekly contact hours) and course language available)
- 08-OC4-1-092: 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-OC4-2-101: Organic Chemistry 4 (Lab Course)

- 5 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 in module component 08-OC4-1-092: Organic Chemistry 4 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)
- 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).
<table>
<thead>
<tr>
<th>Allocation of places</th>
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<tbody>
<tr>
<td>Additional information</td>
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<td>Referred to in LPO I (examination regulations for teaching-degree programmes)</td>
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Thesis

(12 ECTS credits)
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<th><strong>Module title</strong></th>
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<tbody>
<tr>
<td>Bachelor Thesis in Biochemistry</td>
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<th><strong>Module offered by</strong></th>
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<tbody>
<tr>
<td>chairperson of examination committee Biochemie (Biochemistry)</td>
<td>Chair of Biochemistry</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**Contents**

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

**Intended learning outcomes**

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

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

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**

--

**Additional information**

Additional information on module duration: 10 weeks.

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

--
Subject-specific Key Skills
(15-17 ECTS credits)
<table>
<thead>
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<tr>
<td>Philosophy 2</td>
<td>06-B-P2TF2-072-m01</td>
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<tbody>
<tr>
<td>holder of the Chair of Theoretical Philosophy</td>
<td>Institute of Philosophy</td>
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<td>5</td>
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<table>
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<th>Duration</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</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)

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. 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>
<thead>
<tr>
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<th>Abbreviation</th>
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<td>Mathematical Biology and Biostatistics</td>
<td>07-2BM-072-m01</td>
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<tbody>
<tr>
<td>holder of the Chair of Bioinformatics</td>
<td>Faculty of Biology</td>
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<tbody>
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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

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

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

### Method of assessment

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)
<table>
<thead>
<tr>
<th>Module title</th>
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<tbody>
<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)

--
Module title | Abbreviation
---|---
Contemporary Research in Biochemistry | 03-FOR-BC-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)
2 | (not) successfully completed | --

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

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>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<td>Physiology</td>
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<tbody>
<tr>
<td>Managing Director of the Institute of Physiology</td>
<td>Faculty of Medicine</td>
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<tr>
<td>1 semester</td>
<td>undergraduate</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**

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

**Method of assessment**

written examination (30 multiple choice questions)

**Allocation of places**

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**Additional information**

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

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Laboratory animal sciences</td>
<td>03-VTK-092-m01</td>
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<tbody>
<tr>
<td>Animal Welfare Officer of the University of Würzburg</td>
<td>Faculty of Medicine</td>
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<th>Other prerequisites</th>
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<td>Admission prerequisite to assessment: regular attendance of lab course as specified at the beginning of the course.</td>
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</table>

**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**

--

**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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<td>Practical Course - external</td>
<td>08-EP-092-m01</td>
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<tbody>
<tr>
<td>chairperson of examination committee Biochemie (Biochemistry)</td>
<td>Chair of Biochemistry</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

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

Das Praktikum wird außerhalb der Universität in einer außeruniversitären Forschungs-/Diagnostikeinrichtung oder als Betriebspraktikum in einer Firma durchgeführt. Die Inhalte des Praktikums werden von der jeweiligen Einrichtung bestimmt. Die inhaltlichen Anforderungen sollen denen eines im Bachelor Studiengang Biochemie (180 ECTS) angebotenen Praktikums entsprechen, was im Vorfeld mit dem Verantwortlichen abzusprechen ist.

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

### Courses

<table>
<thead>
<tr>
<th>type, number of weekly contact hours, language — if other than German</th>
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<tr>
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### Method of assessment

<table>
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<th>type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus</th>
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<tbody>
<tr>
<td>a) written examination (approx. 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</td>
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</table>

### Allocation of places

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### Additional information

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

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tr>
<td>Practical Course as Exchange Student</td>
<td>03-AP-092-m01</td>
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<td>degree programme coordinator Biochemie (Biochemistry)</td>
<td>Faculty of Medicine</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

### Contents

The practical course will be completed at a university abroad and may be completed within the context of an exchange programme (e.g., Erasmus). The contents should correspond to those of the electives of the degree programme (please consult with the person in charge in advance).

### Intended learning outcomes

The students are familiar with the working methods at universities abroad. In addition to professional competencies, they have also acquired language and social skills.

### Courses

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

### Method of assessment

- a) written examination (approx. 60 minutes)
- b) log (approx. 10 to 20 pages)
- c) oral examination of one candidate each (approx. 30 minutes)
- d) oral examination in groups (groups of up to 3 candidates, approx. 60 minutes)
- e) presentation (approx. 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>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<td>Toxicology and legal studies</td>
<td>03-TR-072-m01</td>
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<tbody>
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<td>lecturer of lecture &quot;Toxikologie und Rechtskunde&quot;</td>
<td>Faculty of Medicine</td>
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<tr>
<td>1 semester</td>
<td>undergraduate</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**

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

**Method of assessment**

written examination (approx. 90 minutes)

**Allocation of places**

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**Additional information**

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

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<td>Introductory Neurobiology for students of biomedicine</td>
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<th>Other prerequisites</th>
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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**

--

**Additional information**

--

**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

--
## Module title
Information Literacy for Students of the Natural Sciences (Basic Level)

### Abbreviation
41-IK-NW1-101-m01

## Module coordinator
head of University Library

## Module offered by
University Library

## ECTS
2

## Duration
1 semester

## Module level
undergraduate

## Other prerequisites
--

## 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
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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>Information Literacy for Students of the Natural Sciences (Advanced Level)</td>
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<td>head of University Library</td>
<td>University Library</td>
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<td>2</td>
<td>Only after succ. compl. of module(s)</td>
<td>Knowledge and skills equivalent to those achieved in the basic module desirable.</td>
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</table>

**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.