# Modules for Biology

## Mastermodule

### bio100 - Introduction into Didactics of Biology

<table>
<thead>
<tr>
<th>Module label</th>
<th>Introduction into Didactics of Biology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio100</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>Master of Education (Sonderpädagogik) Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td></td>
<td>Zwei-Fächer-Bachelor Biologie &gt; Aufbaumodule</td>
</tr>
</tbody>
</table>

### Contact person

- Module responsibility
  - Corinna Hößle
- Authorized examiners
  - Corinna Hößle
  - Wiebke Rathje
  - Bianca Kuhlemann
- Module counseling
  - Wiebke Rathje

### Entry requirements

Skills taught by this module:
The students will be introduced to the basics of didactics of biology. In the beginning the focus will lie on the standards of education and school-curriculums. Afterwards scientific methods, different methods of education, media, social forms and the culture of problem solving in biological classes will be reflected and realized by concrete examples out of everyday practice (micro-teaching). During the second half of the module the students will be able to conceive and reflect own concepts of teaching. Furthermore the possibilities of studying in out-of-school-facilities will be fathomed, excursions planned, realized and reflected.

Importance of this module during the studies:
Teaching skills for all fields of study (compulsory subject for following degrees: teaching post in primary school (Grundschule), extended elementary school (Hauptschule) and secondary school (Realschule)).

### Module contents

3. semester: seminar
Introduction to curricular standards, media, methods, social forms, concepts of pupils, instruments of diagnosis, natural scientific methods, culture of exercises in biological classes. Construction of teaching that considers social matters and the environment of the pupils.

4. semester: seminar and excursions
Forms and places for teaching biology, methods and media for teaching biological contents in different spheres of activity (scientific museums, botanical and zoological gardens, regional environmental centers, the Wadden Sea national park).

### Reader's advisory


### Links

- Language of instruction: German
- Duration (semesters): 2 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Modullevel: AM (Aufbaumodul)
- Modulart: Pflicht

### Lern-/Lehrform / Type of program

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>Papers have to be presented or handed in: one week after the end of the course</td>
<td>1 Presentation (50%), 1 oral exam (50%)</td>
</tr>
</tbody>
</table>

### Course type

- Seminar

<p>| SWS | 4.00 |</p>
<table>
<thead>
<tr>
<th>Frequency</th>
<th>56 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workload attendance</td>
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</table>
**bio110 - Practical Biology Experiments for Science Education**

<table>
<thead>
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<th>Module label</th>
<th>Practical Biology Experiments for Science Education</th>
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<tbody>
<tr>
<td>Module code</td>
<td>bio110</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
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</table>
| Used in course of study      | • Master of Education (Gymnasium) Biologie > Mastermodule  
• Master of Education (Sonderpädagogik) Biologie > Mastermodule  
• Zwei-Fächer-Bachelor Biologie > Aufbaumodule |
| Contact person               | Module responsibility                                |
|                              | • Corinna Hößle                                      |
|                              | • N. N.                                               |
| Authorized examiners         | • Corinna Hößle                                      |
|                              | • Wiebke Rathje                                      |
| Module counseling            | • Wiebke Rathje                                      |
| Entry requirements           |                                                      |
| Skills to be acquired in this module |                                                |
| Module contents              |                                                      |
| Reader's advisory            |                                                      |
| Links                        |                                                      |
| Language of instruction      | German                                               |
| Duration (semesters)         | 1 Semester                                           |
| Module frequency             | jährlich                                              |
| Module capacity              | unlimited                                             |
| Modullevel                   | MM (Mastermodul)                                     |
| Modulart                     | Ergänzung/Professionalisierung                        |
| Lern-/Lehrform / Type of program |                                                |
| Examination                  |                                                      |
| Time of examination          |                                                      |
| Type of examination          |                                                      |
| Final exam of module         |                                                      |
| Course type                  | Comment SWS Frequency Workload attendance             |
| Seminar                      | 2.00 28 h                                            |
| Practical                    | 3.00 42 h                                            |
| Total time of attendance for the module | 70 h                                               |
**bio120 - Science-Teaching and Learning in School-Labs**

**Module label**  
Science-Teaching and Learning in School-Labs

**Module code**  
bio120

**Credit points**  
3.0 KP

**Workload**  
90 h

**Used in course of study**
- Master of Education (Gymnasium) Biologie > Mastermodule
- Master of Education (Haupt- und Realschule) Biologie > Mastermodule
- Master of Education (Sonderpädagogik) Biologie > Mastermodule

**Contact person**
- **Module responsibility**
  - Corinna Hößle
- **Authorized examiners**
  - Corinna Hößle
  - Birgit Weusmann
  - Holger Winkler
  - Anja Wübben
  - Bianca Kuhlemann
- **Module counceling**
  - Birgit Weusmann
  - Holger Winkler
  - Anja Wübben

**Entry requirements**

**Skills to be acquired in this module**

**Module contents**

**Reader's advisory**

**Links**

**Language of instruction**  
German

**Duration (semesters)**  
1 Semester

**Module frequency**  
halbjährlich

**Module capacity**  
unlimited

**Modullevel**  
MM (Mastermodul)

**Modulart**  
Pflicht

**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**  
Time of examination

**Final exam of module**
- 1 unbenotetes Portfolio (Entwicklung eines Kurzentwurfs samt Arbeitsblättern/Forschertagebuch und eines Diagnosebogens, Durchführung und Reflektion eines Lernarrangements)

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>2.00</td>
<td></td>
<td>SuSe and WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Study trip</td>
<td>0.00</td>
<td></td>
<td>SuSe</td>
<td>0 h</td>
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**Total time of attendance for the module**

28 h
### Module label
Human Biology Experiments for Science Education

### Module code
bio130

### Credit points
6.0 KP

### Workload
180 h

### Used in course of study
- Master of Education (Gymnasium) Biologie > Mastermodule
- Master of Education (Haupt- und Realschule) Biologie > Mastermodule
- Master of Education (Sonderpädagogik) Biologie > Mastermodule

### Contact person
- Module responsibility
  - Corinna Hößle
- Authorized examiners
  - Corinna Hößle
  - Wiebke Rathje
- Module counseling
  - Wiebke Rathje

### Entry requirements

### Skills to be acquired in this module

### Module contents

### Reader's advisory

### Links

### Language of instruction
German

### Duration (semesters)
1 Semester

### Module frequency
jährlich

### Module capacity
unlimited

### Module level
MM (Mastermodul)

### Module type
Pflicht

### Lern-/Lehrform / Type of program

### Vorkenntnisse / Previous knowledge

### Examination

<table>
<thead>
<tr>
<th>Time of examination</th>
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<tr>
<td>1 portfolio</td>
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### Final exam of module

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>1.00</td>
<td></td>
<td></td>
<td>14 h</td>
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<tr>
<td>Practical</td>
<td>4.00</td>
<td></td>
<td></td>
<td>56 h</td>
</tr>
</tbody>
</table>

### Total time of attendance for the module
70 h
### bio245 - Flora and Fauna

**Module label**  
Flora and Fauna

**Module code**  
bio245

**Credit points**  
9.0 KP

**Workload**  
270 h

**Used in course of study**  
- Master of Education (Sonderpädagogik) Biologie > Mastermodule  
- Zwei-Fächer-Bachelor Biologie > Aufbaumodule

**Contact person**

- Module responsibility  
  - Dirk Carl Albach  
  - Thomas Glatzel

- Authorized examiners  
  - Dirk Carl Albach  
  - Thomas Glatzel  
  - Klaus Bernhard von Hagen

**Module counseling**  
- Klaus Bernhard von Hagen

**Entry requirements**

**Skills to be acquired in this module**

- Biological knowledge
- Knowledge of biological working methods
- Independent learning and (research-based) working
- Knowledge of safety and environmental issues

To determine species-rich taxa and to verify the results independently using relevant literature

**Module contents**

- **L**: Introduction to the variety of indigenous flora and fauna, presentation of important plant families and animal groups, studying the characteristics important for determination, introduction to systematics. Moreover, subjects are included that present ecological aspects of the taxa dealt with.
- **E**: Applying literature to determine animal and plant species and to classify them systematically.
- **EX**: Excursions to the characteristic North German biotopes. The excursions focus on correct identification and classification of plants and animals according to the properties of the living organism.

**Reader's advisory**

- **Botany**: Rothmaler - Exkursionsflora von Deutschland, Band 2 - Grundband, Spektrum Akademischer Verlag
- **Zoology**: M. Schaefer: Brohmer - Fauna von Deutschland, from 20th edition

**Links**

**Language of instruction**  
German

**Duration (semesters)**  
2 Semester

**Module frequency**  
jährlich

**Module capacity**  
unlimited

**Modullevel**  
---

**Modulart**  
je nach Studiengang Pflicht oder Wahlpflicht

**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**  
Time of examination  
Type of examination

**Final exam of module**  
Botany: Written examination before the end of the lecture  
1 written examination (Botany 50 %)  
1 written examination (Zoology 50 %)  
ungraded minutes

Zoology: Written examination before the end of the lecture

Please note: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

**Course type**  
**Comment**  
**SWS**  
**Frequency**  
Workload attendance

<table>
<thead>
<tr>
<th>Lecture</th>
<th>2.00</th>
<th>28 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises</td>
<td>4.00</td>
<td>56 h</td>
</tr>
<tr>
<td>Study trip</td>
<td>1.00</td>
<td>14 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module**  
98 h
### bio269 - Allgemeine Mikrobiologie

**Module label**
- Allgemeine Mikrobiologie

**Module code**
- bio269

**Credit points**
- 6.0 KP

**Workload**
- 180 h

**Used in course of study**
- Master of Education (Sonderpädagogik) Biologie > Mastermodule

**Contact person**
- Module responsibility
  - Ralf Andreas Rabus
- Authorized examiners
  - Erhard Rhiel
  - Ralf Andreas Rabus
  - Lars Wöhlbrand
- Module counseling
  - Erhard Rhiel
  - Lars Wöhlbrand

**Entry requirements**

**Skills to be acquired in this module**

**Module contents**

**Reader's advisory**

**Links**

**Language of instruction**
- German

**Duration (semesters)**
- 1 Semester

**Module frequency**
- jährlich

**Module capacity**
- unlimited

**Modulelevel**
- AC (Aufbaucurriculum)

**Modulart**
- Wahlpflicht

**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**
- Time of examination
- Type of examination

**Final exam of module**
- 1 written exam

**Course type**
- Comment
- SWS
- Frequency
- Workload attendance

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>0.00</td>
<td>WiSe</td>
<td>0 h</td>
</tr>
<tr>
<td>Lecture</td>
<td></td>
<td>0.00</td>
<td>WiSe</td>
<td>0 h</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>0.00</td>
<td>WiSe</td>
<td>0 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module**
- 0 h
bio279 - Basic Concepts in Animal Physiology

Module label: Basic Concepts in Animal Physiology
Module code: bio279
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Master Engineering Physics > Schwerpunkt: Biomedical Physics
- Master of Education (Sonderpädagogik) Biologie > Mastermodule

Contact person:
Module responsibility:
- Dominik Heyers

Authorized examiners:
- Dominik Heyers
- Christine Köppl
- Karin Dedek

Module counseling:
- Christine Köppl
- Karin Dedek

Entry requirements:
Skills to be acquired in this module:
++ biological knowledge
++ knowledge of biological working methods
+ biologically relevant knowledge in the natural sciences and mathematics
++ statistics & scientific programming
++ abstract, logical, analytical thinking
+ deepened expertise in biological specialist field
++ independent learning and (research-based) working
+ teamwork

Basic knowledge on physiological processes and their underlying mechanisms with a focus on human physiology. Performing, analysing and documenting physiological experiments.

Module contents:
The lecture (Vorlesung: 5.02.271 - Physiologie der Tiere und des Menschen) covers topics such as cell physiology, sensory physiology, neurophysiology, functions of the vegetative system, blood physiology/immune response, blood cycle, respiration and digestion. Emphasis will be on human physiology. In the following lab exercises, students get the opportunity to perform physiological experiments linking to topics from the lecture. By performing experiments on themselves and computer simulations students will gain insight into the underlying physiological principles.

Reader's advisory:
Klinke, Pape, Kurtz, Silbernagl: Physiologie, Aufl. 6, 2010
Schmidt, Lang, Heckmann: Physiologie des Menschen mit Pathophysiologie, Aufl. 31, 2011
(if available: Wehner, Gehring: Zoologie)

Links:

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Modullevel: ---
Modulart: je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

Examination:
Time of examination: within a few weeks after the winter term lecture period
Type of examination: written exam (100%)

To qualify for the exam, the following additional requirements need to be met:
- regular participation in the laboratory experiments (no more than 1 day of absence)
- lab protocols for each experiment which have been accepted by the respective supervisors
A cumulative bonus can be obtained with good lab protocols. The decision whether a given protocol deserves the bonus lies with the respective supervisor of each experiment.

The bonus improves the exam mark by maximally two steps (0.7). The bonus is optional, an exam mark of 1.0 is achievable without a bonus. A bonus cannot be applied to pass a failed exam.

PLEASE NOTE:
Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

<table>
<thead>
<tr>
<th>Course type</th>
<th>Lecture</th>
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<tbody>
<tr>
<td>SWS</td>
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<tr>
<td>Frequency</td>
<td></td>
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<tr>
<td>Workload attendance</td>
<td>56 h</td>
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</table>
### Module Information

**Module label**: Plant Physiology  
**Module code**: bio289  
**Credit points**: 6.0 KP  
**Workload**: 180 h  
**Used in course of study**: Master of Education (Sonderpädagogik) Biologie > Mastermodule  
**Contact person**: Sascha Laubinger, Gerhard Wolfgang Zotz  
**Entry requirements**:  
- ++ biological knowledge  
- ++ knowledge of biological working methods  
- + biologically relevant knowledge in the natural sciences and mathematics  
- + statistics & scientific programming  
- + abstract, logical, analytical thinking  
- + independent learning and (research-based) working  
- + teamwork  
- + (scientific) communication skills  

### Module Contents

**Reader’s advisory**

**Language of instruction**: German  
**Duration (semesters)**: 1 Semester  
**Module frequency**: jährlich  
**Module capacity**: unlimited  
**Modullevel**: ---  
**Modulart**: je nach Studiengang Pflicht oder Wahlpflicht

### Examination

**Vorkenntnisse / Previous knowledge**  
**Examination**

<table>
<thead>
<tr>
<th>Type of program</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>Comment</td>
<td>SWS</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
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</table>

**Total time of attendance for the module**: 0 h
bio299 - Genetics

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<th>Genetics</th>
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</thead>
<tbody>
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<td>bio299</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
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</tr>
<tr>
<td>Used in course of study</td>
<td>• Master of Education (Sonderpädagogik) Biologie &gt; Mastermodule</td>
</tr>
</tbody>
</table>

Contact person

- Module responsibility
  - Maike Claußen
- Authorized examiners
  - Maike Claußen
  - Hans Gerd Nothwang
  - Anna-Maria Hartmann

Module counseling

- Anna-Maria Hartmann
- Hans Gerd Nothwang

Entry requirements

Skills to be acquired in this module

++ biological knowledge
++ knowledge of biological working methods
+ biologically relevant knowledge in the natural sciences and mathematics
+ abstract, logical, analytical thinking
++ deepened expertise in biological specialist field
++ independent learning and (research-based) working
++ data presentation and evidence-based discussion (written and spoken)
+ teamwork
++ (scientific) communication skills
+ project and time management
+ knowledge of safety and environmental issues

Module contents

Reader's advisory

Links

- Language of instruction: German

Duration (semesters)

1 Semester

Module frequency

jährlich

Module capacity

unlimited

Modullevel

---

Modular

je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>1 ungraded report</td>
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</table>

Final exam of module

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>1.00</td>
<td></td>
<td>WiSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Lecture</td>
<td>1.00</td>
<td></td>
<td>WiSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Practical</td>
<td>4.00</td>
<td></td>
<td>WiSe</td>
<td>56 h</td>
</tr>
<tr>
<td>Exercises</td>
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<td></td>
<td>WiSe</td>
<td>0 h</td>
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Total time of attendance for the module

84 h
### Abschlussmodul

**mam - Master´s Thesis Module**

<table>
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<tr>
<th><strong>Module label</strong></th>
<th>Master´s Thesis Module</th>
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<tbody>
<tr>
<td><strong>Module code</strong></td>
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<td><strong>Credit points</strong></td>
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<td>Master of Education (Sonderpädagogik) Biologie &gt; Abschlussmodul</td>
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<td><strong>Entry requirements</strong></td>
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<tr>
<td><strong>Skills to be acquired in this module</strong></td>
<td></td>
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<td><strong>Module contents</strong></td>
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<td><strong>Reader's advisory</strong></td>
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<td><strong>Languages of instruction</strong></td>
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</tr>
<tr>
<td><strong>Duration (semesters)</strong></td>
<td>1 Semester</td>
</tr>
<tr>
<td><strong>Module frequency</strong></td>
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<td><strong>Module capacity</strong></td>
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<tr>
<td><strong>Modullevel</strong></td>
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<td><strong>Modulart</strong></td>
<td>je nach Studiengang Pflicht oder Wahlpflicht</td>
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<td><strong>Lern-Lehrform / Type of program</strong></td>
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<tr>
<td><strong>Vorkenntnisse / Previous knowledge</strong></td>
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<tr>
<td><strong>Examination</strong></td>
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</tr>
<tr>
<td><strong>Final exam of module</strong></td>
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</tr>
<tr>
<td><strong>Course type</strong></td>
<td>Seminar</td>
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<td><strong>SWS</strong></td>
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<td><strong>Frequency</strong></td>
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<tr>
<td><strong>Workload attendance</strong></td>
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Frühere Module

bio295 - Genetics

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<tr>
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<td>bio295</td>
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<tr>
<td>Credit points</td>
<td>9.0 KP</td>
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<tr>
<td>Workload</td>
<td>270 h</td>
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Used in course of study
- Fach-Bachelor Biologie > Aufbaumodule
- Master of Education (Sonderpädagogik) Biologie > Frühere Module
- Zwei-Fächer-Bachelor Biologie > Aufbaumodule

Contact person
- Module responsibility
  - Maike Claußen

Authorized examiners
- Maike Claußen
- Hans Gerd Nothwang
- Anna-Maria Hartmann
- Lena Ebbers

Module counseling
- Anna-Maria Hartmann
- Hans Gerd Nothwang
- Lena Ebbers

Entry requirements

Skills to be acquired in this module
- ++ biological knowledge
- ++ knowledge of biological working methods
- + biologically relevant knowledge in the natural sciences and mathematics
- + abstract, logical, analytical thinking
- ++ deepened expertise in biological specialist field
- ++ independent learning and (research-based) working
- ++ data presentation and evidence-based discussion (written and spoken)
- + teamwork
- ++ (scientific) communication skills
- + project and time management
- + knowledge of safety and environmental issues

Fundamentals of genetics, performing experiments, quantitative analyses.

Module contents
- general and molecular genetics; mechanisms of mutation, recombination, DNA repair, regulation of transcription; quantitative experiments, prokaryotes and eukaryotes, human genome project, personalized medicine, genetic engineering, safety regulations, sterile working

Reader's advisory
- Campbell/Reece Biologie (latest edition, Pearson Verlag), Strachan & Read Molekulare Humangenetik (latest edition, Sprektrum Verlag);
- Purves Biologie (latest edition, Sprektrum Verlag).

Links

Language of instruction
- German

Duration (semesters)
- 1 Semester

Module frequency
- jährlich

Module capacity
- 72

Modullevel
- AC (Aufbaucurriculum / Composition)

Modulart
- Wahlpflicht / Elective

Lern-/Lehrform / Type of program
- lecture, seminar, exercise

Vorkenntnisse / Previous knowledge

Examination
- Time of examination
- Type of examination
- Written examination (100%), ungraded presentation, protocol

Course type
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<th>Frequency</th>
<th>Workload attendance</th>
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**Total time of attendance for the module**

84 h