**Modules for Biology**

**Mastermodule**

**bio100 - Introduction into Didactics of Biology**

<table>
<thead>
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<th>Module label</th>
<th>Introduction into Didactics of Biology</th>
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<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
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<tr>
<td></td>
<td>Master of Education (Sonderpädagogik) Biologie &gt; Mastermodule</td>
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<td></td>
<td>Zwei-Fächer-Bachelor Biologie &gt; Aufbaumodule</td>
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<tr>
<td>Contact person</td>
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<td>Module responsibility</td>
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<tr>
<td></td>
<td>Corinna Hößle</td>
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<tr>
<td>Authorized examiners</td>
<td></td>
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<tr>
<td></td>
<td>Corinna Hößle</td>
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<tr>
<td></td>
<td>Wiebke Rathje</td>
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<td></td>
<td>Bianca Kuhlemann</td>
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<td>Module counseling</td>
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<td>Wiebke Rathje</td>
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</table>

**Entry requirements**

**Skills to be acquired in this module**

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 their 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
Module level           AM (Aufbaumodul)
Moduleart              Pflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

Time of examination

- Final exam of module: Papers have to be presented or handed in: one week after the end of the course
- Type of examination: 1 Presentation (50%), 1 oral exam (50%)

**Course type**

Seminar

**SWS**

4.00
<table>
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<tbody>
<tr>
<td>Workload attendance</td>
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bio110 - Practical Biology Experiments for Science Education

Module label: Practical Biology Experiments for Science Education
Module code: bio110
Credit points: 6.0 KP
Workload: 180 h

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 Hörßle
  - N. N.
Authorized examiners:
  - Corinna Hörßle
  - 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:

Vorkenntnisse / Previous knowledge:

Examination:

Type of examination:

Final exam of module:

Course type: Seminar
Comment: 2.00
SWS: 2.00
Frequency: 28 h
Workload attendance: 28 h

Course type: Practical
Comment: 3.00
SWS: 3.00
Frequency: 42 h
Workload attendance: 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 counseling
- 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  Type of examination
Final exam of module  1 unbenotetes Portfolio (Entwicklung eines Kurzentwurfs samt Arbeitsblättern/Forschertagebuch und eines Diagnosebogens, Durchführung und Reflektion eines Lernarrangements)

Course type  Comment  SWS  Frequency  Workload attendance
Seminar  2.00  SuSe and WiSe  28 h
Study trip  0.00  SuSe  0 h

Total time of attendance for the module  28 h
bio130 - Human Biology Experiments for Science Education

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

Modullevel MM (Mastermodul)

Modulart Pflicht

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination Time of examination Type of examination

Final exam of module 1 portfolio

Course type Comment SWS Frequency Workload attendance
Lecture 1.00 14 h
Practical 4.00 56 h

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
- Zoology: Written examination before the end of the lecture

1 written examination (Botany 50 %)
1 written examination (Zoology 50 %)
ungraded minutes

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

Lecture 2.00 28 h
Exercises 4.00 56 h
Study trip 1.00 14 h

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

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<tr>
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<tr>
<td>Credit points</td>
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<td>Workload</td>
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<td>Used in course of study</td>
<td>• Master of Education (Sonderpädagogik) Biologie &gt; Mastermodule</td>
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**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

**Modullevel**

- AC (Aufbaucurriculum)

**Modulart**

- Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

- Final exam of module
  - 1 written exam

**Course type**

<table>
<thead>
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<th>Frequency</th>
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<td>Exercises</td>
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<td>0.00</td>
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**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
- ++ 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
- + 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)

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited

Lern- /Lehrform / Type of program

Vorkenntnisse / Previous knowledge
Examination: Time of examination: Type of examination: written exam (100%)
Final exam of module: within a few weeks after the winter term lecture period
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.

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**bio289 - Plant Physiology**

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**Contact person**

- Module responsibility
  - Sascha Laubinger
- Authorized examiners
  - Sascha Laubinger
  - Gerhard Wolfgang Zotz
- Module counseling
  - Gerhard Wolfgang Zotz

**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
- + independent learning and (research-based) working
- + teamwork
- + (scientific) communication skills

**Module contents**

**Reader's advisory**

**Links**

**Language of instruction**

- German

**Duration (semesters)**

- 1 Semester

**Module frequency**

- jährlich

**Module capacity**

- unlimited

**Modullevel**

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**Modulart**

je nach Studiengang Pflicht oder Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
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<th>Type of examination</th>
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**Final exam of module**

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**Total time of attendance for the module**

- 0 h
bio299 - Genetics

Module label: Genetics
Module code: bio299
Credit points: 6.0 KP
Workload: 180 h

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

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
Module level: ---

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 1 ungraded report

Course type Comment SWS Frequency Workload attendance
Seminar 1.00 WiSe 14 h
Lecture 1.00 WiSe 14 h
Practical 4.00 WiSe 56 h
Exercises 0.00 WiSe 0 h

Total time of attendance for the module: 84 h
Abschlussmodul

mam - Master´s Thesis Module

<table>
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<td>je nach Studiengang Pflicht oder Wahlpflicht</td>
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| Lern-/Lehrform / Type of program |                |
|Vorkenntnisse / Previous knowledge |                |

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</thead>
<tbody>
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Frühere Module

bio295 - Genetics

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<th>Genetics</th>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</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, Spektrum Verlag);
  - Purves Biologie (latest edition, Spektrum Verlag).

**Language of instruction**
- German

**Duration (semesters)**
- 1 Semester

**Module frequency**
- jährlich

**Module capacity**
- 72

**Modullevel**
- AC (Aufbautenriculum / Composition)

**Modulart**
- Wahlpflicht / Elective

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

**Vorkenntnisse / Previous knowledge**

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

**Final exam of module**

<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>1.50</td>
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<td>Exercises</td>
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<td>42 h</td>
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**Links**
- ***Campbell/Reece Biologie (latest edition, Pearson Verlag), Strachan & Read Molekulare Humangenetik (latest edition, Spektrum Verlag), Purves Biologie (latest edition, Spektrum Verlag).***
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<th>Comment</th>
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<tbody>
<tr>
<td>Seminar</td>
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<td>1.50</td>
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<td>21 h</td>
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**Total time of attendance for the module** 84 h