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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>bio210</td>
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<td>bio220</td>
<td>Introductory Zoology-Botany</td>
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<tr>
<td>bio230</td>
<td>Microbiology and Cell Biology</td>
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<tr>
<td>bio215</td>
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<tr>
<td>bio233</td>
<td>Basics in Microbiology and Genetics</td>
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<tr>
<td>bio236</td>
<td>Basics in Biochemistry and Cell Biology</td>
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<td>bio239</td>
<td>Didactical Excercises and Genetics</td>
<td>14</td>
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<td>bio100</td>
<td>Introduction into Didactics of Biology</td>
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<td>bio110</td>
<td>Practical Biology Experiments for Science Education</td>
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<td>bio285</td>
<td>Plant Physiology, Molecular Biology and Biotechnology</td>
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<td>bio300</td>
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<td>bio310</td>
<td>General Ecology</td>
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<tr>
<td>bio320</td>
<td>Pollination and Dispersal Biology</td>
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<td>bio330</td>
<td>Marine Ecology</td>
<td>33</td>
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<td>bio340</td>
<td>Morphology, Phylogeny, and Evolution of Metazoa</td>
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<td>bio350</td>
<td>Organismic Microanatomy</td>
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<td>Marine Biodiversity</td>
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<td>bio370</td>
<td>Flora Advanced Plant Biodiversity</td>
<td>41</td>
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<td>bio380</td>
<td>Specific Microbiology</td>
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<td>bio400</td>
<td>Basic Concepts in Neurobiology I</td>
<td>43</td>
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<tr>
<td>bio410</td>
<td>Basic Concepts in Neurobiology II</td>
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<td>bio390</td>
<td>Plant molecular biology and genetics</td>
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<td>Pollination and Dispersal - Concepts</td>
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<td>Pollination and Dispersal - Methods</td>
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<td>Pollination and Dispersal - Methods not just for Schools</td>
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<td>Microscopical Anatomy</td>
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<td>Flora - Advanced Concepts</td>
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<td>Experiments in Neurobiology II</td>
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<td>Biochemistry of the Cell</td>
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<td>bio430</td>
<td>Analytical Biochemistry</td>
<td>64</td>
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<tr>
<td>bio440</td>
<td>Microfauna, Microflora &amp; Protista of limnic and marine habitats</td>
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<tr>
<td>bio450</td>
<td>Posters, Pictures, Presentations and Papers</td>
<td>67</td>
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<tr>
<td>bio460</td>
<td>Diversity of marine Invertebrates</td>
<td>69</td>
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<tr>
<td>bio470</td>
<td>Marine Biology Field Trip</td>
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<td>Functional Morphology of Plants</td>
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<td>bio408</td>
<td>Introduction to Neurobiology I</td>
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<td>Marine Biology Field Trip</td>
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<td>bio473</td>
<td>Evolutionsgeschichte des Lebens: Leben im Wandel der Erdzeitalter</td>
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<td>Statistics for Biologists</td>
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<td>bio250</td>
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<tr>
<td>che101</td>
<td>Basic Chemistry</td>
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<td>che102</td>
<td>Basic Chemistry Laboratory</td>
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<tr>
<td>che190</td>
<td>Basic Organic Chemistry</td>
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<tr>
<td>che290</td>
<td>Experimental Organic Chemistry</td>
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<td>Mathematics for the Life Sciences</td>
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<td>Physics for Students of Biology and Dual Subject Chemistry</td>
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<td>Exercises in Biochemistry and Molecular Biology</td>
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Basismodule

bio210 - General Biology

Module label: General Biology
Module code: bio210
Credit points: 12.0 KP
Workload: 360 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Basismodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule

Responsible persons:
- Zotz, Gerhard Wolfgang (Module counselling)
- Gerlach, Gabriele (Authorized examiners)

Prerequisites:
Skills to be acquired in this module:
++ biological knowledge
+ knowledge of biological working methods
++ biologically relevant knowledge in the natural sciences and mathematics
+ interdisciplinary knowledge & thinking

The students are enabled:
- to understand and explain the fundamentals of the subjects dealt with in "Purves" or "Campbell" and to give examples,
- to find the role of biology in other special fields according to their inclinations and abilities,
- to reflect upon the role of biology in other special fields and in a modern society,
- to approach their individual planning of studies according to their inclinations and abilities

Module contents:
The lecture imparts the basic knowledge of biology and covers the subjects dealt with in the textbooks "Purves" or "Campbell"

Reader's advisory:
Purves, Spektrum Verlag, latest edition
Campbell, Pearson Verlag, latest edition

Links:
Language of instruction: German
Duration (semesters): 2 Semester
Module frequency: jährlich
Module capacity: unlimited

Modullevel / module level: Pflicht / Mandatory
Modulart / typ of module: (pro Semester)

Vorkenntnisse / Previous knowledge:

Examination:
Time of examination: Written examination either in the final week of the semester or in the first week of the semester vacation
Type of examination: One written examination in the winter and summer terms (50 % each)
PLEASE NOTE:
Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

Final exam of module:

Course type:
Lecture: 8
Tutorial: WiSe 0
Seminar (PFLICHT für Erstsemester!):
Pflichtveranstaltung für alle Studierenden im 1. Semester (Bachelor und Master)
SoSe und WiSe 0

Frequency
112
0

Workload of compulsory attendance

5 / 88
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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bio220 - Introductory Zoology-Botany

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<td>Module code</td>
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<tr>
<td>Credit points</td>
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<td>Workload</td>
<td>270 h</td>
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<td>Applicability of the module</td>
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<td></td>
<td>Bachelor's Programme Biology (Bachelor) &gt; Basismodule</td>
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<td>Dual-Subject Bachelor's Programme Biology (Bachelor) &gt; Basismodule</td>
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</table>

Responsible persons

Zotz, Gerhard Wolfgang (Module responsibility)
Bininda-Emonds, Olaf (Module responsibility)
Glatzel, Thomas (Module responsibility)
Ahlrichs, Wilko (Module counselling)
Glatzel, Thomas (Module counselling)
Ahlrichs, Wilko (Authorized examiners)
Bininda-Emonds, Olaf (Authorized examiners)
Zotz, Gerhard Wolfgang (Authorized examiners)
Will, Maria (Authorized examiners)

Prerequisites

keine

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
+ independent learning and (research-based) working
+ teamwork

THEORY:

* To understand the fundamentals of reconstructing phylogenetic relationships
* To know the phylogenetic system and ground pattern of high-ranking ancestral animal species
* To know the cell structures, organization, and reproduction of plants and animals
* To know the morphology and anatomy of individual species

PRACTICE:

* To improve and verify the theoretical knowledge acquired from lectures and textbooks by studying the original
* To train visual and tactile perception by studying various species
* To learn that representations in textbooks are abstractions of a much more complex reality
* To be able to criticize representations in textbooks and models
* To acquire the knowledge of the function in living animals and plants by studying preserved specimens
* Learning how to follow preparation instructions
* Learning that the organization of individual species may be highly variable
* Preparing records or drawings from the information obtained by original specimens studied

Module contents

GENERAL: Light microscopic methods are applied to study structures in plants and animals. Records in the form of descriptions and drawings.

BOTANY: Morphological structure and reproduction of various plant organization types with a focus on the structure of plant tissue. Representation of the relationships between structure and function with regard to absorption processes, transport processes, transpiration, and photosynthesis.


Reader's advisory

GENERAL:: Campbell: Biologie (Spektrum Verlag) or Purves: Biologie (Spektrum Verlag), latest edition


<table>
<thead>
<tr>
<th>Links</th>
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<tbody>
<tr>
<td>Language of instruction</td>
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<tr>
<td>Duration (semesters)</td>
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<tr>
<td>Modullevel / module level</td>
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<td>Modulart / typ of module</td>
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<tr>
<th>Lehr-/Lernform / Teaching/Learning method</th>
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<tr>
<td>Vorkenntnisse / Previous knowledge</td>
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<tr>
<td>Examination</td>
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<tr>
<td>Final exam of module</td>
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PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

<table>
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<td>4</td>
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<td>Tutorial</td>
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<td>WiSe</td>
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Total time of attendance for the module 84 h
**bio230 - Microbiology and Cell Biology**

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<tr>
<td>Credit points</td>
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<td>Workload</td>
<td>270 h</td>
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<td>- Bachelor's Programme Biology (Bachelor) &gt; Basismodule</td>
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<td>- Dual-Subject Bachelor's Programme Biology (Bachelor) &gt; Basismodule</td>
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<tr>
<td>Responsible persons</td>
<td>Rabus, Ralf Andreas (Authorized examiners)</td>
</tr>
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<td>Nothwang, Hans Gerd (Authorized examiners)</td>
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<td>Claußen, Maike (Module counselling)</td>
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<td>Prerequisites</td>
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<tr>
<td>Skills to be acquired in this module</td>
<td>++ biological knowledge</td>
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<tr>
<td></td>
<td>++ knowledge of biological working methods</td>
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<td></td>
<td>+ biologically relevant knowledge in the natural sciences and mathematics</td>
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<td></td>
<td>+ abstract, logical, analytical thinking</td>
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<td></td>
<td>+ deepened expertise in biological specialist field</td>
</tr>
<tr>
<td></td>
<td>+ teamwork</td>
</tr>
<tr>
<td>Theory</td>
<td>Basic knowledge in Biochemistry, Microbiology, Cell Biology and Genetics</td>
</tr>
<tr>
<td>Practice</td>
<td>Basic methodological skills acquired by performing experiments</td>
</tr>
</tbody>
</table>

| Module contents               | Fundamentals of Microbiology and Cell Biology: Molecules of life; energy and enzymes; central metabolism; breathing; photosynthesis; anaerobic metabolism; chemolithotrophy; procaryotic and eucaryotic cell structures; microbial diversity; importance of microorganisms for human beings, plants, animals, biotechnology and earth system cell group; signal transmission and communication between cells; meiosis; mitosis; mendelian inheritance; chromosomal and molecular basis of inheritance; replication; transcription; translation; genomic organization; mutation and repair. |

| Reader's advisory             | Purves et al., Biologie (Spektrum Verlag), latest edition |
|                               | Campbell, Pearson Verlag, latest edition |
|                               | Fuchs, Allgemeine Mikrobiologie (Thieme Verlag), latest edition |
|                               | Lodisch et al., Molekulare Zellbiologie (Spektrum Verlag), latest edition |

| Links                         |                                |
| Language of instruction       | German                         |
| Duration (semesters)          | 1 Semester                     |
| Module frequency              | jährlich                       |
| Module capacity               | unlimited                      |
| Modulelevel / module level    | BC (Basiscurriculum / Base curriculum) |
| Modulart / typ of module      | Pflicht / Mandatory           |
| Lehr-/Lernform / Teaching/Learning method |              |

| Vorkenntnisse / Previous knowledge |                                |
| Examination                      | Time of examination            | Type of examination                  |
| Final exam of module             | Written examination in the final week of the current part | 1 written examination (50%) following the part Microbiology |
|                                 |                               | 1 written examination (50%) following the part Cell Biology |
|                                 |                               | Records are collected following every course day. |
|                                 |                               | PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply |

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bio215 - Introduction to Biology

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<td>Workload</td>
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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Basismodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule

**Responsible persons**
- Gerlach, Gabriele (Module responsibility)
- Zotz, Gerhard Wolfgang (Module counselling)
- Sienknecht, Ulrike (Module counselling)
- Gerlach, Gabriele (Authorized examiners)
- Köppl, Christine (Authorized examiners)
- Zotz, Gerhard Wolfgang (Authorized examiners)
- Sienknecht, Ulrike (Authorized examiners)

**Prerequisites**
++ biological knowledge
+ knowledge of techniques in biology
++ biologically relevant knowledge in the natural sciences and mathematics
+ cross-disciplinary knowledge and thinking

**Module contents**
Lecture conveys knowledge in
- evolution, ecology and biodiversity (WiSe)
- animal physiology and developmental biology (SoSe)

**Reader's advisory**
Campbell et al. "Biologie", Pearson
Sadava et al. "Purves, Biologie", Springer

**Links**
German

**Duration (semesters)**
2 Semester

**Module frequency**
BC (Basiscurriculum / Base curriculum)

**Modulart / typ of module**
Pflicht / Mandatory

**Lehr-/Lernform / Teaching/Learning method**
Vorlesung

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
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**Final exam of module**
lecture-free periods after each series
2 written examinations (WiSe and SoSe)

<table>
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<tr>
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**Total time of attendance for the module**
84 h
bio233 - Basics in Microbiology and Genetics

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<td>Workload</td>
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| Applicability of the module  | - Bachelor's Programme Biology (Bachelor) > Basismodule  
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule |
| Responsible persons          | Rabus, Ralf Andreas (Module responsibility)  
Claußen, Maike (Module counselling)  
Rabus, Ralf Andreas (Authorized examiners)  
Claußen, Maike (Authorized examiners) |
| Prerequisites                 |                                     |
| Skills to be acquired in this module | ++ biological knowledge  
+ knowledge of biological working methods  
+ biologically relevant knowledge in the natural sciences and mathematics  
+ deepened expertise in biological specialist field  
+ independent learning and (research-based) working |
| Module contents              | Grundlagen der Mikrobiologie und Genetik:  
Mikrobiologie: Moleküle des Lebens; Energie und Enzyme.; Zentralstoffwechsel; Atmung; Photosynthese; anaerober Stoffwechsel; Chemolithotrophie; prokaryotische Zellstruktur; mikrobielle Diversität; Bedeutung von Mikroorganismen für Mensch, Pflanze und Tier; Biotechnologie und Erdsystem.  
Genetik: Mitose und Zellzyklus, Meiose und Rekombination, Mendelsche Vererbungslehre, chromosomale und molekulare Grundlagen der Vererbung; Replikation, Transkription, Translation, Mutation und DNA-Reparatur, Organisation des genetischen Materials und Genregulation |
| Reader's advisory            | Purves Biologie (Spektrum Verlag), neueste Ausgabe  
Campbell et al., Biologie (Pearson Verlag), neueste Ausgabe  
Fuchs, Allgemeine Mikrobiologie (Thieme Verlag), neueste Auflage |
| Links                        |                                     |
| Language of instruction      | German                              |
| Duration (semesters)         | 1 Semester                          |
| Module frequency             |                                     |
| Module capacity              | unlimited                           |
| Modulelevel / module level   | BC (Basiscurriculum / Base curriculum) |
| Modulart / typ of module     | Pflicht / Mandatory                 |
| Lehr-/Lernform / Teaching/Learning method | lecture |
| Vorkenntnisse / Previous knowledge |                             |
| Examination                  |                                      |
| Time of examination          |                                      |
| Type of examination          |                                      |
| Final exam of module         | Klausuren direkt nach jeweiligem Veranstaltungsteil  
2 Prüfungsleistungen:  
- 1 Klausur (50 %) nach dem Teil Mikrobiologie  
- 1 Klausur (50 %) nach dem Teil Genetik |
| Course type                  | Comment                              |
|                              | SWS | Frequency | Workload of compulsory attendance |
| Lecture                      | 4   | SoSe oder WiSe | 56 |
| Tutorial (optional)          |     | SoSe und WiSe | 0 |
| Total time of attendance for the module | 56 h |
### bio236 - Basics in Biochemistry and Cell Biology

<table>
<thead>
<tr>
<th><strong>Module label</strong></th>
<th>Basics in Biochemistry and Cell Biology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module code</strong></td>
<td>bio236</td>
</tr>
<tr>
<td><strong>Credit points</strong></td>
<td>6.0 KP</td>
</tr>
<tr>
<td><strong>Workload</strong></td>
<td>180 h</td>
</tr>
</tbody>
</table>
| **Applicability of the module** | - Bachelor's Programme Biology (Bachelor) > Basismodule  
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule |
| **Responsible persons** | Koch, Karl-Wilhelm (Module responsibility)  
Winklhofer, Michael (Module counselling)  
Koch, Karl-Wilhelm (Authorized examiners)  
Winklhofer, Michael (Authorized examiners) |
| **Prerequisites** | Zulassung BSc Biologie                   |
| **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 |
| **Module contents** | Introduction to structure and function of main biochemical building blocks; amino acids, carbohydrates, proteins, nucleic acids, introduction to metabolism; biological membranes and transmembrane transport; structure and function of cell organelles; protein synthesis and posttranslational modification, intracellular transport and trafficking, signalling agents and cellular communication, cell division, controlled cell death |
| **Reader's advisory** | Biochemie, Müller-Esterl  
Stryer Biochemie, Berg, Tymoczko, Stryer  
Lehninger Prinzipien der Biochemie, David L. Nelson und Michael M. Cox  
Principles of Biochemistry, Horton et al.  
Zellbiologie, Helmut Plattner und Joachim Hentschel  
Molekulare Zellbiologie, Gerald Karp  
Molekularbiologie der Zelle, Bruce Alberts |
| **Links** | |
| **Language of instruction** | German |
| **Duration (semesters)** | 1 Semester |
| **Module frequency** | |
| **Module capacity** | unlimited |
| **Modullevel / module level** | BC (Basiscurriculum / Base curriculum) |
| **Modulart / typ of module** | Pflicht / Mandatory |
| **Lehr-/Lernform / Teaching/Learning method** | lecture |
| **Vorkenntnisse / Previous knowledge** | |
| **Examination** | Time of examination  
Type of examination |
| **Final exam of module** | during the semester  
written exam |
| **Course type** | Lecture |
| **SWS** | 4 |
| **Frequency** | WiSe |
| **Workload attendance** | 56 h |
## bio239 - Didactical Excercises and Genetics

<table>
<thead>
<tr>
<th>Module label</th>
<th>Didactical Excercises and Genetics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio239</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td><strong>Applicability of the module</strong></td>
<td>• Dual-Subject Bachelor's Programme Biology (Bachelor) &gt; Basismodule</td>
</tr>
<tr>
<td>Responsible persons</td>
<td>Hößle, Corinna (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Weusmann, Birgit (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Kapteina, Ulrich (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>Knapp, Edgar (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>Plewka, Isabelle (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>Claußen, Maike (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>Claußen, Maike (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Hößle, Corinna (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Weusmann, Birgit (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Kapteina, Ulrich (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Knapp, Edgar (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Plewka, Isabelle (Authorized examiners)</td>
</tr>
</tbody>
</table>

**Prerequisites**

**Skills to be acquired in this module**
- Die Studierenden erwerben genetische Fachkenntnisse - Entwicklung bzw. Adaptation von Lerneinheiten an Lernausgangssituation von Schülern - Erprobung dieser Lerneinheiten ohne und mit Schülern, anschließende Reflexion

**Module contents**

1. Grundlagen der Genetik: Mitose und Zellzyklus, Meiose und Rekombination, Mendelsche Vererbungslehre, chromosomale und molekulare Grundlagen der Vererbung; Replikation, Transkription, Translation, Mutation und DNA-Reparatur, Organisation des genetischen Materials und Genregulation. (Studierende mit dem Ziel "Master of Education" müssen nur den Vorlesungsteil "Genetik" belegen, der ab der 2. Semesterhälfte stattfindet.)


**Reader's advisory**


**Links**

Language of instruction: German

Duration (semesters): 1 Semester

Module frequency: 4 x 16 Studierende

Modulelevel / module level: BC (Basiscurriculum / Base curriculum)

Modulart / typ of module: Pflicht / Mandatory

Lehr-/Lernform / Teaching/Learning method:

Vorkenntnisse / Previous knowledge:

Examination: Klausur im Anschluss an Vorlesungsteil Genetik

Final exam of module: KL

Course type: SWS

Comment: Workload of compulsory attendance
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2</td>
<td>SoSe oder WiSe</td>
<td>28</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>2</td>
<td>SoSe oder WiSe</td>
<td>28</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module** 56 h
**Aufbaumodule**

**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>
</tbody>
</table>

**Applicability of the module**

- Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule
- Master of Education Programme (Special Needs Education) Biology (Master of Education) > Mastermodule

**Responsible persons**

- Hößle, Corinna (Module responsibility)
- Rathje, Wiebke (Module counselling)
- Hößle, Corinna (Authorized examiners)
- Rathje, Wiebke (Authorized examiners)
- Kuhlemann, Bianca (Authorized examiners)
- Maurer, Michaela (Authorized examiners)
- Winkler, Holger (Authorized examiners)

**Prerequisites**

Skills to be acquired in 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 / module level**

AC (Aufbaucurriculum / Composition)

**Modulart / typ of module**

je nach Studiengang Pflicht oder Wahlpflicht

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Examination**

Time of examination

Type of examination

Papers have to be presented or handed in: one week after the end of the course

1 Presentation (50%), 1 oral exam (50%)

**Course type**

Seminar
<table>
<thead>
<tr>
<th>SWS</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>Workload attendance</td>
<td>56 h</td>
</tr>
</tbody>
</table>
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

Applicability of the module:
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule
- Master of Education Programme (Special Needs Education) Biology (Master of Education) > Mastermodule

Responsible persons:
- Hößle, Corinna (Module responsibility)
- N., N. (Module responsibility)
- Rathje, Wiebke (Module counselling)
- Hößle, Corinna (Authorized examiners)
- Rathje, Wiebke (Authorized examiners)

Prerequisites:
Die Studierenden erwerben folgende Kompetenzen:
- lernen basale Arbeits-und Erkenntnismethoden der Biologie unter besonderer Berücksichtigung der Zoologie und Botanik kennen und wenden diese bei der Planung von Lernarrangements an
- veröffentlichen insbesondere über Kenntnisse und Fähigkeiten im hypothesengeleiteten Experimentieren, im kriteriengleiteten Vergleichen, beim Nutzen von Modellen sowie im Handhaben von schulrelevanten Geräten
- sind zur Rezeption und Verwendung von Fachsprache in der Lage und können diese zu alltagssprachlichen Äußerungen (Schülervorschlüsse) in Beziehung setzen
- kennen das Prinzip der didaktischen Rekonstruktion und curriculare Strukturierung als Grundlagen der Planung von Lernarrangements und können diese bei der Planung ihres Lernarrangements anwenden
- kennen typische Lernschwierigkeiten und Schülervorschlüsse in den Themengebieten der Zoologie und Botanik sowie didaktische Ansätze, sie zu überwinden bzw. zu verändern.

Module contents:
Im Rahmen des Moduls lernen die Studierenden klassische und innovative Schulversuche zur Botanik und Zoologie kennen. Sie sind aufgefordert, die Versuche in ein Unterrichtskonzept einzubauen und dieses vorzustellen sowie die Versuche im praktischen Teil der Veranstaltung durchzuführen. Im Anschluss werden die didaktischen Konzepte gemeinsam reflektiert und gegebenenfalls optimiert. Die Studierenden üben sich so in der Entwicklung von Lernarrangements, deren Ziel es ist, naturwissenschaftliche Arbeits- und Denkweisen von Schülern zu fördern. Dabei sollen die Studierenden die Grundlagen naturwissenschaftlicher Arbeitsweisen selbst kennen und anwenden lernen sowie Schülervorschlüsse zu den thematischen Schwerpunkthemen reflektieren lernen.

Reader's advisory:

Links:

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Module level / module level: je nach Studiengang Pflicht oder Wahlpflicht
Lehr-/Lernform / Teaching/Learning method:

Vorkenntnisse / Previous knowledge:

Examination:
- Time of examination
- Type of examination

Final exam of module:
- Portfolio zu einem ausgewählten Schulversuch

Course type:
- Comment
- SWS
- Frequency
- Workload of compulsory attendance

Seminar: 2
Practical training: 3
Total time of attendance for the module: 70 h
### bio245 - Flora and Fauna

<table>
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<tr>
<th>Module label</th>
<th>Flora and Fauna</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio245</td>
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<tr>
<td>Credit points</td>
<td>9.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>270 h</td>
</tr>
</tbody>
</table>

#### Applicability of the module
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule
- Master of Education Programme (Special Needs Education) Biology (Master of Education) > Mastermodule

#### Responsible persons
- Albach, Dirk Carl (Module responsibility)
- Glatzel, Thomas (Module responsibility)
- von Hagen, Klaus Bernhard (Module counselling)
- Will, Maria (Module counselling)
- Albach, Dirk Carl (Authorized examiners)
- Glatzel, Thomas (Authorized examiners)
- von Hagen, Klaus Bernhard (Authorized examiners)
- Will, Maria (Authorized examiners)

#### Prerequisites
- + biological knowledge
- + knowledge of biological working methods
- + independent learning and (research-based) working
- + knowledge of safety and environmental issues

#### 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
- http://

#### Language of instruction
- German

#### Duration (semesters)
- 2 Semester

#### Module frequency
- jährlich

#### Module capacity
- unlimited

#### Modulelevel / module level
- je nach Studiengang Pflicht oder Wahlpflicht

#### Lehr-/Lernform / Teaching/Learning method

#### Vorkenntnisse / Previous knowledge

#### Examination

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botany: Written examination before the end of the lecture</td>
<td>1 written examination (Botany 50 %)</td>
</tr>
<tr>
<td>Zoology: Written examination before the end of the lecture</td>
<td>1 written examination (Zoology 50 %)</td>
</tr>
</tbody>
</table>

**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>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course type</td>
<td>Comment</td>
<td>SWS</td>
<td>Frequency</td>
<td>Workload of compulsory attendance</td>
</tr>
<tr>
<td>---------------</td>
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</tr>
<tr>
<td>Lecture</td>
<td></td>
<td>2</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>4</td>
<td>4</td>
<td>56</td>
</tr>
<tr>
<td>Study trip</td>
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<td>1</td>
<td>1</td>
<td>14</td>
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**Total time of attendance for the module** 98 h
## bio265 - General Microbiology

<table>
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<tr>
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<th>General Microbiology</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Workload</td>
<td>270 h</td>
</tr>
<tr>
<td>Applicability of the module</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Bachelor's Programme Biology (Bachelor) &gt; Aufbaumodule</td>
</tr>
<tr>
<td></td>
<td>• Bachelor's Programme Environmental Science (Bachelor) &gt; Wahlpflichtmodule</td>
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<tr>
<td></td>
<td>• Dual-Subject Bachelor's Programme Biology (Bachelor) &gt; Aufbaumodule</td>
</tr>
<tr>
<td>Responsible persons</td>
<td>Rabus, Ralf Andreas (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Rhiel, Erhard (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>Wöhlbrand, Lars (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>Rabus, Ralf Andreas (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Rhiel, Erhard (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Wöhlbrand, Lars (Authorized examiners)</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Basic knowledge of microbiology; ability to assess and apply fundamental microbiological techniques.</td>
</tr>
<tr>
<td>Module contents</td>
<td>Imparting basic microbiological skills and working methods: Chemistry and structure of the cell, fundamentals of metabolism, taxonomy and phylogeny of microorganisms, diversity of microorganisms, insight into Applied Microbiology, propagation of microorganisms.</td>
</tr>
<tr>
<td>Reader's advisory</td>
<td>Allgemeine Mikrobiologie, Schlegel 1992; Brock-Biology of Microorganisms, eds.: Madigan et al., 2003; Grundlagen der Mikrobiologie, Cypionka, 2003</td>
</tr>
<tr>
<td>Links</td>
<td><a href="http://www-icbm.de/~gmb/11429.html">http://www-icbm.de/~gmb/11429.html</a></td>
</tr>
<tr>
<td>Language of instruction</td>
<td>German</td>
</tr>
<tr>
<td>Duration (semesters)</td>
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<tr>
<td>Module frequency</td>
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</tr>
<tr>
<td>Module capacity</td>
<td>unlimited</td>
</tr>
<tr>
<td>Modulart / module level</td>
<td>---</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td>je nach Studiengang Pflicht oder Wahlpflicht</td>
</tr>
<tr>
<td>Examination</td>
<td>Time of examination</td>
</tr>
<tr>
<td>Final exam of module</td>
<td>1 written examination</td>
</tr>
<tr>
<td></td>
<td>PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2</td>
<td>WiSe</td>
<td>28</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>1</td>
<td>WiSe</td>
<td>14</td>
</tr>
<tr>
<td>Practical training</td>
<td></td>
<td>4</td>
<td>WiSe</td>
<td>56</td>
</tr>
<tr>
<td>Total time of attendance for the module</td>
<td></td>
<td></td>
<td></td>
<td>98 h</td>
</tr>
</tbody>
</table>
bio275 - Basics in Physiology

Module label: Basics in Physiology
Module code: bio275
Credit points: 9.0 KP
Workload: 270 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Aufbaumodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule

Responsible persons:
- Heyers, Dominik (Module responsibility)
- Köppl, Christine (Module counselling)
- Dedek, Karin (Module counselling)
- Heyers, Dominik (Authorized examiners)
- Köppl, Christine (Authorized examiners)
- Dedek, Karin (Authorized examiners)

Prerequisites:
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. Designing, performing, documenting and analysing physiological experiments; troubleshooting, basic statistics, "experimental thinking".

Module contents:
The lecture 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. 4, 2014
Schmidt, Lang, Heckmann: Physiologie des Menschen mit Pathophysiologie, Aufl. 31, 2011
Wehner, Gehring: Zoologie, Aufl. 25, 2013

Links:
Language of instruction: German
Duration (semesters): 1 Semester

Module capacity: 144
Module frequency: jährlich

Module type / module level: AC (Aufbaucurriculum / Composition)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method: Vorlesung, Übung

Vorkenntnisse / Previous knowledge:

<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>within a few weeks after the winter term lecture period</td>
<td>written exam (100%)</td>
</tr>
</tbody>
</table>

Written protocols and active participation in the lab exercises. 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.
An exam mark of 1.0 is achievable without a bonus. A bonus cannot be applied to pass a failed exam.

Course type: Comment | SWS | Frequency | Workload of compulsory attendance
--- | --- | --- | ---
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>4</td>
<td>WiSe</td>
<td>56</td>
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</tbody>
</table>

**Total time of attendance for the module** 84 h
# bio285 - Plant Physiology, Molecular Biology and Biotechnology

<table>
<thead>
<tr>
<th>Module label</th>
<th>Plant Physiology, Molecular Biology and Biotechnology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio285</td>
</tr>
<tr>
<td>Credit points</td>
<td>9.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>270 h</td>
</tr>
</tbody>
</table>
| Applicability of the module          | • Bachelor's Programme Biology (Bachelor) > Aufbaumodule  
                                           • Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule |
| Responsible persons                  | Laubinger, Sascha (Module responsibility)              
                                           Laubinger, Sascha (Authorized examiners) |
| Prerequisites                        |                                                       |
| 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                      |
                                           S: Vorstellung der Experimente, Darstellung der theoretischen Grundlagen der Experimente, Vorstellung aktueller Fachliteratur.  
| Reader's advisory                    | Campbell/Reece: Biologie (Pearson); Schopfer/Brennicke: Pflanzenphysiologie (Springer Spektrum); Buchanan/Gruissem/Jones: Biochemistry and molecular biology of plants (American Society of Plant Physiologists); Heldt/Piechulla: Pflanzenbiochemie (Springer Spektrum). |

| Links                                |                                                       |
|--------------------------------------|                                                       |
| Language of instruction              | German                                               |
| Duration (semesters)                 | 1 Semester                                            |
| Module frequency                     | jährlich                                              |
| Module capacity                      | 32                                                    |
| Modulelevel / module level           | AC (Aufbaucurriculum / Composition)                   |
| Modulart / typ of module             | Wahlpflicht / Elective                                |
| Lehr-/Lernform / Teaching/Learning method | Vorlesung, Seminar, Übung                      |

## Vorkenntnisse / Previous knowledge

<table>
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<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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| Total time of attendance for the module | 98 h |
bio295 - Genetics

Module label: Genetics
Module code: bio295
Credit points: 9.0 KP
Workload: 270 h

Applicability of the module
- Bachelor's Programme Biology (Bachelor) > Aufbaumodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule
- Master of Education Programme (Special Needs Education) Biology (Master of Education) > Frühere Module

Responsible persons
- Claußen, Maike (Module responsibility)
- Hartmann, Anna-Maria (Module counselling)
- Nothwang, Hans Gerd (Module counselling)
- Ebbers, Lena (Module counselling)
- Claußen, Maike (Authorized examiners)
- Nothwang, Hans Gerd (Authorized examiners)
- Hartmann, Anna-Maria (Authorized examiners)
- Ebbers, Lena (Authorized examiners)

Prerequisites

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

Links
http://

Language of instruction
German

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
72

Module level / module level
AC (Aufbaucurriculum / Composition)

Modulart / typ of module
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method
Vorlesung, Seminar, Übung

Vorkenntnisse / Previous knowledge
biochemisches und genetisches Grundlagenwissen

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

Course type
Comment
SWS
Frequency
Workload of compulsory attendance

Lecture
1.5
WiSe
21

Exercises
3
WiSe
42
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**Total time of attendance for the module**

84 h
**bio255 - Basics in Biochemistry and Cell Biology**

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<td>Workload</td>
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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Aufbaumodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule

**Responsible persons**
- Nolte, Arne (Module responsibility)
- Nolte, Arne (Authorized examiners)

**Prerequisites**
++ biological knowledge
++ knowledge of biological working methods
++ biologically relevant knowledge in the natural sciences and mathematics
++ statistics & scientific programming
++ interdisciplinary knowledge & thinking
++ abstract, logical, analytical thinking
++ deepened expertise in biological specialist field

The field of molecular ecology examines relationships among genotypes, phenotypes and the environment to explain evolution and diversity of organisms. The lecture will introduce basics in genomics, molecular evolution and population genetics to explore properties of the genome and the organism from an evolutionary perspective. Central aspects are the adaptation of species to their environment and ecological change, speciation, the genetic basis of phenotypic change. Methods and data used in genomics and molecular ecology will be introduced during the lecture and exercises.

**Module contents**
- Lecture: the lecture conveys knowledge about the fields of genomics, evolution and organismic biology. Moreover laboratory methods as well as basics and background information on the analysis of genetic and genomic datasets are given.
- Exercise: Modern data sets and up to date methods in genomics and population genetics are introduced. The practical emphasizes computer based data analyses.

**Reader's advisory**

**Links**
- Language of instruction: German
- Duration (semesters): 1 Semester

**Module frequency**
- Module capacity: 30
- Module level / module level: AC (Aufbaucurriculum / Composition)
- Modulart / typ of module: Wahlpflicht / Elective
- Lehr-/Lernform / Teaching/Learning method: Vorlesung, Übung

**Vorkenntnisse / Previous knowledge**

**Final exam of module**

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<td>Lecture</td>
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<tr>
<td>Exercises</td>
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**Total time of attendance for the module**
- 84 h
Akzentsetzungsmodul

**bio300 - Evolutionary Biology**

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<tbody>
<tr>
<td><strong>Module code</strong></td>
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<tr>
<td><strong>Credit points</strong></td>
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<tr>
<td><strong>Workload</strong></td>
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<td><strong>Applicability of the module</strong></td>
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<td>Bachelor's Programme Biology (Bachelor) &gt; Akzentsetzungsmodul</td>
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<tr>
<td>Dual-Subject Bachelor's Programme Biology (Bachelor) &gt; Akzentsetzungsmodul</td>
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<tr>
<td>Master of Education Programme (Gymnasium) Biology (Master of Education) &gt; Mastermodule</td>
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</tbody>
</table>

**Responsible persons**

- Bininda-Emonds, Olaf (Module responsibility)
- Bininda-Emonds, Olaf (Authorized examiners)
- Ahlrichs, Wilko (Authorized examiners)
- Albach, Dirk Carl (Authorized examiners)
- Gerlach, Gabriele (Authorized examiners)
- Nolte, Arne (Authorized examiners)

**Prerequisites**

++ biological knowledge
+ knowledge of biological working methods
++ biologically relevant knowledge in the natural sciences and mathematics
+ statistics & scientific programming
+ interdisciplinary knowledge & thinking
+ 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

**Module contents**

The lecture imparts basic knowledge in areas including population biology, phylogenetic systematics, phyloinformatics, behavioural and reproduction ecology. These fundamentals are extended in the seminar and exercises.

**Reader's advisory**


**Links**

- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Modullevel / module level: AS (Akzentsetzung / Accentuation)
- Modulart / typ of module: Wahlpflicht / Elective
- Lehr-/Lernform / Teaching/Learning method

**Vorkenntnisse / Previous knowledge**

**Examination**

Time of examination: Written examination in the final week of the semester or in the first week following the lecture period.

Type of examination: Written examination (60%) Portfolio (40%)

PLEASE NOTE:
<table>
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<tr>
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<th>Time of examination</th>
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</thead>
<tbody>
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<td>Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.</td>
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<table>
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<tbody>
<tr>
<td>Lecture</td>
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<tr>
<td>Exercises</td>
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<td>84</td>
</tr>
<tr>
<td>Seminar</td>
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**Total time of attendance for the module** 140 h
### Module label
General Ecology

### Module code
bio310

### Credit points
15.0 KP

### Workload
450 h

### Applicability of the module
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

### Responsible persons
- Hillebrand, Helmut (Module responsibility)
- Niedringhaus, Rolf (Module counselling)
- Buchwald, Rainer (Module counselling)
- Striebel, Maren (Module counselling)
- Zotz, Gerhard Wolfgang (Module counselling)
- Schupp, Peter (Module counselling)
- Rohde, Sven (Module counselling)
- Zotz, Gerhard Wolfgang (Authorized examiners)
- Hillebrand, Helmut (Authorized examiners)
- Niedringhaus, Rolf (Authorized examiners)
- Buchwald, Rainer (Authorized examiners)
- Schupp, Peter (Authorized examiners)
- Rohde, Sven (Authorized examiners)
- Striebel, Maren (Authorized examiners)

### Prerequisites
- Bestandene Pflichtmodule des Kerncurriculums

### 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
- ++ interdisciplinary knowledge & thinking
- ++ 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)
- + (scientific) communication skills

### Module contents
- Allgemeine Ökologie VL (Hillebrand) 2 SWS, 3 KP; Präsenzzeit 21 h, Nachbereitungszeit 69 h; im Wintersemester
- Theoretische Grundlagen, Resourcen, Populationsökologie, biologische Interaktionen, Lebensgemeinschaften, Ökosysteme
- PR/S, 4 SWS, 6 KP; Präsenzzeit 42 h, Nachbereitungszeit 138 h; im folgenden Sommersemester
- B.Sc. Biologie: alternativ 2 aus 5 Wahlpraktika
- B.Sc. Umweltwissenschaften: alternativ 1 aus 5 Wahlpraktika
- PR/S Vegetationsökologie / Naturschutz (Buchwald)
- Vegetationskundliche Aufnahmemethoden (Artenzusammensetzung, Struktur), Nährstoffverhältnisse des Oberbodens, Mikroklima, Naturschutzprojekte
- PR/S Zoo-Ökologie (Niedringhaus)
- Repräsentative Fragestellungen der (terrestrischen) Freiland-Ökologie, Problematik von Erfassungsmethoden sowie der Einfluss abiotischer und biotischer Faktoren auf Struktur und Dynamik von Populationen, Arbeiten im Freiland, Auswertungen im Labor
- PR/SE Funktionelle Ökologie der Pflanzen (Zotz, Bader)
- Analyse abiotischer Rahmenbedingungen (u.a. Mikroklima), Wasser-, Nährstoff-, Kohlenstoffhaushalt, Aspekte der Populationsbiologie, Analyse von Pflanzenbeständen (Struktur, Funktion), statistische Auswertung und Modellierung
PR/S Aquatische Ökologie (Hillebrand, Moorthi)
Experimentelle Analyse von Artwechselwirkungen, zum Beispiel Räuber-Beute und Konkurrenz.
Experimentelles Design. Auswertung von Proben, Biomassebestimmungen, Auszählungen, Mikroskopie.
Statistische Analyse. Schreiben unter wissenschaftlicher Publikationsnorm

PR/S Benthische Ökologie (Schupp, Rohde)
S Gemeinsames Symposium zu den Praktikumsergebnissen (O-Woche des folgenden Wintersemesters), 4h.

Reader's advisory
VL Allgemeine Ökologie
Vegetationsökologie / Naturschutz
Zoo-Ökologie
Nentwig et al., 2004. Ökologie. Spektrum Lehrbuch, Heidelberg. 466 S.
Funktionelle Ökologie der Pflanzen
Aquatische Ökologie
Lampert, Sommer 1999: Limnoökologie. Thieme
Praktikumslehrbuch
Benthische Ökologie

Links

Language of instruction
German

Duration (semesters)
2 Semester

Module frequency
jährlich

Module capacity
unlimited

Modullevel / module level
AS (Akzentsetzung / Accentuation)

Modulart / typ of module
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method
V (2 SWS) , S (1 SWS) , PR (3 SWS)
VL Ökologie (3 KP)
Alternativ 2 aus 5 Wahlpрактиka (5+1 KP):
PR/SE Vegetationsökologie/Naturschutz
PR/SE Funktionelle Ökologie der Pflanzen
PR/SE Zoo-Ökologie
PR/SE Aquatische Ökologie
PR/SE Benthische Ökologie

Vorkenntnisse / Previous knowledge

Examination
Time of examination
Type of examination
Final exam of module
VL: Ende des Winter-semesters
PR: Ende des jeweiligen Praktikumblockes
2 Prüfungsleistungen:
1) Prüfung zur Vorlesung (Klausur; 30%) im 1. Semester des Moduls sowie
2) Portfolio zum Praktikum (Portfolio; 70%) im 2. Semester des Moduls
Zum Bestehen des Moduls müssen alle Teilleistungen bestanden sein.

Voraussetzung für die Vergabe von Kreditpunkten ist die aktive Teilnahme an:
Seminar und Praktikum

Course type
Comment
SWS
Frequency
Workload of compulsory attendance

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<th>Frequency</th>
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Total time of attendance for the module
84 h
# bio320 - Pollination and Dispersal Biology

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<td><strong>Credit points</strong></td>
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<tr>
<td><strong>Workload</strong></td>
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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- von Hagen, Klaus Bernhard (Module counselling)
- Albach, Dirk Carl (Authorized examiners)

**Prerequisites**
- * biological knowledge
- * knowledge of biological working methods
- * 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

Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants

**Module contents**
- **L:** Pollination, dispersal, germination of plants, plant breeding
- **S:** Pollination and dispersal biology of plants in a systematic context
- **LC:** Pollination, fertilisation, dispersal and germination biological experiments in regard of adaptation to environmental factors

**Reader's advisory**
The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar - Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung.

**Links**
http://

**Language of instruction**
German

**Duration (semesters)***
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Modullevel / module level**
AS (Akzentsetzung / Accentuation)

**Modulart / typ of module**
Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

<table>
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<th>Time of examination</th>
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<tr>
<td>Final exam of module</td>
<td>Four weeks after the end of the exercises at the latest.</td>
<td>1 Portfolio</td>
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**PLEASE NOTE:** Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

**Course type**

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<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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<tr>
<td>Seminar</td>
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**Total time of attendance for the module**
112 h
### Module Contents

**Lecture Biological Oceanography**

- 2 SWS = 3 CP. Presence time 24 h, additional study time 66h, winter-term
- Abiotic environmental conditions in marine systems (light, temperature, chemical and physical properties of the water, waves, tides, global distribution of water masses and currents. Pelagic communities, plankton (phyt-, zoo-, bacterio-, viroplankton), microbial loop, sedimentation, C-and N cycling, Nekton, Fisheries, El Nino, Benthic communities, estuaries.

**Exercise Concepts in marine ecology**

- 6 SWS = 9 CP. Presence time 70 h, additional study time 200h, winter-term
- Practical and theoretical exercises on marine ecology, including field studies, experiments and working with case studies from the literature. The focus is on concepts here, pinpointing at general ecological frameworks.

**Lecture Marine Ecology**

- 2 SWS = 3 CP. Presence time 24 h, additional study time 66h, winter-term
- Ecology of marine systems: estuaries, rocky and sediment coasts, pelagial, shelves, mangroves, seagrass meadows, coral reefs, deep sea, polar regions. The focus is on ecological specifics and interactions in the biotic communities of these systems. The second half of the lecture will focus on importance and consequences of overfishing, habitat destruction, pollution, climate change and bioinvasion on marine systems.

### Reader's Advisory

- U. Sommer, Biologische Meereskunde, Springer Verlag, Heidelberg.

### Links

- Language of instruction: German
- Duration (semesters): 2 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Modulelevel / module level: AS (Akzentsetzung / Accentuation)
- Modulart / typ of module: Wahlpflicht / Elective

### Prerequisites

- ++ biological knowledge
- ++ knowledge of biological working methods
- ++ biologically relevant knowledge in the natural sciences and mathematics
- + statistics & scientific programming
- ++ interdisciplinary knowledge & thinking
- ++ 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

Basic knowledge and practical experience in biological oceanography

Apply theoretical concepts from different fields in marine ecology

Analyse, present, and interpret results from the marine ecological literature and own investigations

Acknowledge the importance of general ecological concepts for ecosystem management

Gain experience in the application of field and lab methods in ecology
**Examination**

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td><strong>Final exam of module</strong></td>
<td>Written exam at the end of the Lecture Marine Ecology</td>
<td>1 written exam (Lecture) (50%), 1 oral presentation (Exercise) (50%)</td>
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</table>

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

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<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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<td>Lecture</td>
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<td>Exercises</td>
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**Total time of attendance for the module** 140 h
Bio340 - Morphology, Phylogeny, and Evolution of Metazoa

<table>
<thead>
<tr>
<th>Module label</th>
<th>Morphology, Phylogeny, and Evolution of Metazoa</th>
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<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
<td>450 h</td>
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</table>
| Applicability of the module     | • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
• Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
• Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule |
| Responsible persons             | Bininda-Emonds, Olaf (Module responsibility)  
Ahrichs, Wilko (Module counselling)  
Bininda-Emonds, Olaf (Authorized examiners)  
Ahrichs, Wilko (Authorized examiners) |
| Prerequisites                   | ++ biological knowledge  
+ knowledge of biological working methods  
++ biologically relevant knowledge in the natural sciences and mathematics  
+ statistics & scientific programming  
+ interdisciplinary knowledge & thinking  
+ 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 |
| Skills to be acquired in this module | Upon successful completion of the module the students will gain:  
1. a survey of topical subjects relating to the morphology and phylogeny of animals,  
2. a thorough knowledge of the development of morphological characteristics,  
3. technical skills in studying morphological structures, and  
4. knowledge into recent hypotheses on the phylogeny of animals. |
| Module contents                 | Lecture: Details regarding the morphology and evolution of Metazoa from an explicit phylogenetic framework  
Seminar: Presentation and discussion of recent subjects and issues relating to the evolution of Metazoa; presentation of individual metazoan taxa  
Exercise: Preparation and documentation of exemplary species of Metazoa; various field studies (e.g. visit to the Dierenpark Emmen or to the Zoo am Meer (Bremerhaven), sampling aquatic micrometazoans, observing birds) |
| Reader's advisory               | Relevant literature will be announced during the first seminar and is contingent on the latest developments in the research field. |
| Links                           | Language of instruction: German  
Duration (semesters): 1 Semester  
Module frequency: Jährlich  
Module capacity: unlimited  
Modulelevel / module level: AS (Akzentsetzung / Accentuation)  
Modulart / typ of module: Wahlpflicht / Elective |
| Lehr-/Lernform / Teaching/Learning method | |
| Vorkenntnisse / Previous knowledge | Examination: Time of examination:  
Type of examination:  
Final exam of module: Portfolio during the course of the seminar; written examination in the final week of the course or in the first week following the lecture period.  
1 Written examination (50%),  
1 Portfolio (50%),  
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 of compulsory attendance: |

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<table>
<thead>
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<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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<td>Seminar</td>
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<td><strong>Total time of attendance for the module</strong></td>
<td></td>
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<td>126 h</td>
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bio350 - Organismic Microanatomy

Module label: Organismic Microanatomy
Module code: bio350
Credit points: 15.0 KP
Workload: 450 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Ahlrichs, Wilko (Authorized examiners)
- Hoppenrath, Mona (Module counselling)
- Kieneke, Alexander (Module counselling)

Prerequisites:
- ++ biological knowledge
- ++ knowledge of biological working methods
- ++ biologically relevant knowledge in the natural sciences and mathematics
- + interdisciplinary knowledge & thinking
- ++ 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:
- Zell und Gewebelehre der Tiere und Protisten;
- Anpassungsleistungen von Organismen unterschiedlicher Lebensräume;
- Vorstellung traditioneller und aktueller Hypothesen zur Phylogenie und Evolution der Tiere;

Reader's advisory:
Wird zur Beginn der Veranstaltungen bekannt gegeben.

Links:
Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Module level / module level: AS (Akzentsetzung / Accentuation)
Module art / type of module: Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method
Vorkenntnisse / Previous knowledge
Examination: Time of examination
Type of examination
Final exam of module: Modulende
Bachelor: 1 Portfolio
Master of Education: 1 oral exam

Course type | Comment | SWS | Frequency | Workload of compulsory attendance |
--- | --- | --- | --- | --- |
Lecture |  | 3 |  | 42 |
Exercises |  | 5 |  | 70 |
Study trip |  | 1 |  | 14 |

Total time of attendance for the module: 126 h
bio360 - Marine Biodiversity

Module label: Marine Biodiversity
Module code: bio360
Credit points: 15.0 KP
Workload: 450 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Glatzel, Thomas (Module responsibility)
- Martinez Arbizu, Pedro Miguel (Module counselling)
- Hoppenrath, Mona (Module counselling)
- Glatzel, Thomas (Authorized examiners)
- Martinez Arbizu, Pedro Miguel (Authorized examiners)
- Hoppenrath, Mona (Authorized examiners)

Prerequisites:

Skills to be acquired in this module:
++ biological knowledge
++ knowledge of biological working methods
+ interdisciplinary knowledge & thinking
+ 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

By active participation the students acquire the following knowledge/abilities/qualification:
* Preparation and organization of sampling
* Keeping organisms – field study
* Marine deposits, development of marine sediments and their effects on the fauna
* Methods of meiofauna and macrofauna sampling, also plankton sampling
* Methods of quantitative community analysis
* Diversity comparison of various sites applying statistical methods
* Multivariate statistics for correlation of biocenoses and environmental variables
* Biocenoses of marine habitats
* Biology, morphology, systematics, behaviour and ecology of selected taxa in marine water systems
* Formulation and definition of scientific questions and selection of methods
* Habitat and biocenoses, interstitial, litoral (lotic, lenitic), diversity
* Planning behavioural experiments
* Presentation and discussion of scientific results
* Independent scientific work in groups and presentation of results

Module contents:
The module gives an introduction to marine biodiversity research demonstrated by various animal groups from the Wadden Sea and the North Sea including independent sampling on the coast and on the islands. The students will collect the organisms in the field or on board using sampling equipment. In the laboratory course, the biology and morphology as well as the ecology and behaviour of certain species are investigated and documented. The morphology of marine sediments and their development are further aspects of this module.

Reader's advisory:

The literature listed above is available in the university library. More reading will be recommended in the course of the lecture.

Literature inquiry:
web of science: externhttp://www.bis.uni-oldenburg.de - Datenbanken(DBIS) - Biologie - TOP-Datenbanken z. B. ASFA, Science Citation Index, Zoological Record
http://www.biodiversitylibrary.org/bibliography/14107
externhttp://scholar.google.de/
externhttp://www.vifabio.de
Open access journals: externhttp://www.doaj.org/ - externhttp://www.plosone.org

Links
http://

Language of instruction
German

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
unlimited

Modullevel / module level
AS (Akzentsetzung / Accentuation)

Modulart / typ of module
Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge

Examination
Time of examination
Type of examination
Final exam of module
During lectures
1 Portfolio

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 of compulsory attendance
Lecture
2
28
Exercises
9
126
Seminar
2
28

Total time of attendance for the module
182 h
Bio370 - Flora Advanced Plant Biodiversity

**Module label**
Flora Advanced Plant Biodiversity

**Module code**
bio370

**Credit points**
15.0 KP

**Workload**
450 h

**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- Albach, Dirk Carl (Authorized examiners)
- von Hagen, Klaus Bernhard (Module counselling)

**Prerequisites**
- passed module Flora/Fauna

**Skills to be acquired in this module**
- biological knowledge
- knowledge of biological working methods
- deepened expertise in biological specialist field
- independent learning and (research-based) working
- data presentation and evidence-based discussion (written and spoken)
- (scientific) communication skills
- knowledge of safety and environmental issues

The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation.

**Module contents**
The module comprises a lecture in the Botanical Garden, where plants will be observed and investigated. This includes algae, bryophytes, ferns, gymnosperms and various families of angiosperms. The seminar is intended to let students study in-depth additional plant families with their typical characters. The exercises will be used to apply the abilities to plant species in the vicinity of Oldenburg and to practice methods in mapping and surveying plant species.

**Reader's advisory**
Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband

**Language of instruction**
German

**Duration (semesters)**
im 2-Jahres-Zyklus

**Module frequency**
im 2-Jahres-Zyklus

**Module capacity**
unlimited

**Reference text**
The module will be offered biennially.

**Modullevel / module level**
AS (Akzentsetzung / Accentuation)

**Modulart / typ of module**
Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

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

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**Total time of attendance for the module**
140 h
**bio380 - Specific Microbiology**

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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- Rabus, Ralf Andreas (Authorized examiners)
- Trautwein, Kathleen (Module counselling)

**Prerequisites**

**Skills to be acquired in this module**

- ++ biological knowledge
- ++ knowledge of biological working methods
- ++ biologically relevant knowledge in the natural sciences and mathematics
- + interdisciplinary knowledge & thinking
- ++ 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
- + project and time management
- + knowledge of safety and environmental issues

**Emphasis on:**
- Theory: Different cultivation strategies (batch, fed-batch, continuous) and physiological interpretation of measuring parameters (growth rates, respiration rates, yield)
- Practice: Knowledge of device and handling of bioreactors including sensor systems

**Module contents**
- Fundamentals of process-controlled cultivation in bioreactors
- Part A: Handling of bioreactors, determination of the kLa??? value (oxygen yield rate)
- Part B: Cultivation of marine bacteria under controlled conditions in a bioreactor, balance of metabolic activities

**Reader's advisory**
- Schmauder HP (1994) Methoden der Biotechnologie, Kapitel 3.2.2. Gustav Fischer Verlag Jena

**Links**
- www.icbm.de/ammb/index.html

**Language of instruction**
- German

**Duration (semesters)**
- 1 Semester

**Module frequency**
- jährlich

**Module capacity**
- unlimited

**Modulart / typ of module**
- Wahlpflicht / Elective

**Vorkenntnisse / Previous knowledge**

**Examination**
- Time of examination
- Type of examination
- 1 written examination (50%)
- 1 record (50%)

**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 of compulsory attendance

| Lecture   | 4 | 56 |
| Exercises | 6 | 84 |
| Seminar   |   |    |

**Total time of attendance for the module**
- 140 h
bio400 - Basic Concepts in Neurobiology I

Module label: Basic Concepts in Neurobiology I
Module code: bio400
Credit points: 15.0 KP
Workload: 450 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Greschner, Martin (Authorized examiners)
- Koch, Karl-Wilhelm (Authorized examiners)
- Janssen-Bienhold, Ulrike (Module counselling)
- Richter-Landsberg, Christiane (Module counselling)
- Goldbaum, Olaf (Module counselling)

Prerequisites:
Skills to be acquired in this module:
++ biological knowledge
++ knowledge of biological working methods
+ abstract, logical, analytical thinking
+ deepened expertise in biological specialist field
+ data presentation and evidence-based discussion (written and spoken)

Imparting basic knowledge and relations of neurobiology. Transfer achievement: Preparing scientific records from the results of independent experiments.

Module contents:
In its first part, the lecture (4 H/W) covers the molecular and cellular fundamentals of neurobiology, the electrical processes in nervous cells, the organization and development of the nervous system, its function explained by simple circuits as well as the sensorimotor integration underlying any behaviour. In the seminar (1 H/W), individual subjects of the lecture are consolidated. In the subsequent block laboratory course (6 H/W), this theoretical knowledge is verified under real-world conditions by simple experiments related to the subjects dealt with in the lecture. Unobjectionable scientific minutes are to be prepared of the experiments and the individual results are to be presented in a seminar paper.

Reader's advisory:

Links:
http://

Language of instruction: German

Duration (semesters): 1 Semester

Module frequency: jährlich

Module capacity: unlimited

Modullevel / module level: AS (Akzentsetzung / Accentuation)

Modulart / typ of module: Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge:

Examination:

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<th>Final exam of module</th>
<th>Time of examination</th>
<th>Type of examination</th>
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</thead>
<tbody>
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<td></td>
<td></td>
<td>1 written examination, signed minutes</td>
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PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

Course type:

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<td>56</td>
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<td>Frequency</td>
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</table>
**bio410 - Basic Concepts in Neurobiology II**

<table>
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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodul
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- Klump, Georg Martin (Authorized examiners)
- Langemann, Ulrike (Module counselling)
- Thiel, Christiane Margarete (Module counselling)
- Köppl, Christine (Module counselling)

**Prerequisites**

**Skills to be acquired in this module**
- ++ biological knowledge
- ++ knowledge of biological working methods
- + abstract, logical, analytical thinking
- + deepened expertise in biological specialist field
- + data presentation and evidence-based discussion (written and spoken)

Basic knowledge and relations of sensory science, cognition, and motor functions are imparted. Transfer achievement: Presentation of personal experimental results.

**Module contents**
The lecture covers the anatomy and function of simple sensory and motory systems as well as higher cognitive functions. Selected subjects are treated in more detail in the seminar. In the subsequent block practical course, this theoretical knowledge is verified under real-world conditions by simple experiments related to the subjects dealt with in the lecture including data analysis and presentation of results.

**Reader's advisory**

**Links**

**Language of instruction**
- German

**Duration (semesters)**
- 1 Semester

**Module frequency**
- jährlich

**Module capacity**
- unlimited

**Modullevel / module level**
- AS (Akzentsetzung / Accentuation)

**Modulart / typ of module**
- Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

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<td>Final exam of module</td>
<td>Written examination in the course of the semester vacation (usually in March)</td>
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**PLEASE NOTE:**
Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

**Course type**

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**Total time of attendance for the module**
- 140 h
bio390 - Plant molecular biology and genetics

Module label: Plant molecular biology and genetics
Module code: bio390
Credit points: 15.0 KP
Workload: 450 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
Laubinger, Sascha (Authorized examiners)

Prerequisites:
++ biologische Fachkenntnisse
++ Kenntnisse biologischer Arbeitstechniken
+ biologierelevante naturwissenschaftliche/mathematische Grundkenntnisse
+ Statistik und wissenschaftliches Programmieren
++ fächerübergreifende(s) Kenntnisse & Denken
++ Abstraktes, logisches, analytisches Denken
++ vertiefte Fachkompetenz in biologischem Spezialgebiet
++ Selbstständiges Lernen und (forschendes) Arbeiten
++ Datenpräsentation und evidenzbasierte Diskussion in Wort und Schrift
++ Teamfähigkeit
++ (wissenschaftliche) Kommunikationsfähigkeit
++ Projekt- und Zeitmanagement
+ Kenntnisse von Sicherheits- und Umweltbelangen

Skills to be acquired in this module:
In der interaktiv gestalteten Vorlesung für die Teilnehmenden wird das Basiswissen vermittelt. Hauptfokus besteht dabei auf Pflanze/Umwelt-Interaktionen und die zugrundeliegenden molekularen Mechanismen der Genregulation in Pflanzen. Im Praktikum werden wir an ausgewählten Beispielen molekulare und genetische Techniken erlernen und durchführen (z.B. Mutantenanalysen, Isolation von RNA/DNA, Bestimmung der Genaktivität mittel qRT-PCR, Analyse von Spleißmustern, Methoden zur Bestimmung von Protein-Protein-Interaktionen).

Module contents:

Reader's advisory:
Aktuelle Literaturvorschläge werden mit den Studierenden in der Vorbesprechung besprochen.

Links:

Languages of instruction:
German, English

Duration (semesters):
1 Semester

Module frequency:
jährlich im Wintersemester

Module capacity:
12 (16)

Modullevel / module level:
AS (Akzentsetzung / Accentuation)

Modulart / typ of module:
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method:
3 SWS Vorlesung
3 SWS Seminar
4 SWS Übung

Vorkenntnisse / Previous knowledge:

Examination:

Final exam of module:

Course type:
Lecture
Seminar

Comment:
3
3

SWS:

Frequency:
WiSe
WiSe

Workload:
42
42

KL

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**Total time of attendance for the module**
140 h
bio325 - Pollination and Dispersal - Concepts

**Module label**  
Pollination and Dispersal - Concepts

**Module code**  
bio325

**Credit points**  
6.0 KP

**Workload**  
180 h

**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- Albach, Dirk Carl (Module responsibility)
- von Hagen, Klaus Bernhard (Module counselling)
- Will, Maria (Module counselling)
- Albach, Dirk Carl (Authorized examiners)
- von Hagen, Klaus Bernhard (Authorized examiners)
- Will, Maria (Authorized examiners)

**Prerequisites**
- bio256 Flora and Fauna

**Skills to be acquired in this module**
- biological knowledge
- knowledge of biological working methods
- 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

Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants

**Module contents**
- L: Pollination, dispersal, germination of plants, plant breeding
- S: Pollination and dispersal biology of plants in a systematic context

**Reader's advisory**
The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar -Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung.

**Links**

**Language of instruction**  
German

**Duration (semesters)**  
1 Semester

**Module frequency**  
The module will be offered every other year

**Module capacity**  
12

**Modullevel / module level**  
AS (Akzentsetzung / Accentuation)

**Modulart / typ of module**  
Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**  
Vorlesung, Seminar

**Vorkenntnisse / Previous knowledge**

**Examination**  
Type of examination

**Final exam of module**  
portfolio

**Course type**  
Time of examination  
Type of examination

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**Total time of attendance for the module**  
56 h
### Module Information

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  - Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
  - Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule  
  - Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule |
| **Responsible persons** |  
  - Albach, Dirk Carl (Module responsibility)  
  - von Hagen, Klaus Bernhard (Module counselling)  
  - Will, Maria (Module counselling)  
  - Albach, Dirk Carl (Authorized examiners)  
  - von Hagen, Klaus Bernhard (Authorized examiners)  
  - Will, Maria (Authorized examiners) |
| **Prerequisites** |  
  - bio325 Pollination and dispersal concepts  
  - bio256 Flora/Fauna |
| **Skills to be acquired in this module** |  
  - biological knowledge  
  - knowledge of biological working methods  
  - 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  
  - Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants |
| **Module contents** |  
  - Pollination, fertilisation, dispersal and germination biological experiments in regard of adaptation to environmental factors |
| **Reader's advisory** |  
  The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar -Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung. |
| **Links** |  
  - Language of instruction: German  
  - Duration (semesters): 1 Semester  
  - Module frequency: The module will be offered every other year  
  - Module capacity: 12  
  - Modullevel / module level: AS (Akzentsetzung / Accentuation)  
  - Modulart / typ of module: Wahlpflicht / Elective  
  - Lehr-/Lernform / Teaching/Learning method: Übung  
  - Vorkenntnisse / Previous knowledge:  
  - Examination: Time of examination  
  - Type of examination  
  - Final exam of module: Portfolio  
  - Course type: Exercises  
  - SWS: 4  
  - Frequency: SuSe  
  - Workload attendance: 56 h |
bio327 - Pollination and Dispersal - Methods not just for Schools

Module label: Pollination and Dispersal - Methods not just for Schools
Module code: bio327
Credit points: 9.0 KP
Workload: 270 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodul
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Albach, Dirk Carl (Module responsibility)
- von Hagen, Klaus Bernhard (Module counselling)
- Will, Maria (Module counselling)
- Albach, Dirk Carl (Authorized examiners)
- von Hagen, Klaus Bernhard (Authorized examiners)
- Will, Maria (Authorized examiners)

Prerequisites:
- bio325 Pollination and dispersal concepts
- bio256 Flora/fauna

Skills to be acquired in this module:
- biological knowledge
- knowledge of biological working methods
- 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

Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants

Module contents:
The module introduces methods to study pollination, fertilisation, dispersal and germination in regard of adaptation to environmental factors. Experiments applicable to school lessons will be presented and especially thoroughly discussed.

Reader's advisory:
The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar -Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung.

Links:
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: Das Modul wird alle zwei Jahre stattfinden.
- Module capacity: 12
- Modullevel / module level: AS (Akzentsetzung / Accentuation)
- Modulart / typ of module: Wahlpflicht / Elective
- Lehr-/Lernform / Teaching/Learning method: Übung

Vorkenntnisse / Previous knowledge:

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Course type: Exercises

SWS: 6
Frequency: SuSe
Workload attendance: 84 h
### bio355 - Microscopical Anatomy

<table>
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<tr>
<td>Credit points</td>
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</tr>
<tr>
<td>Workload</td>
<td>270 h</td>
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| Applicability of the module  | • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
  • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule  
  • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule |
| Responsible persons          | Ahlrichs, Wilko (Module responsibility)                    |
|                              | Kieneke, Alexander (Module counselling)                     |
|                              | Hoppenrath, Mona (Module counselling)                       |
|                              | Ahlrichs, Wilko (Authorized examiners)                      |
|                              | Kieneke, Alexander (Authorized examiners)                   |
|                              | Hoppenrath, Mona (Authorized examiners)                     |

#### Prerequisites

#### Skills to be acquired in this module

++ biological knowledge  
++ knowledge of biological working methods  
++ biologically relevant knowledge in the natural sciences and mathematics  
++ interdisciplinary knowledge & thinking  
++ 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

This course is designed for students to learn about the basic light and electron optical methods. Students will be able to work with preparative techniques for scanning electron microscopy, trans-mission electron microscopy, and light microscopy, and confocal scanning laser microscopy. Students completing this course will have learned basic principles for fixing and embedding biological materials for electron microscopy. Students will have learned how to operate a transmission electron microscope, a scanning electron microscope, several ultramicrotomes, a vacuum evaporator, a critical point dryer, and a sputter coater. Digital imaging techniques that will be learned will include print making, design and assembly of materials for publication, PowerPoint presentations, and poster design. Students will be introduced to the principles of light microscopy utilizing different optical sys-tems and will have the opportunity to have hands-on experience with a Leica photomicroscope as well as the Leica SP5 confocal laser scanning.

#### Module contents

Microscopy of protists and micro metazoans. Students are required plan and carry out a research pro-ject that exposes them to some of the challenges and problems encountered by microscopical anato-my - and some of the techniques that are used to solve these problems. Students have to present a scientific poster, a short oral presentation and a scientific paper.

#### Reader's advisory

Will be announced in the course.

#### Links

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<tr>
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<td>Module capacity</td>
<td>8 (For more applicants than places, a motivation letter decides on the admission.)</td>
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<td>Modullevel / module level</td>
<td>AS (Akzentsetzung / Accentuation)</td>
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<td>Vorlesung/Seminar, Übung</td>
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### Examination

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<td><strong>Total time of attendance for the module</strong></td>
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**bio375 - Flora - Advanced Concepts**

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<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<td>Workload</td>
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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- Albach, Dirk Carl (Module responsibility)
- von Hagen, Klaus Bernhard (Module counselling)
- Will, Maria (Module counselling)
- Albach, Dirk Carl (Authorized examiners)
- von Hagen, Klaus Bernhard (Authorized examiners)
- Will, Maria (Authorized examiners)

**Prerequisites**
- bio256 Flora and Fauna

**Skills to be acquired in this module**
- biological knowledge
- knowledge of biological working methods
- deepened expertise in biological specialist field
- independent learning and (research-based) working
- data presentation and evidence-based discussion (written and spoken)
- (scientific) communication skills
- knowledge of safety and environmental issues

The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation. Subjects and methods relevant for nature conservation are emphasized. Along with these, students shall improve their systemic thinking with relation to nature in northwestern Germany and its flora. Students learn about plants and how to group them according to their phylogeny and evolutionary adaptations, so they can pass this knowledge on to others. Competence in assessment is conveyed in the areas of diversity and nature conservation to sensibilize students for a respectful treatment of nature and passing on this ability to others. Finally, we will discuss sustainable use of plants and habitats and their restoration.

**Module contents**
The module comprises a lecture in the Botanical Garden, where plants will be observed and investigated. This includes algae, bryophytes, ferns, gymnosperms and various families of angiosperms. The seminar is intended to let students study in-depth additional plant families with their typical characters.

**Reader's advisory**
Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband

**Links**

**Language of instruction**
- German

**Duration (semesters)**
- 1 Semester

**Module frequency**
The module will be offered every other year

**Module capacity**
- 12

**Modulart / typ of module**
- Wahlrichtung / Elective

**Lehr-/Lernform / Teaching/Learning method**
- Vorlesung, Seminar

**Vorkenntnisse / Previous knowledge**

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**Course type**

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**Comment**

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**SWS**

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**Frequency**

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**Workload of compulsory attendance**

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**Total time of attendance for the module**
- 56 h
bio376 - Flora - Advanced Methods

Module label: Flora - Advanced Methods
Module code: bio376
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule

Responsible persons:
- Albach, Dirk Carl (Module responsibility)
- von Hagen, Klaus Bernhard (Module counselling)
- Will, Maria (Module counselling)
- Albach, Dirk Carl (Authorized examiners)
- von Hagen, Klaus Bernhard (Authorized examiners)
- Will, Maria (Authorized examiners)

Prerequisites:
- bio256 Flora and Fauna
- bio375 Flora - Advanced concepts

Skills to be acquired in this module:
- biological knowledge
- knowledge of biological working methods
- deepened expertise in biological specialist field
- independent learning and (research-based) working
- data presentation and evidence-based discussion (written and spoken)
- (scientific) communication skills
- knowledge of safety and environmental issues

The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation. Subjects and methods relevant for nature conservation are emphasized. Along with these, students shall improve their systemic thinking with relation to nature in northwestern Germany and its flora. Students learn about plants and how to group them according to their phylogeny and evolutionary adaptations, so they can pass this knowledge on to others. Competence in assessment is conveyed in the areas of diversity and nature conservation to sensibilize students for a respectful treatment of nature and passing on this ability to others. Finally, we will discuss sustainable use of plants and habitats and their restoration.

Module contents:
The exercises will be used to apply the abilities to plant species in the vicinity of Oldenburg and to practice methods in mapping and surveying plant species.

Reader's advisory:
Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband

Links:

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: The module will be offered every other year
Module capacity: 12
Modulelevel / module level: AS (Akzentsetzung / Accentuation)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method: Übung

Vorkenntnisse / Previous knowledge:
Examination: 
Time of examination: 
Type of examination: portfolio

Final exam of module: 
Course type: Exercises

SWS: 4
Frequency: SuSe
Workload attendance: 56 h
bio377 - Flora - Advanced Methods not just for schools

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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- Albach, Dirk Carl (Module responsibility)
- von Hagen, Klaus Bernhard (Module counselling)
- Will, Maria (Module counselling)
- Albach, Dirk Carl (Authorized examiners)
- von Hagen, Klaus Bernhard (Authorized examiners)
- Will, Maria (Authorized examiners)

**Prerequisites**
- bio375 Flora - Advanced Concepts
- bio256 Flora and Fauna

**Skills to be acquired in this module**
- biological knowledge
- knowledge of biological working methods
- deepened expertise in biological specialist field
- independent learning and (research-based) working
- data presentation and evidence-based discussion (written and spoken)
- (scientific) communication skills
- knowledge of safety and environmental issues

The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation. Subjects and methods relevant for nature conservation are emphasized. Along with these, students shall improve their systemic thinking with relation to nature in northwestern Germany and its flora. Students learn about plants and how to group them according to their phylogeny and evolutionary adaptations, so they can pass this knowledge on to others. Competence in assessment is conveyed in the areas of diversity and nature conservation to sensibilize students for a respectful treatment of nature and passing on this ability to others. Finally, we will discuss sustainable use of plants and habitats and their restoration.

**Module contents**
The exercises will be used to apply the abilities to identify plant species in the vicinity of Oldenburg and to practice methods in mapping and surveying plant species. Investigations applicable to school lessons will be presented and especially thoroughly discussed.

**Reader's advisory**
Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband

**Links**

<table>
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<td>Lehr-/Lernform / Teaching/Learning method</td>
<td>Übung</td>
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**Vorkenntnisse / Previous knowledge**

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<td>portfolio</td>
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**Course type**
- Exercises

| SWS | 6 |
| Frequency | SuSe |
| Workload attendance | 84 h |
bio395 - Plant Molecular Biology and Genetics I

Module label: Plant Molecular Biology and Genetics I
Module code: bio395
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
Laubinger, Sascha (Module responsibility)
Laubinger, Sascha (Authorized examiners)

Prerequisites:
++ biological knowledge
++ knowledge of biological working methods
++ biologically relevant knowledge in the natural sciences and mathematics
++ statistics & scientific programming
++ interdisciplinary knowledge & thinking
++ 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

Skills to be acquired in this module:
The module serves the in-depth study of state-of-the-art techniques and problems in the field of molecular plant biology and plant genetics.
Specialist competencies: basic knowledge in plant genetics, plant developmental genetics, plant/environment interactions and molecular basis of gene regulation
General competencies: Presentation of scientific papers, presentation techniques, teamwork, problem solving competencies

Module contents:
Part of this module is a lecture that addresses several topics of modern plant molecular biology. The main focus is on plant developmental genetics, plant/environment interactions and the underlying molecular mechanisms of gene regulation in plants. At the beginning of the module, the students will present diverse molecular biology techniques and the latest developments in the field in a "method and techniques" seminar. In a "literature" seminar, the students will present and discuss a recent publication on one of the above-mentioned topics.

Reader's advisory:
Literature will be handed out at the beginning of the course.

Links:
Languages of instruction: German, English
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: 16
Reference text: This module is mandatory for "Plant molecular biology and genetics II"
Modullevel / module level: AS (Akzentsetzung / Accentuation)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method: Vorlesung, Seminar

Vorkenntnisse / Previous knowledge:

Examination Time of examination Type of examination
Final exam of module Written examination (good seminar presentations improve the grade)

Course type Comment SWS Frequency Workload of compulsory attendance
Lecture 2 WiSe 28
Seminar 2 WiSe 28

Total time of attendance for the module: 56 h
### bio396 - Plant Molecular Biology and Genetics II

<table>
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<td>Credit points</td>
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<td>Applicability of the module</td>
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- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule  
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule |
| Responsible persons |  
Laubinger, Sascha (Module responsibility)  
Laubinger, Sascha (Authorized examiners) |
| Prerequisites | bio395 Plant molecular biology and genetics I |
| 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  
++ interdisciplinary knowledge & thinking  
++ 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 |
| The module serves the in-depth study of state-of-the-art techniques and problems in the field of molecular plant biology and plant genetics. Specialist competencies: Acquiring basic skill in plant molecular biology, genetics and plant biochemistry  
Methodological competencies: molecular biology techniques, conducted independently  
General competencies: Presentation of scientific results, presentation techniques, teamwork, problem solving competencies |
| Module contents | Part of this module is a lecture that addresses several topics of modern plant molecular biology. The main focus is on plant developmental genetics, plant/environment interactions and the underlying molecular mechanisms of gene regulation in plants. At the beginning of the module, the students will present diverse molecular biology techniques and the latest developments in the field in a "method and techniques" seminar. In a "literature" seminar, the students will present and discuss a recent publication on one of the above-mentioned topics. |
| Reader's advisory | Literature will be handed out at the beginning of the course. |
| Links |  
Languages of instruction: German, English  
Duration (semesters): 1 Semester  
Module frequency: annually  
Module capacity: 16  
Modullevel / module level: AS (Akzentsetzung / Accentuation)  
Modulart / typ of module: Wahlpflicht / Elective  
Lehr-/Lernform / Teaching/Learning method: Übung |
| Vorkenntnisse / Previous knowledge |  
Examination | Time of examination | Type of examination |
| Final exam of module | portfolio (presentation, protocols) |
| Course type | Exercises |
| SWS | 4 |
| Frequency | WiSe |
| Workload attendance | 56 h |
## bio405 - Introduction to Neurobiology I

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<td>Workload</td>
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| Applicability of the module | - Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule  
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule |
| Responsible persons | Greschner, Martin (Module responsibility)  
Koch, Karl-Wilhelm (Module counselling)  
Janssen-Bienhold, Ulrike (Module counselling)  
Klump, Georg Martin (Module counselling)  
Greschner, Martin (Authorized examiners)  
Janssen-Bienhold, Ulrike (Authorized examiners)  
Klump, Georg Martin (Authorized examiners) |
| Prerequisites | ++ deepened biological expertise  
++ deepened knowledge of biological working methods  
+ scientific/mathematical basic knowledge relevant for biology  
+ critical and analytical thinking  
++ data presentation and discussion in German (written and spoken)  
+ teamwork |
| Module contents | The lecture covers the molecular and cellular basis of neurobiology, the electrical properties of nerve cells, the organization and development of the nervous system and the function of the motor system. In the seminar, topics related to the lectures of the week are covered in more depth. In the exercises, the theoretical knowledge from the lectures will be tested in small experiments. |
| Links |  |
| Language of instruction | German |
| Duration (semesters) | 1 Semester |
| Module frequency | annually |
| Module capacity | 30 |
| Reference text | associated with the modules bio415 and bio416 Introduction to Neurobiology II in the winter semester |
| Modullevel / module level | AS (Akzentsetzung / Accentuation) |
| Modulart / typ of module | Wahlpflicht / Elective |
| Lehr-/Lernform / Teaching/Learning method | Vorlesung, Seminar, Übung |
| Vorkenntnisse / Previous knowledge | Grundlagen der Physiologie/ Zellbiologie |
| Examination | Time of examination | Type of examination |
| Final exam of module | end of semester | exam and protocol |
| Course type | Comment | SWS | Frequency | Workload of compulsory attendance |
| Lecture |  | 3 | SuSe | 42 |
| Seminar |  | 1 | SuSe | 14 |
| Exercises |  | 4 | SuSe | 56 |
| Tutorial (optional) |  |  | SoSe und WiSe | 0 |
| Total time of attendance for the module | 112 h |
bio415 - Introduction to Neurobiology II

<table>
<thead>
<tr>
<th>Module label</th>
<th>Introduction to Neurobiology II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio415</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
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</tbody>
</table>
| Applicability of the module         | • Bachelor's Programme Biology (Bachelor) > Akzentsetzungs module  
• Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule  
• Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungs module  
• Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule |
| Responsible persons                | Klump, Georg Martin (Module responsibility)  
Thiel, Christiane Margarete (Module counselling)  
Köppl, Christine (Module counselling)  
Greschner, Martin (Module counselling)  
Klump, Georg Martin (Authorized examiners)  
Thiel, Christiane Margarete (Authorized examiners)  
Köppl, Christine (Authorized examiners)  
Greschner, Martin (Authorized examiners) |
| Prerequisites                      | ++ deepened biological expertise  
++ deepened knowledge of biological working methods  
+ scientific/mathematical basic knowledge relevant for biology  
+ critical and analytical thinking |
| Module contents                    | The lecture covers the basics of systemic neuroscience with a focus on processing in sensory systems, the plasticity of the nervous system and the mechanisms underlying cognitive processing. In the seminar, topics related to the lectures of the week are covered in more depth. |
| Language of instruction            | German                          |
| Duration (semesters)               | 1 Semester                      |
| Module frequency                   |                                 |
| Module capacity                    | 30                              |
| Module level / module level        | AS (Akzentsetzung / Accentuation) |
| Modulart / typ of module          | Wahlpflicht / Elective          |
| Lehr-/Lernform / Teaching/Learning method | Vorlesung, Seminar            |
| Vorkenntnisse / Previous knowledge | Grundlagen der Physiologie/ Wahrnehmung |
| Examination                        | Time of examination             |
| Final exam of module               | Type of examination             |
| Course type                        | Comment | SWS | Frequency | Workload of compulsory attendance |
| Lecture                            |         | 3   | WiSe     | 42         |
| Seminar                            |         | 1   | WiSe     | 14         |
| Total time of attendance for the module |         | 56 h |           |            |
# bio416 - Experiments in Neurobiology II

<table>
<thead>
<tr>
<th>Module label</th>
<th>Experiments in Neurobiology II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio416</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
</tbody>
</table>
| Applicability of the module | • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
• Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule  
• Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
• Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule |
| Responsible persons | Klump, Georg Martin (Module responsibility)  
Thiel, Christiane Margarete (Module counselling)  
Langemann, Ulrike (Module counselling)  
Klump, Georg Martin (Authorized examiners)  
Thiel, Christiane Margarete (Authorized examiners)  
Langemann, Ulrike (Authorized examiners) |
| Prerequisites | bio415 "Introduction to Neurobiology II" |
| Skills to be acquired in this module | ++ deepened biological expertise  
++ deepened knowledge of biological working methods  
++ data analysis skills  
++ data presentation and discussion in German and English (written and spoken)  
+ teamwork  
+ scientific/mathematical basic knowledge relevant for biology |
| Module contents | The exercise immediately follows the module "Introduction to Neurobiology II". By experimenting with each other, the students deepen their knowledge in the fields of cognitive neuroscience and hearing science. The students analyze their own data (incl. statistics) an present these in a written report. |
| Links |  |
| Language of instruction | German |
| Duration (semesters) | 1 Semester |
| Module frequency | annually |
| Module capacity | 30 |
| Module level / module level | AS (Akzentsetzung / Accentuation) |
| Modulart / typ of module | Wahlpflicht / Elective |
| Lehr-/Lernform / Teaching/Learning method | Übung |
| Vorkenntnisse / Previous knowledge | Neurobiologie II |
| Examination | Time of examination | Type of examination |
| Final exam of module | end of module | portfolio (data analysis, presentation) |
| Course type | Exercises |
| SWS | 4 |
| Frequency | WiSe |
| Workload attendance | 56 h |
bio385 - Specific Microbiology

Module label: Specific Microbiology
Module code: bio385
Credit points: 12.0 KP
Workload: 360 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Rabus, Ralf Andreas (Module responsibility)
- Rabus, Ralf Andreas (Authorized examiners)
- Wünsch, Daniel (Authorized examiners)

Prerequisites:
- bio233 Basics in microbiology and genetics
- bio265 general microbiology

Skills to be acquired in this module:
- **THEORIE**: verschiedene Kultivierungsstrategien (batch, fed-batch, kontinuierlich) und physiologische Interpretation von Meßparametern (Wachstumsraten, Respirationsraten, Ertrag)
- **PRAXIS**: apparatives Verständnis von und praktischer Umgang mit Bioreaktoren inkl. Sensorsystemen

Module contents:
- Grundlagen der Prozess-kontrollierten Kultivierung in Bioreaktoren
- TEIL A: Umgang mit Bioreaktoren inkl. Analyse und Regelung von Prozess-Parametern
- TEIL B: Kultivierung mariner Bakterien unter definierten Bedingungen im Bioreaktor, Bilanzierung von Stoffwechselaktivitäten

Reader's advisory:
- Schmauder HP (1994) Methoden der Biotechnologie, Kapitel 3.2.2. Gustav Fischer Verlag Jena

Links:
- www.icbm.de/ammb

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: 8

Module level / module level: AS (Akzentsetzung / Accentuation)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method:
- Vorlesung, Seminar, Praktikum

Vorkenntnisse / Previous knowledge: Chemie

Examination:
- Time of examination
- Type of examination

<table>
<thead>
<tr>
<th>Final exam of module</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>exam (50%) protocol (50%)</td>
</tr>
</tbody>
</table>

Course type:
- Lecture
- Seminar
- Practical training

Comment:
- 2
- 2
- 6

SWS:
- WiSe 28
- WiSe 28
- WiSe 84

Total time of attendance for the module: 140 h
bio420 - Biochemistry of the Cell

Module label: Biochemistry of the Cell
Module code: bio420
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Scholten, Alexander (Module responsibility)
- Scholten, Alexander (Authorized examiners)

Prerequisites:
- Basic knowledge in biology
- Knowledge of biological working methods
- Biologically relevant knowledge in the natural sciences and mathematics
- Abstract, logical, analytical thinking
- Data presentation and evidence-based discussion (written and spoken)
- Scientific communication skills

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
- + data presentation and evidence-based discussion (written and spoken)
- ++ (scientific) communication skills

Module contents:
- Supramolecular organization in the cell, interactions of biomolecules, signalling fluxes

Reader's advisory:
- Biochemie, Müller-Esterl
- Biochemie, Lubert Stryer
- Lehninger Prinzipien der Biochemie, David L. Nelson und Michael M. Cox
- Principles of Biochemistry, Horton et al.

Links:

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: annually
Module capacity: 20
Modullevel / module level: AS (Akzentsetzung / Accentuation)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method: Vorlesung, Seminar, Übung

Vorkenntnisse / Previous knowledge:
- Biochemie und Molekularbiologie

Examination:
- Time of examination: during the semester
- Type of examination: oral presentation

Course type:
- Lecture: 1 SWS, WiSe, 14
- Exercises: 1 SWS, WiSe, 14
- Seminar: 2 SWS, WiSe, 28

Final exam of module:
- Type of examination: oral presentation

Total time of attendance for the module: 56 h
bio430 - Analytical Biochemistry

<table>
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<tr>
<th>Module label</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio430</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
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</table>

**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

**Responsible persons**
- Koch, Karl-Wilhelm (Module responsibility)
- Scholten, Alexander (Module counselling)
- Koch, Karl-Wilhelm (Authorized examiners)
- Scholten, Alexander (Authorized examiners)

**Prerequisites**
- ++ 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
- ++ data presentation and evidence-based discussion (written and spoken)
- + teamwork

The students get a survey of current techniques in Biochemistry and learn some essential techniques such as column chromatography and enzyme kinetic measurements in practice. They understand the theoretical fundamentals of these techniques and assess experimentally collected data bases.

**Module contents**
- Bioanalytical methods in theory and practice

**Reader's advisory**
- Bioanalytik, Lottspeich/Engels

**Links**
- Language of instruction: German

**Duration (semesters)**
- 1 Semester

**Module frequency**
- annually

**Module capacity**
- 20

**Modullevel / module level**
- AS (Akzentsetzung / Accentuation)

**Modulart / typ of module**
- Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**
- Vorlesung, Seminar, Übung

**Vorkenntnisse / Previous knowledge**
- Biochemie, Molekularbiologie

**Examination**
- Time of examination: during semester
- Type of examination: oral presentation and protocol

**Final exam of module**
- Type of examination: oral presentation and protocol

**Course type** | Comment | SWS | Frequency | Workload of compulsory attendance
--- | --- | --- | --- | ---
Lecture | 1 | SuSe | 14
Seminar | 1 | SuSe | 14
Exercises | 2 | SuSe | 28

**Total time of attendance for the module**
- 56 h
bio440 - Microfauna, Microflora & Protista of limnic and marine habitats

Module label Microfauna, Microflora & Protista of limnic and marine habitats
Module code bio440
Credit points 6.0 KP
Workload 180 h

Applicability of the module
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons
Ahlrichs, Wilko (Module responsibility)
Kieneke, Alexander (Module counselling)
Hoppenrath, Mona (Module counselling)
Ahlrichs, Wilko (Authorized examiners)
Kieneke, Alexander (Authorized examiners)
Hoppenrath, Mona (Authorized examiners)

Prerequisites
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
++ interdisciplinary knowledge & thinking
+ 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

The objectives of the module are the teaching and learning of methods in the field of taxonomy, systematics, morphology, ecology, and evolution. Competencies for finding, identifying, preparing, micro-copying, illustrating, describing, and publishing species are taught. It learns how a scientific collection is created and managed. Another goal is the teaching of basics of molecular systematics and barcoding. The focus is on taxa of the microfauna and protists of limnic and marine habitats. The goal is the knowledge of biotic and abiotic properties of aquatic habitats, their formation and biodiversity. The students should learn to hypothesize structural adaptations of organisms to aquatic habitats.

Module contents
We study microfauna and protists of limnic and marine habitats. Microfauna refers to microscopic animals. They live together with protists aquatic habitats in high diversity. Animals of the microfauna and protists usually belong to groups that developed early in evolution. The study of communities of these groups give a unique insight into the evolution of animals and protists. The microfauna and the protists are little studied compared to other groups of animals and offer great potential. But they must be examined under the optical microscope. This requires special techniques and knowledge. Fortunately, through digital techniques, the investigation and publications have been greatly simplified. We will make excursions to ponds, ponds, lakes, rivers, bogs, sea beaches, etc. It teaches where, when, and how to find species of microfauna and protists. The collected organisms are determined, prepared, microscoped, photographed, drawn, and digitally illustrated. Art descriptions are produced. Attention is paid to the correct application of nomenclature rules. We show how a scientific collection is built and managed. For this purpose, basic knowledge in SQL database technology is taught. Dichotomous, synoptic, and digital identification keys are presented and developed. In addition to the classical morphological methods, it will be shown how species for molecular barcoding and phylogenetic analyzes are investigated. The students will create art portraits. The results are communicated in the form of posters, short lectures, and scientific publications.

Reader's advisory
Will be announced in the course.

Links

Language of instruction German
Duration (semesters) 1 Semester
Module frequency irregular
Module capacity 12 /
For more applicants than places, a motivation letter decides on the admission.
<table>
<thead>
<tr>
<th>Modullevel / module level</th>
<th>AS (Akzentsetzung / Accentuation)</th>
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</thead>
<tbody>
<tr>
<td>Modulart / typ of module</td>
<td>Wahlpflicht / Elective</td>
</tr>
<tr>
<td>Lehr-/Lernform / Teaching/Learning method</td>
<td>Seminar, Übung, Exkursion</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td>Lichtmikroskopie</td>
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<table>
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<tr>
<th>Final exam of module</th>
<th>Time of examination</th>
<th>Type of examination</th>
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<tr>
<td>Course type</td>
<td>Comment</td>
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<tr>
<td>Study trip</td>
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<tr>
<td>Seminar</td>
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<td>Exercises</td>
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<tr>
<td>Total time of attendance for the module</td>
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</table>
bio450 - Posters, Pictures, Presentations and Papers

<table>
<thead>
<tr>
<th>Module label</th>
<th>Posters, Pictures, Presentations and Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio450</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
<td>270 h</td>
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</table>
| Applicability of the module                | - Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule  
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodul |  
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodul |
| Responsible persons                        | Bininda-Emonds, Olaf (Module responsibility)  
Ahrichs, Wilko (Module counselling)  
Bininda-Emonds, Olaf (Authorized examiners)  
Ahrichs, Wilko (Authorized examiners) |
| Prerequisites                               |                                             |
| Skills to be acquired in this module       | + interdisciplinary knowledge & thinking  
+ 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)  
++ (scientific) communication skills  
+ project and time management |
| Practical experience with four forms of scientific presentation: papers, presentations, scientific drawings, and posters. The students will learn / gain: 1) the logical and structural form of a scientific paper (or protocol or thesis) so as to communicate their results more effectively; 2) the distillation of the key information out of a project and its focused presentation in a lecture or poster; 3) experience with constructive criticism in a group setting as well as the critical assessment of scientific studies; 4) experience with scientific English; and 5) the art of scientific drawing, including the making of high-quality photo montages for papers or posters through microphotography and digital editing. |
| Module contents                            | Theoretical part: General tips regarding the logical and structural form of a scientific paper, presentation, or posters, including how to avoid making the most common mis-takes.  
Practical part: Critical analysis of selected papers from the (evolutionary biological) literature. Writing of a scientific paper using pre-given results. Construction and presentation of a lecture and poster in front of the group based on a recent paper from the literature. Through the feedback obtained in this process, improvements will be made in both cases. Microscopic photography of selected zoological specimens that will then be transferred to / drawn on transparent paper before being rescanned for digital editing. High-quality photo montages of both the photos themselves and the drawings derived from them will be obtained through diverse software (e.g., Adobe Illustrator or InDesign). |
| Reader's advisory                          | None. The relevant scientific literature will be distributed during the course. |
| Links                                      |                                             |
| Languages of instruction                   | German, English                             |
| Duration (semesters)                       | 1 Semester                                  |
| Module frequency                           | annually                                    |
| Module capacity                            | 10 (Letter of motivation)                   |
| Module level / module level                | AS (Akzentsetzung / Accentuation)           |
| Modulart / typ of module                   | Wahlpflicht / Elective                      |
| Lehr-/Lernform / Teaching/Learning method  | Übung                                       |
| Vorkenntnisse / Previous knowledge         | Erfahrungen in der Anwendung von Excel oder ähnlichen Software-Programmen mit Graph-Fähigkeiten, von Adobe Photoshop, und von PowerPoint, Keynote oder ähnlichen Software-Programmen |
| Examination                                | Time of examination                         |
| Final exam of module                       | Type of examination                         |
| Course type                                | Exercises                                   |
| SWS                                        | 6                                           |
| Frequency                                  | SuSe                                        |
| Workload attendance | 84 h |
bio460 - Diversity of marine Invertebrates

Module label: Diversity of marine Invertebrates
Module code: bio460
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor’s Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor’s Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Glatzel, Thomas (Module responsibility)
- Glatzel, Thomas (Authorized examiners)

Prerequisites:
- ++ biological knowledge
- + knowledge of biological working methods
- + interdisciplinary knowledge & 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

By actively participating in this module the students acquire qualifications in the fields stated below:
- Survey of recent subjects concerning the biology and morphology of aquatic organisms
- Extended knowledge of how morphological characteristics have developed
- Technical skills in preparing and documenting morphological structures
- Knowledge of organizational principles of these structures

Module contents:
The module serves an extended examination of selected aquatic animals from a functional and morphological point of view. Living and fixed animals are investigated and histological preparations are analysed. Thus, the morphology, anatomy, and histology are studied in detail. The biology and ecology of these animals are also considered, which enables the organisms to be studied very intensively and provides an illustrative basis for theoretical discussions.

Reader’s advisory:
GRÜNER, H.-E., 1993: „Der Kästner“, A., Lehrbuch der speziellen Zoologie. All volumes, Gustav Fischer/Spektrum Akademischer Verlag, Jena, Stuttgart. Many interesting details are found only in these volumes!
GRÜTER, W., 2001: Leben im Meer – Vielfalt und Zusammenhänge. Dr. Friedrich Pfeil Verlag, München. This book arouses your curiosity about the underwater world.
HAYWARD, P. NELSON-SMITH, T., SHIELDS, C. & M. KREMER, 2008: Der neue Kosmos Strandführer - 1500 Arten der Küsten Europas. Franckh-Kosmos Verlag. This coastal guide provides excellent and clearly arranged colour tables for individual groups.
WESTHEIDE, W. & R., RIEGER, 2013: Spezielle Zoologie. Band I, II, Gustav Fischer Verlag, Stuttgart, Jena. The textbook absolute! My explicit recommendation! The literature listed above is available in the university library in Wechloy. Further reading will be recommended in the course of the lecture.

Literature inquiry:
- web of science: http://zbix10.uni-regensburg.de/dbinfo/dblist.php?bib_id=ubol&colors=7&ocolors=40&lett=f&gebiete=5 – Data banks(DBIS) - Biology - TOPData banks e.g. ASFA, Science Citation Index, Zoological Record
- http://www.biodiversitylibrary.org/bibliogrphy/14107
- http://scholar.google.de/
- http://www.wifabio.de
- Open access journals: http://www.doaj.org/ - www.plosone.org

Links:
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: annually
- Module capacity: 15
<table>
<thead>
<tr>
<th>Modullevel / module level</th>
<th>AS (Akzentsetzung / Accentuation)</th>
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</thead>
<tbody>
<tr>
<td>Modulart / typ of module</td>
<td>Wahlpflicht / Elective</td>
</tr>
<tr>
<td>Lehr-/Lernform / Teaching/Learning method</td>
<td>Seminar, Übung</td>
</tr>
</tbody>
</table>

### Previous knowledge

<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>During the lecture</td>
<td>portfolio</td>
</tr>
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</table>

**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>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises</td>
<td></td>
<td>3</td>
<td>WiSe</td>
<td>42</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>1</td>
<td>WiSe</td>
<td>14</td>
</tr>
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</table>

**Total time of attendance for the module** 56 h
bio470 - Marine Biology Field Trip

Module label: Marine Biology Field Trip
Module code: bio470
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodulle
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodulle
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Ahlrichs, Wilko (Module responsibility)
- Kieneke, Alexander (Module counselling)
- Ahlrichs, Wilko (Authorized examiners)
- Kienieke, Alexander (Authorized examiners)

Prerequisites:
Motivationsschreiben bei mehr Teilnehmern als Plätzen.

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
++ interdisciplinary knowledge & thinking
++ 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

On completion of this modul students will:
- have a basic knowledge of the diversity of marine life
- understand the fundamental physiochemical and physiological processes underlying the productivity of marine environments
- understand the ecological dynamics of marine ecosystems
- appreciate the role of humans in disturbing and exploiting marine ecosystems
- have developed a critical, analytical approach to scientific research
- have developed skills in writing scientific reports and in oral communication of scientific information.

Module contents:
Microscopy of marine fauna and flora of the wadden sea; Students are required plan and carry out a research project that exposes them to some of the challenges and problems encountered by field biologists - and some of the techniques that are used to solve these problems. Students have to present a scientific poster and a short oral presentation.

Reader's advisory:
Will be announced in the course.

Links:
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: annually
- Module capacity: 14 (For more applicants than places, a letter of motivation decides on the admission.)

Module level / module level:
AS (Akzentsetzung / Accentuation)

Modulart / typ of module:
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method:
Seminar, Übung, Exkursion

Vorkenntnisse / Previous knowledge:
Kenntnisse der Großgruppen der Tiere, der Pflanzen und der Protisten

Examination:
- Time of examination
- Type of examination

Final exam of module:
- Modulende: portfolio

Course type: Modulende
Frequency: SuSe
Workload of compulsory attendance: 28

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>2</td>
<td>SuSe</td>
<td>28</td>
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<tr>
<td>Exercises</td>
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<td>2</td>
<td>SuSe</td>
<td>28</td>
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<tr>
<td>Study trip</td>
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<td>2</td>
<td>SuSe</td>
<td>28</td>
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</table>

Total time of attendance for the module: 84 h
bio480 - Functional Morphology of Plants

Module label: Functional Morphology of Plants
Module code: bio480
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons:
- Zotz, Gerhard Wolfgang (Module responsibility)
- Einzmann, Helena (Module counselling)
- Zotz, Gerhard Wolfgang (Authorized examiners)
- Einzmann, Helena (Authorized examiners)

Prerequisites:
++ biological knowledge
+ knowledge of biological working methods
+ biologically relevant knowledge in the natural sciences and mathematics
+ interdisciplinary knowledge & thinking
+ abstract, logical, analytical thinking
++ deepened expertise in biological specialist field
+ independent learning and (research-based) working

Skills to be acquired in this module:
Students acquire knowledge in macroscopic and microscopic morphology of plants, always putting form in the context of function
Students understand the concepts of allometry and scaling
Students put this knowledge in the context of theoretical concepts of ecology and evolution
Students learn experimental techniques in diverse topics, e.g. biomechanics or water relations

Module contents:
V: Functional Morphology of Plants (1 SWS)
E: Mikroskopy, biomechanical Experiments, Form/Function Experiments regarding water uptake, storage and loss (2 SWS)
S new studies in the field of functional morphology (1 SWS)

Reader's advisory:

Links:
Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: annually
Module capacity: 8

Modullevel / module level: AS (Akzentsetzung / Accentuation)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method: Vorlesung, Seminar, Übung

Vorkenntnisse / Previous knowledge: Ökologie, Flora

Examination:
Time of examination: 1 Portfolio (oral presentation and 1 report) OR 1 Written examination

Course type:
- Lecture: 1 SWS
- Seminar: 1 SWS
- Exercises: 2 SWS

Frequency: WiSe

Workload of compulsory attendance:
- Lecture: 14 h
- Seminar: 14 h
- Exercises: 28 h

Total time of attendance for the module: 56 h
bio408 - Introduction to Neurobiology I

Module label: Introduction to Neurobiology I
Module code: bio408
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodul
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule

Responsible persons

Prerequisites

Skills to be acquired in this module

Module contents

Reader's advisory

Language of instruction: German

Duration (semesters): 1 Semester

Module frequency

Module capacity: unlimited

Modul level / module level: BW (Bereichswahlmodul / Range selection)

Modulart / typ of module: Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge

Examination

Time of examination

Type of examination

Final exam of module: Klausur

Course type: Lecture, Seminar

Comment

SWS

Frequency

Workload of compulsory attendance

Lecture: 3
SuSe
32

Seminar: 1
SuSe
14

Total time of attendance for the module: 46 h

SWS
Frequency

Workload of compulsory attendance
**bio472 - Marine Biology Field Trip**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Marine Biology Field Trip</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio472</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
</tbody>
</table>
| Applicability of the module| - Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodulle 
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodulle 
- Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule |

**Responsible persons**

**Prerequisites**

**Skills to be acquired in this module**

**Module contents**

**Reader's advisory**

**Links**

<table>
<thead>
<tr>
<th>Language of instruction</th>
<th>German</th>
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<tbody>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
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<tr>
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<tr>
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<tr>
<td>Modulelevel / module level</td>
<td>BW (Bereichswahlmodul / Range selection)</td>
</tr>
<tr>
<td>Modulart / typ of module</td>
<td>Wahlpflicht / Elective</td>
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</table>

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Final exam of module**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>2</td>
<td>SoSe oder WiSe</td>
<td>28</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>2</td>
<td>SoSe oder WiSe</td>
<td>28</td>
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</table>

**Total time of attendance for the module**

56 h
### Module Information

**Module Code:** bio473  
**Module Label:** Evolutionsgeschichte des Lebens: Leben im Wandel der Erdzeitalter  
**Credit Points:** 6.0 KP  
**Workload:** 180 h

### Responsible Persons

### Prerequisites

### Skills to be Acquired in this Module

### Module Contents

### Reader's Advisory

### Links

**Language of Instruction:** German  
**Duration (Semesters):** 1 Semester  
**Module Frequency:** 1 Semester  
**Module Capacity:** Unlimited  
**Module Level / Module Level:** BW (Bereichswahlmodul / Range selection)  
**Module Art / Type of Module:** Wahlpflicht / Elective

### Examination

**Course Type:** Seminar, Exercises, Study Trip  
**Comment:**  
**SWS:** 2, 1, 1  
**Frequency:** SoSe oder WiSe  
**Workload of Compulsory Attendance:** 28, 14, 14  
**Total Time of Attendance for the Module:** 56 h
Ergänzungsmodule

bio150 - Statistics for Biologists

<table>
<thead>
<tr>
<th>Module label</th>
<th>Statistics for Biologists</th>
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<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
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<tr>
<td>Applicability of the module</td>
<td>- Bachelor's Programme Biology (Bachelor) &gt; Naturwissenschaftliche Grundlagen</td>
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<tr>
<td>Responsible persons</td>
<td>Kretzberg, Jutta (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Kretzberg, Jutta (Authorized examiners)</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Skills to be acquired in this module</td>
</tr>
<tr>
<td></td>
<td>[nop] + knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics ++ statistics &amp; scientific programming + interdisciplinary knowledge &amp; thinking ++ abstract, logical, analytical thinking + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) + teamwork /nop] Knowledge in applied statistics Basic knowledge of programming language R Ability to plan, conduct and interpret statistical analysis of biological data</td>
</tr>
<tr>
<td>Module contents</td>
<td>Introduction to applied statistics - background and application in R: Logic, set theory, combinatorics, probability theory, distributions, descriptive statistics, inferential statistics, statistical tests, ANOVA, study design, Bayes' statistics, correlation, regression, curve fitting</td>
</tr>
<tr>
<td>Reader's advisory</td>
<td>A detailed script for lecture and exercises is available in Stud.IP</td>
</tr>
<tr>
<td>Links</td>
<td>Language of instruction</td>
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<tr>
<td></td>
<td>Duration (semesters)</td>
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<td>Module frequency</td>
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<td>Module capacity</td>
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<td>Modulelevel / module level</td>
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<td>Modulart / typ of module</td>
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<td>Lehr-/Lernform / Teaching/Learning method</td>
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<td>Vorkenntnisse / Previous knowledge</td>
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<tr>
<td>Examination</td>
<td>Time of examination</td>
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<td></td>
<td>Final exam of module</td>
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<tr>
<td></td>
<td>Exercises</td>
</tr>
<tr>
<td></td>
<td>Total time of attendance for the module</td>
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</table>
bio250 - Biochemistry

Module label: Biochemistry
Module code: bio250
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule

Responsible persons:
- Koch, Karl-Wilhelm (Authorized examiners)
- Scholten, Alexander (Module counselling)

Prerequisites
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
+ 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

The students have a survey of the arrangement, function, and biosynthesis of the most important substance classes and metabolic processes, learn basic experimental methods of biochemistry and are able to present and interpret experimental results.

Module contents:
The module gives an introduction to conceptions and methods of biochemistry.

Reader's advisory:
General textbooks of Biochemistry, e.g.:
- Biochemie, Müller-Esterl
- Biochemie, Lubert Stryer
- Lehninger Prinzipien der Biochemie, David L. Nelson und Michael M. Cox
- Principles of Biochemistry, Horton et al.

Links

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Modullevel / module level: EB (Ergänzungsbereich / Complementary)
Modulart / typ of module: Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge

Examination
Time of examination
Type of examination
Final exam of module
Written examination following the end of lectures or end of the semester.
1 written examination signed 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 of compulsory attendance
Lecture
2
28
Tutorial
WiSe
0
Seminar
1
14
Practical training
2
28
Total time of attendance for the module
70 h
che101 - Basic Chemistry

Module label: Basic Chemistry
Module code: che101
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen
- Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule

Responsible persons:
Wark, Michael (Module responsibility)

Prerequisites:

Skills to be acquired in this module:

Module contents:
V: Allgemeine und Anorganische Chemie (3 SWS)
- Aufbau des Periodensystems; Grundlagen der chemischen Bindung; Nomenklatur chemischer Verbindungen; stöchiometrische Gesetze; chemische Gleichgewichte; fundamentale Stoffchemie; Struktur wichtiger Verbindungen; Säuren und Basen; Reduktionen und Oxidationen; Einführung in Methoden der Spektroskopie und der Chromatographie.

Ü: Übung zur Vorlesung Allgemeine und Anorganische Chemie (1 SWS)

Reader's advisory:
Zeeck: Chemie für Mediziner, Urban & Schwarzenberg;
Latschakatmaier: Chemie für Biologen, Springer;
Riedel: Anorganische Chemie, de Gruyter;
Holleman-Wiberg: Lehrbuch der Anorganischen Chemie, de Gruyter;
Skript zur Vorlesung

Links:
Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Reference text: 6 KP / WiSe: V 101, Ü 101Ü

Modulelevel / module level:
je nach Studiengang Pflicht oder Wahlpflicht

Lehr-/Lernform / Teaching/Learning method:

Vorkenntnisse / Previous knowledge:

Examination:
Time of examination:
- Klausur am Beginn der vorlesungsfreien Zeit (normalerweise Anfang Februar)
Type of examination:
- written exam (100%)

Course type:
Lecture:
- Comment: 3
- SWS:
- Frequency: WiSe
- Workload of compulsory attendance: 42

Exercises:
- Comment: 1
- SWS:
- Frequency: WiSe
- Workload of compulsory attendance: 14

Total time of attendance for the module:
56 h
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<th>che102 - Basic Chemistry Laboratory</th>
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<tr>
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<td><strong>Module code</strong></td>
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<tr>
<td><strong>Workload</strong></td>
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<tr>
<td><strong>Applicability of the module</strong></td>
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<tr>
<td><strong>Responsible persons</strong></td>
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<tr>
<td><strong>Prerequisites</strong></td>
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<tr>
<td><strong>Skills to be acquired in this module</strong></td>
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<tr>
<td><strong>Reader's advisory</strong></td>
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<tr>
<td><strong>Links</strong></td>
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<tr>
<td><strong>Language of instruction</strong></td>
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<tr>
<td><strong>Duration (semesters)</strong></td>
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<tr>
<td><strong>Module frequency</strong></td>
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<tr>
<td><strong>Module capacity</strong></td>
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<tr>
<td><strong>Reference text</strong></td>
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<tr>
<td><strong>Modullevel / module level</strong></td>
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<tr>
<td><strong>Modulart / typ of module</strong></td>
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<td><strong>Lehr-/Lernform / Teaching/Learning method</strong></td>
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<td><strong>Vorkenntnisse / Previous knowledge</strong></td>
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<tr>
<td><strong>Examination</strong></td>
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<td><strong>Type of examination</strong></td>
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<td><strong>Course type</strong></td>
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<tr>
<td><strong>SWS</strong></td>
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<td>che190 - Basic Organic Chemistry</td>
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<td><strong>Workload</strong></td>
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<td><strong>Applicability of the module</strong></td>
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<tr>
<td><strong>Responsible persons</strong></td>
</tr>
<tr>
<td>Christoffers, Jens (Module responsibility)</td>
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<tr>
<td>Christoffers, Jens (Authorized examiners)</td>
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<tr>
<td>Hilt, Gerhard (Authorized examiners)</td>
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<tr>
<td>Doye, Sven (Authorized examiners)</td>
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<tr>
<td>Hilt, Gerhard (Module counselling)</td>
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<td>Doye, Sven (Module counselling)</td>
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<td>Christoffers, Jens (Module counselling)</td>
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<td><strong>Prerequisites</strong></td>
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<td><strong>Skills to be acquired in this module</strong></td>
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<tr>
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<td><strong>Reader's advisory</strong></td>
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<td><strong>Language of instruction</strong></td>
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<td><strong>Duration (semesters)</strong></td>
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<td><strong>Module frequency</strong></td>
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<td><strong>Module capacity</strong></td>
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<td><strong>Modulart / typ of module</strong></td>
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<tr>
<td><strong>Lehr-/Lernform / Teaching/Learning method</strong></td>
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<td><strong>Vorkenntnisse / Previous knowledge</strong></td>
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<td><strong>Examination</strong></td>
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<td><strong>Time of examination</strong></td>
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<td><strong>Type of examination</strong></td>
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<td><strong>Final exam of module</strong></td>
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<td><strong>SWS</strong></td>
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<tr>
<td><strong>Frequency</strong></td>
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<tr>
<td><strong>Workload attendance</strong></td>
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## che290 - Experimental Organic Chemistry

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<th>Experimental Organic Chemistry</th>
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<tr>
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<td>6.0 KP</td>
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<tr>
<td>Workload</td>
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### Applicability of the module
- Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule
- Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Aufbaumodule
- Master of Education Programme (Vocational and Business Education) Chemistry (Master of Education) > Mastermodule

### Responsible persons
- Doye, Sven (Module responsibility)
- Christoffers, Jens (Authorized examiners)
- Doye, Sven (Authorized examiners)
- Martens, Jürgen (Authorized examiners)
- Christoffers, Jens (Module counselling)
- Martens, Jürgen (Module counselling)

### Prerequisites
Erfolgreiche Teilnahme am Modul "Grundvorlesung Organische Chemie"

### Skills to be acquired in this module
Den Studierenden soll der Ausbau ihrer grundlegenden Kenntnisse über die Reaktivität organischer Substanzen in Theorie und Praxis ermöglicht werden.

### Module contents

### Reader's advisory

### Links
http://www.chemie.uni-oldenburg.de/doc...

### Language of instruction
German

### Duration (semesters)
1 Semester

### Module frequency
jährlich

### Module capacity
unlimited

### Reference text
6 KP / SoSe: PR 204, S 205 / 4. FS / Doye

### Modullevel / module level

### Modulart / typ of module
PR + SE (6 SWS)

### Vorkenntnisse / Previous knowledge

### Examination
<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eine mündliche Prüfung von maximal 45 Minuten</td>
<td>KL</td>
</tr>
<tr>
<td>Dauer nach Abschluss des Praktikums und nach Terminvereinbarung mit einem der möglichen Prüfer spätestens zum Ende des Semesters</td>
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</table>

### Final exam of module

### Course type

<table>
<thead>
<tr>
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<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>3</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Practical training</td>
<td>3</td>
<td>42</td>
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### Total time of attendance for the module
84 h
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
Reference text: 6 KP | 1 V: 981, 1 Ü: 982| 1. FS |
Module level / module level: BC (Basiscurriculum / Base curriculum)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method: Vorlesung + Übung

Vorkenntnisse / Previous knowledge

Examination Time of examination Type of examination
Final exam of module Vorlesungsende
Course type Comment SWS Frequency Workload of compulsory attendance
Lecture 3 42
Exercises 1 14
Total time of attendance for the module: 56 h
# phy910 - Physics for Students of Biology and Dual Subject Chemistry

<table>
<thead>
<tr>
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<th>Physics for Students of Biology and Dual Subject Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>phy910</td>
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<tr>
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</table>
| Applicability of the module | Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen  
                               | Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule  
                               | Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Aufbaumodule |
| Responsible persons | Gülker, Gerd (Module responsibility)  
                      | Gütay, Levent (Module responsibility) |
| Prerequisites | Keine                                                        |
| Links | http://www.uni-oldenburg.de/physik/lehre/praktika/bio-che/bio/ |
| Language of instruction | German |
| Duration (semesters) | 1 Semester |
| Module frequency | jährlich |
| Module capacity | unlimited |
| Module level / module level | --- |
| Lehr-/Lernform / Teaching/Learning method | Vorlesung mit optionalem, jedoch dringlich empfohlenem Tutorium, Praktikum |
| Vorkenntnisse / Previous knowledge | |
| Examination | Time of examination | Type of examination |
| Final exam of module | Modulende | 1 written exam or 1 oral exam |
| Course type | Seminar |
| SWS | |
| Frequency | |
| Workload attendance | 0 h |
**bio251 - Exercises in Biochemistry and Molecular Biology**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Exercises in Biochemistry and Molecular Biology</th>
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<tbody>
<tr>
<td>Module code</td>
<td>bio251</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
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</table>
| Applicability of the module |  - Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen  
                             - Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule |

**Responsible persons**
- Scholten, Alexander (Module responsibility)
- Laubinger, Sascha (Module counselling)
- Nolte, Arne (Module counselling)
- Scholten, Alexander (Authorized examiners)
- Laubinger, Sascha (Authorized examiners)
- Nolte, Arne (Authorized examiners)

**Prerequisites**
admission of BSc students in Biology

**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
- + data presentation and evidence-based discussion (written and spoken)
- + teamwork
- + knowledge of safety and environmental issues

**Module contents**
General introduction to principles of laboratory work in Biochemistry and Cell Biology

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Prerequisites**
admission of BSc students in Biology

**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
- + data presentation and evidence-based discussion (written and spoken)
- + teamwork
- + knowledge of safety and environmental issues

**Module contents**
General introduction to principles of laboratory work in Biochemistry and Cell Biology

**Reader's advisory**
Script

**Links**

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Module frequency**

**Module capacity**
unlimited

**Modulart / typ of module**
Pflicht / Mandatory

**Lehr-/Lernform / Teaching/Learning method**
Übunge, Seminar

**Vorkenntnisse / Previous knowledge**
VL Biochemie und Zellbiologie

**Examination**

**Time of examination**
during semester

**Type of examination**
written exam; additionally ungraded protocols

**Final exam of module**
during semester
written exam; additionally ungraded protocols

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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<tbody>
<tr>
<td>Seminar</td>
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<td>Exercises</td>
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**Total time of attendance for the module**
56 h
Abschlussmodul

bam - Bachelor’s Thesis Module

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<th>Bachelor’s Thesis Module</th>
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<tr>
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<td>Workload</td>
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Applicability of the module
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Abschlussmodul

Responsible persons
der Biologie, Lehrende (Authorized examiners)

Prerequisites
Successful completion of the Bachelor module demonstrates that students are able to work on a problem in the field of Biology within a fixed period applying scientific methods.

++ biological knowledge
++ knowledge of biological working methods
+ statistics & scientific programming
+ 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)
+ (scientific) communication skills
++ project and time management

Module contents
Preparing the Bachelor thesis
Active participation in the seminar of the research group, in which the Bachelor's thesis is written

Reader's advisory
Supervisors may supply an initial reading list with important literature. The students are expected to find and use further literature as needed.

Links
Languages of instruction
- German, English

Duration (semesters)
1 Semester

Module frequency
halbjährlich

Module capacity
unlimited

Modullevel / module level
Abschlussmodul (Abschlussmodul / Conclude)

Modulart / typ of module
je nach Studiengang Pflicht oder Wahlpflicht

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge

Examination

<table>
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<tr>
<th>Time of examination</th>
<th>Type of examination</th>
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</thead>
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<tr>
<td></td>
<td>Bachelor's thesis (12 CP) and accompanying seminar (3 CP)</td>
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Course type
Seminar

SWS
1

Frequency
--

Workload attendance
14 h
**Frühere Module**

**che100 - Introduction to Chemistry**

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<th>Introduction to Chemistry</th>
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<tr>
<td>Module code</td>
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**Applicability of the module**
- Bachelor's Programme Biology (Bachelor) > Frühere Module
- Bachelor's Programme Chemistry (Bachelor) > Basismodule
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Frühere Module
- Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Basismodule

**Responsible persons**
- Beckhaus, Rüdiger (Module responsibility)
- Müller, Thomas (Module responsibility)
- Beckhaus, Rüdiger (Authorized examiners)
- Albers, Lena (Authorized examiners)
- Müller, Thomas (Authorized examiners)
- Weiz, Alexander (Module counselling)

**Prerequisites**
Dokumentierte Teilnahme an der Sicherheitsbelehrung vor Beginn des Praktikums

**Skills to be acquired in this module**

**Module contents**
- Vorlesung Experimentalvorlesung zur Allgemeinen und Anorganischen Chemie: • Aufbau der Atome • Aufbau des Periodensystems • Grundlagen der chemischen Bindung • Nomenklatur chemischer Verbindungen • stöchiometrische Gesetze • chemische Gleichgewichte • Säure- / Basereaktionen • Redoxreaktionen • Komplexbildungen • Struktur wichtiger Verbindungen • Fundamental Stoffchemie • Vorführung chemischer Experimente Praktikum • Einführung in die Laborpraxis: Erlernen wichtiger Standardprozeduren im chemischen Labor. Übungen • Übungen zu den Inhalten der Vorlesung, Klausurvorbereitung

**Reader's advisory**

**Links**
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Reference text: WiSe
- Modullevel / module level: BC (Basiscurriculum / Base curriculum)
- Modulart / typ of module: Pflicht / Mandatory
- Lehr-/Lernform / Teaching/Learning method: VL (4 SWS) + PR (8 SWS) + SEM (1 SWS)
  - Interaktive Tafelvorlesung, fachliche Inhalte werden durch passende Experimente verdeutlicht.

**Vorkenntnisse / Previous knowledge**

**Examination**
- Time of examination: In der vorlesungsfreien Zeit entsprechend separater Ankündigung
- Type of examination: KL

**Course type**
- Comment: SWS
- Frequency
- Workload of compulsory attendance: 56
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<th>SWS</th>
<th>Frequency</th>
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<td>Practical training</td>
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<td>Seminar</td>
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**Total time of attendance for the module** 154 h