### Background Modules

**bio605 - Molecular Genetics and Cell Biology**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Molecular Genetics and Cell Biology</th>
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<tbody>
<tr>
<td>Module code</td>
<td>bio605</td>
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<tr>
<td>Credit points</td>
<td>12.0 KP</td>
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<tr>
<td>Workload</td>
<td>360 h</td>
</tr>
</tbody>
</table>

**Used in course of study**
- Master Biologie > Background Modules
- Master Biology > Background Modules
- Master Neuroscience > Background Modules

**Contact person**
- Module responsibility
  - John Neidhardt
- Authorized examiners
  - John Neidhardt
  - Karl-Wilhelm Koch
  - Kathrin Thedieck
- Module counseling
  - Karl-Wilhelm Koch
  - Kathrin Thedieck

**Entry requirements**

**Skills to be acquired in this module**
- ++ deepened biological expertise
- ++ deepened knowledge of biological working methods
- + data analysis skills
- ++ interdisciplinary thinking
- + critical and analytical thinking
- + independent searching and knowledge of scientific literature
- + data presentation and discussion in German and English (written and spoken)
- + teamwork
- + ethics and professional behaviour
- + project and time management

Addressing students with an emphasis on molecular biology, molecular genetics, cell biology, and neurobiology

**Module contents**

Lecture: To improve knowledge in molecular genetics, molecular biology and cell biology in correlation with human diseases.

Exercise: Learn to transfer the theoretical knowledge to experiments. Gaining methodological knowledge in molecular genetics, cell biology and therapeutic approaches. Initial training on how to perform research projects.

Subjects of the lecture and seminar: Molecular bases of neurodegenerative diseases, structure and function of DNA/RNA/proteins/membranes, cytoskeleton, cell cycle, programmed cell death, cells in the social structure.

Exercises: Learning current methods of molecular biology and human genetics; high throughput technologies, introduction to cell cultivation techniques.

**Reader's advisory**

Textbooks of Cell Biology

**Links**

http://www.uni-oldenburg.de/humangenetik/

**Language of instruction**

English

**Duration (semesters)**

1 Semester

**Module frequency**

15

**Reference text**

associated with bio900

**Modullevel**

MM (Mastermodul / Master module)

**Modulart**

Wahlpflicht / Elective

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

**Vorkenntnisse / Previous knowledge**

**Examination**

Time of examination

Type of examination

written examination (70 %), paper(s) presentation 30 %;
<table>
<thead>
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<tr>
<td></td>
<td></td>
<td>not graded: signed lab protocols, regular active participation is required for the module to be passed.</td>
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<table>
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<th>Comment</th>
<th>SWS</th>
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<td>Lecture</td>
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<td>28 h</td>
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<tr>
<td>Seminar</td>
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<td>70 h</td>
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**Total time of attendance for the module**

112 h
**bio655 - Ornithology**

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<tr>
<th>Module label</th>
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<tr>
<td>Module code</td>
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<td>360 h</td>
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| Used in course of study | Master Biologie > Background Modules
| Used in course of study | Master Biology > Background Modules |

**Contact person**

- Module responsibility
  - Franz Bairlein
- Authorized examiners
  - Georg Martin Klump
  - Sandra Bouwhuis
  - Christine Köppl
  - Ulrike Langemann
  - Henrik Mouritsen
  - Heiko Schmaljohann
  - Franz Bairlein
- Module counseling
  - Georg Martin Klump
  - Sandra Bouwhuis
  - Christine Köppl
  - Ulrike Langemann
  - Henrik Mouritsen
  - Heiko Schmaljohann
  - Franz Bairlein

**Entry requirements**

**Skills to be acquired in this module**

- The module imparts advanced knowledge on different aspects of ornithology. The students acquire:
  - An extended knowledge of morphological and physiological fundamentals and the resulting ecological and behaviour-biological consequences in birds
  - Knowledge, presentation and discussion of relevant English literature from various fields of ornithology
  - ++ deepened biological expertise
  - + deepened knowledge of biological working methods
  - + critical and analytical thinking
  - + independent searching and knowledge of scientific literature
  - ++ data presentation and discussion in German and English (written and spoken)

**Module contents**

- The module is composed of the lecture “Ecology and Physiology of Birds”, a seminar accompanying the lecture “Current Questions of Ornithology”, a seminar “Behavioural Ecology of Birds”, and a seminar “Methods in Field Ornithology”.

  **Lecture “Ecology and Physiology of Birds”:**
  
  This lecture consolidates special aspects of systematics, morphology, physiology, migration, orientation, population biology, communication and behavioural ecology in birds.

  **Seminar “Current Questions of Ornithology”:**
  
  In this seminar, original English publications are presented and discussed which deal with current research results from various fields treated in the lecture. Every student reads a paper on one scientific article and discusses the results of that article with the other participants.

  **Seminar “Behavioural Ecology of Birds” (option 1):**
  
  In the seminar, current literature relating to the life history of birds will be reported. During the term, each participant is presenting an original paper in a short talk and the group of students will be guided to critically discuss the paper.

  **Seminar “Methods in Field Ornithology” (option 2):**
  
  The core methods of field ornithology, such as stable isotopes, bird census, ringing, radar, radio tracking, etc., will be introduced with the help of English scientific papers by the students. In the presentations the corresponding methods will be explained in detail with an emphasis on the pros and cons of the method. The aim of this seminar is to learn how to deal with scientific methods in a critical way.

**Reader's advisory**


Links
Participating Institution: Institut für Vogelforschung
http://www.ifv-vogelwarte.de

Languages of instruction
German, English

Duration (semesters)
1 Semester

Module frequency

Module capacity
30

Reference text
associated with bio900

Modullevel
MM (Mastermodul / Master module)

Modulart
je nach Studiengang Pflicht oder Wahlpflicht

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination Time of examination Type of examination
Final exam of module Presentations 40% (the main seminar is mandatory, one of the two options one need to be taken)
Written examination 60%
Regular active participation is required for the module to be passed successfully.

Course type Comment SWS Frequency Workload attendance
Lecture 4.00 WiSe 56 h
Seminar 4.00 WiSe 56 h

Total time of attendance for the module 112 h
bio675 - Molecular Ecology

Module label: Molecular Ecology
Module code: bio675
Credit points: 12.0 KP
Workload: 360 h

Used in course of study:
- Master Biologie > Background Modules
- Master Biology > Background Modules

Contact person:

- Module responsibility
  - Arne Nolte
- Authorized examiners
  - Arne Nolte
  - Gabriele Gerlach
- Module counseling
  - Gabriele Gerlach

Entry requirements:
- B.Sc. (Biologie, Umweltwissenschaften)
- M.Sc. (Biologie, Marine Umweltwissenschaften, Landschaftsökologie)

Skills to be acquired in this module:
The field of molecular ecology strives to identify relationships between species genotypes, phenotypes and ecological factors. It addresses questions about how organisms adapt and explains patterns of distribution and biodiversity. During the course, participants will get to know the biological background to design an experiment in the field of molecular ecology. We will discuss the state of the art according to literature. Participants will perform sampling and conduct steps of the analysis. The course will cover field methods (sampling) and lab methods (behavior experiments, genetic analyses, phenotypic analyses) as well as computer based analyses.

++ deepened biological expertise
++ deepened knowledge of biological working methods
++ data analysis skills
+ interdisciplinary thinking
+ critical and analytical thinking
+ independent searching and knowledge of scientific literature
++ ability to perform independent biological research
++ data presentation and discussion in German and English (written and spoken)
+ statistics & scientific programming

Module contents:

Lecture: AN/GG - Molecular ecology background of specific study systems. The lectures will introduce a study system that will be analyzed during the course (study systems may vary from year to year). It is the goal of the lecture to provide students with background information to develop an experimental design of a field study during the practical.

Exercise: AN/GG - Mixed course with laboratory and field exercises. Samples will be collected in the field. One goal of the course is to apply modern analyses to understand how organisms are distributed. Another aspect is the application of molecular markers to analyze behavioral experiments.

Reader's advisory:
will be announced during the course

Links:

Languages of instruction: German, English
Duration (semesters): 1 Semester

Module frequency:
Module capacity: 15
Reference text:
associated with bio890 Current Topics of Biology (Seminar)

Modullevel:
MM (Mastermodul / Master module)

Modulart:
Wahlpflicht / Elective

Lern-/Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:
Reading of scientific literature in english and the ability to present a seminar topic in English. Basic skills in working in the genetics lab and with a computer.

Examination:
Time of examination: during the module
Type of examination:
Präsentationen (50%), Portfolio (50%). Regular participation is a prerequisite to pass in the module.

Course type:

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<th>Workload attendance</th>
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<tr>
<td>Exercises</td>
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<td>SuSe</td>
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**Total time of attendance for the module**

112 h
### bio695 - Biochemical concepts in signal transduction

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<td>Workload</td>
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| Used in course of study | - Master Biologie > Background Modules  
                         - Master Biology > Background Modules  
                         - Master Neuroscience > Background Modules |
| Contact person | Module responsibility  
                 - Karl-Wilhelm Koch  
                 - Authorized examiners  
                 - Karl-Wilhelm Koch  
                 - Alexander Scholten  
                 - Module counseling  
                 - Alexander Scholten |
| Entry requirements | Skills to be acquired in this module  
                        - ++ deepened biological expertise  
                        - ++ deepened knowledge of biological working methods  
                        - ++ data analysis skills  
                        - + interdisciplinary thinking  
                        - ++ critical and analytical thinking  
                        - + independent searching and knowledge of scientific literature  
                        - ++ data presentation and discussion in German and English (written and spoken)  
                        - + teamwork  
                        - + project and time management |
| Module contents | Lecture: Molecular fundamentals of cellular signal processes  
                  Seminar: Signal transduction  
                  Exercises: Experiments on cellular signal transduction and enzymology  
                  Mechanisms of biochemical signal transduction are imparted theoretically and experimentally |
| Reader's advisory | Textbooks of cell biology and biochemistry. Current literature on topics of signal transduction (as announced in the preparatory meeting). |
| Language of instruction | English |
| Duration (semesters) | 1 Semester |
| Module frequency | --- |
| Module capacity | 20 |
| Modulart | je nach Studiengang Pflicht oder Wahlpflicht |

### Links

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

### Examination

<table>
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<th>Frequency</th>
<th>Workload attendance</th>
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<td>WiSe</td>
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<tr>
<td>Seminar</td>
<td>1.00</td>
<td>WiSe</td>
<td></td>
<td>14 h</td>
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<td>Exercises</td>
<td>6.00</td>
<td>WiSe</td>
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<td>84 h</td>
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**Total time of attendance for the module**: 112 h
### bio703 - Basic Concepts in Plant Sciences

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<td><a href="#">Master Biologie &gt; Background Modules</a>, Master Biology &gt; Background Modules</td>
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**Contact person**
- **Module responsibility**
  - Dirk Carl Albach
- **Authorized examiners**
  - Dirk Carl Albach
  - Gerhard Wolfgang Zotz
  - Sascha Laubinger
  - Klaus Bernhard von Hagen
- **Module counseling**
  - Gerhard Wolfgang Zotz
  - Sascha Laubinger
  - Klaus Bernhard von Hagen

**Entry requirements**

**Skills to be acquired in this module**
- Communicating deeper knowledge in ecology, phylogeny, evolution and genetics of plants
- Communicating scale- and method-overarching thinking
- Communicating deeper theoretic concepts of ecology, evolution and genetics of plants
- **++ deepened biological expertise**
- **+ deepened knowledge of biological working methods**
- **+ data analysis skills**
- **+ interdisciplinary thinking**
- **++ critical and analytical thinking**
- **++ independent searching and knowledge of scientific literature**
- **+ ability to perform independent biological research**
- **++ data presentation and discussion in German and English (written and spoken)**
- **+ teamwork**
- **++ ethics and professional behaviour**

**Module contents**
- **V: Biodiversity of plants (2 SWS)**
- **V: Resource acquisition and use by plants (1 SWS)**
- **V: Gene expression in plants (1 SWS)**
- **S: Phylogeny of plants (2 SWS)**
- **S: Interactions of plants with environmental parameters (2SWS)**

**Reader's advisory**

**Links**
- **Languages of instruction**
  - German, English

**Duration (semesters)**
- 1 Semester

**Module frequency**
- 12

**Module capacity**
- 12

**Reference text**
- associated with bio765 (Current Methods in Plant Science) (recommended)

**Modullevel**
- MM (Mastermodul / Master module)

**Modulart**
- je nach Studiengang Pflicht oder Wahlpflicht

**Vorkenntnisse / Previous knowledge**
- Ecology, Flora, Genetics

**Examination**
- **Time of examination**
  - Final exam of module 1 Portfolio (40%), 1 report (60%)
  - Type of examination
  - Course type Comments: Frequency Workload attendance
  - Lecture  4.00 WiSe  56 h
  - Seminar  4.00 WiSe  56 h
- **Total time of attendance for the module**
  - 112 h

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**Languages of instruction:** German, English

**Duration:** 1 Semester

**Module frequency:** 12

**Module capacity:** 12

**Reference text:** associated with bio765 (Current Methods in Plant Science) (recommended)

**Modullevel:** MM (Mastermodul / Master module)

**Modulart:** je nach Studiengang Pflicht oder Wahlpflicht

**Vorkenntnisse / Previous knowledge:** Ecology, Flora, Genetics

**Examination:**
- **Time of examination**
  - Final exam of module: 1 Portfolio (40%), 1 report (60%)
  - **Course type Comments: Frequency Workload attendance**
    - Lecture: 4.00 WiSe: 56 h
    - Seminar: 4.00 WiSe: 56 h
- **Total time of attendance for the module:** 112 h
bio720 - Marine Biodiversity

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<td>Workload</td>
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<td></td>
<td>Master Biology &gt; Background Modules</td>
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**Contact person**
- Module responsibility
  - Pedro Miguel Martinez Arbizu
- Authorized examiners
  - Pedro Miguel Martinez Arbizu
  - Thomas Glatzel
- Module counseling
  - Thomas Glatzel

**Entry requirements**
- BSc (Biology)

**Skills to be acquired in this module**
- ++ deepened biological expertise
- ++ deepened knowledge of biological working methods
- ++ data analysis skills
- ++ interdisciplinary thinking
- ++ critical and analytical thinking
- ++ independent searching and knowledge of scientific literature
- ++ ability to perform independent biological research
- ++ data presentation and discussion in German and English (written and spoken)
- ++ teamwork
- ++ ethics and professional behaviour
- ++ project and time management
- ++ statistics & scientific programming

Knowledge of fundamentals, topical subjects and methods in Marine Biology and Marine Geology. Studies and critical assessment of the scientific literature.

**Module contents**
- L: (AW) General Marine Geology
  - Biogenic sedimentation, Interaction benthos-sediment
  - Plankton of the oceans
  - Unicellular plankton
  - Benthos of the North-Sea
  - Biodiversity in the deep sea and on sea-mountains
- E: (SS) Plankton of the oceans
  - (MH) unicellular plankton
  - (IK) benthos of the North-Sea
  - (PM) biodiversity in the deep sea and on sea-mountains
  - (JG) concepions and hypotheses of marine biodiversity
  - (GG) animal migrations and dispersal behaviour

A lecture comprises the above-mentioned subjects and imparts marine biological theories, research results and methods.

In the seminar, research is presented and discussed.

In the laboratory course/exercises, subjects are treated in coordination with the contents of the lecture. With the aid of a computer, data are analysed and interpreted statistically.

**Reader's advisory**
as announced in the lecture

**Links**
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: jährlich (annually)
- Module capacity: unlimited
- Modullevel: MM (Mastermodul / Master module)
- Modulart: Wahlpflicht / Elective

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

**Vorkenntnisse / Previous knowledge**

**Examination**
- Time of examination
- Type of examination
  - Written examination (80 %)
  - Presentation(s) (40 %)

Regular active participation is required for the module to be passed.

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

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<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<td>3.00</td>
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<td>42 h</td>
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<td>Exercises</td>
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<td>9.00</td>
<td>WiSe</td>
<td>126 h</td>
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<td>WiSe</td>
<td>14 h</td>
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**Total time of attendance for the module** 182 h
bio733 - Evolutionary Biology Population Genetics

**Module label**  
Evolutionary Biology Population Genetics

**Module code**  
bio733

**Credit points**  
6.0 KP

**Workload**  
180 h

**Used in course of study**  
- Master Biologie > Background Modules
- Master Biology > Background Modules

**Contact person**  
Module responsibility
- Gabriele Gerlach

Authorized examiners
- Gabriele Gerlach
- Dirk Carl Albach

Module counseling
- Dirk Carl Albach

**Entry requirements**  
none

**Skills to be acquired in this module**

**Module contents**

**Reader's advisory**

**Languages of instruction**  
German, English

**Duration (semesters)**  
1 Semester

**Module frequency**  
12

**Module capacity**  
12

**Reference text**  
associated with bio736 (Evolutionary Transcriptomics) (recommended)

**Modullevel**  
MM (Mastermodul / Master module)

**Modulart**  
Wahlpflicht / Elective

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

**Vorkenntnisse / Previous knowledge**  
Evolutionary biology

**Examination**  
Time of examination  
Type of examination

**Final exam of module**  
portfolio (60%)  
presentation (40%)

**Course type**  
Comment  
SWS  
Frequency  
Workload attendance

<table>
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<tr>
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<td>1.00</td>
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<tr>
<td>Exercises</td>
<td></td>
<td>3.00</td>
<td>WiSe</td>
<td>42 h</td>
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**Total time of attendance for the module**  
56 h
### bio736 - Evolutionary Transcriptomics

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<tr>
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<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
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<td>Used in course of study</td>
<td>• Master Biologie &gt; Background Modules</td>
</tr>
<tr>
<td></td>
<td>• Master Biology &gt; Background Modules</td>
</tr>
</tbody>
</table>

**Contact person**

- **Module responsibility**
  - Arne Nolte
- **Authorized examiners**
  - Arne Nolte
  - Sascha Laubinger
  - Udo Gowik
- **Module counseling**
  - Sascha Laubinger
  - Udo Gowik

**Entry requirements**

- none

**Skills to be acquired in this module**

- deepened biological expertise
- deepened knowledge of biological working methods
- data analysis skills; critical and analytical thinking
- independent searching and knowledge of scientific literature
- data presentation and discussion in English (written and spoken)
- statistics & scientific programming

**Module contents**

- **Lecture:** Gene expression represents the first step of the translation of genomic information into a phenotype. This phenotype is of broad interest in all disciplines of biology. Gene expression data can reveal how genetic changes at single genes manifest phenotypically and how gene expression is regulated. The same data can also explain differences in life history and adaptation to different environments. Different perspectives can be understood by studying mechanisms of gene regulation as well as broad scale transcriptomics analyses.
- **Exercise:** We will generate and analyze gene expression data during the course including wet lab and computational methods. Practicals include the analysis of single-gene expression data as well as RNAseq data representing complete transcriptomes.

**Reader's advisory**

**Links**

- Languages of instruction: German, English
- Duration (semesters): 1 Semester

**Module frequency**

- Module capacity: 12

**Reference text**

- associated with bio733: Evolutionary Biology Population Genetics (recommended)

**Modullevel**

- MM (Mastermodul / Master module)

**Modulart**

- Wahlpflicht / Elective

**Lern- Lehrform / Type of program**

- Evolutionary Biology

**Vorkenntnisse / Previous knowledge**

**Examination**

- Time of examination
- Type of examination
- Final exam of module
  - portfolio (60%)
  - presentation (40%)

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<tr>
<td>Exercises</td>
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**Total time of attendance for the module**

- 56 h
bio765 - Current Methods in Plant Sciences - Ecology, Phylogeny and Molecular Biology

<table>
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<th>Module label</th>
<th>Current Methods in Plant Sciences - Ecology, Phylogeny and Molecular Biology</th>
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<tbody>
<tr>
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<td>Credit points</td>
<td>12.0 KP</td>
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<tr>
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| Used in course of study | • Master Biologie > Background Modules  
• Master Biology > Background Modules |
| Contact person| Module responsibility  
• Sascha Laubinger  
Authorized examiners  
• Sascha Laubinger  
• Dirk Carl Albach  
• Gerhard Wolfgang Zotz  
Module counseling  
• Dirk Carl Albach  
• Gerhard Wolfgang Zotz |
| Entry requirements| Acquaintance and practicing ecological, phylogenetic and molecular methods  
Communication of scale- and method-overarching thinking and project planning  
Knowledge of current methods and questions in plant science  
Capacity for teamwork, project- and time management  
++ deepened biological expertise  
++ deepened knowledge of biological working methods  
++ data analysis skills  
++ interdisciplinary thinking  
+ critical and analytical thinking  
+ independent searching and knowledge of scientific literature  
+ ability to perform independent biological research  
+ data presentation and discussion in German and English (written and spoken)  
+ teamwork  
+ statistics & scientific programming |
| Module contents| Ü: Current Methods in Plant Science (8 SWS) |
| Reader's advisory| |
| Links| |
| Languages of instruction| German, English |
| Duration (semesters)| 1 Semester |
| Module frequency| |
| Module capacity| 12 |
| Reference text| associated with bio703 (Basic Concepts in Plant Sciences) (recommended) |
| Modullevel| MM (Mastermodul / Master module) |
| Modulart| je nach Studiengang Pflicht oder Wahlpflicht |
| Lern-/Lehrform / Type of program| |
| Vorkenntnisse / Previous knowledge| Ecology, Flora, Genetics |
| Examination| Time of examination  
Type of examination |
| Final exam of module| Portfolio |
| Course type| Exercises |
| SWS| 8.00 |
| Frequency| WiSe |
| Workload attendance| 112 h |
bio770 - Field Methods in Organismal Biology

Module label  | Field Methods in Organismal Biology
---|---
Module code  | bio770
Credit points  | 15.0 KP
Workload  | 450 h

Used in course of study
- Master Biologie > Background Modules
- Master Biology > Background Modules

Contact person

Module responsibility
- Gerhard Wolfgang Zotz

Authorized examiners
- Gerhard Wolfgang Zotz
- Gabriele Gerlach
- Dirk Carl Albach
- Thomas Glatzel
- Klaus Bernhard von Hagen
- Henrik Mouritsen

Module counseling
- Gabriele Gerlach
- Dirk Carl Albach
- Thomas Glatzel
- Klaus Bernhard von Hagen
- Henrik Mouritsen

Entry requirements

Skills to be acquired in this module
- ++ deepened biological expertise
- ++ deepened knowledge of biological working methods
- ++ data analysis skills
- ++ interdisciplinary thinking
- ++ critical and analytical thinking
- ++ independent searching and knowledge of scientific literature
- ++ ability to perform independent biological research
- ++ data presentation and discussion in German and English (written and spoken)
- ++ project and time management
- ++ statistics & scientific programming

The module aims at enabling students to apply theoretical knowledge to practical, hypothesis-based field studies within the scope of a seminar. The data derived from the individual projects performed are then to be documented and discussed in the form of a written laboratory course report oriented by a scientific publication and to be written in English. Several teachers cooperate to enable interdisciplinary approaches (e.g. botanical-zoological approaches).

Module contents

S: Biogeographic and ecological classification and characterization of a biome (e.g. Mediterranean region, moist tropics, boreal zone), independent identification and treatment of scientific questions, presentation of scientific results in a "mini symposium" subsequent to the field studies.

E: Planning and performing a field study project, data analysis, written report in the form of a scientific publication

Reader's advisory
Varies with topic and field locality

Links
www.uni-oldenburg.de/fun_eco/

Languages of instruction
German, English

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
21

Module level
MM (Mastermodul / Master module)

Moduleart
Pflicht / Mandatory

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination

Time of examination
Type of examination
Final exam of module
Presentation(s) (30 %)
Laboratory course report on project work (70 %)

Course type
Comment
SWS
Frequency
Workload attendance
<table>
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<th>Course type</th>
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**Total time of attendance for the module** 168 h
**bio780 - Biodiversity of Littoral Communities**

**Module label**  
Biodiversity of Littoral Communities

**Module code**  
bio780

**Credit points**  
15.0 KP

**Workload**  
450 h

**Used in course of study**  
- Master Biologie > Background Modules
- Master Biology > Background Modules

**Contact person**

- Module responsibility
  - Thomas Glatzel

- Authorized examiners
  - Thomas Glatzel
  - Pedro Miguel Martinez Arbizu

- Module counseling
  - Pedro Miguel Martinez Arbizu

**Entry requirements**  
Safe apnoediving with aptitude test and medical fitness certificate

**Skills to be acquired in this module**

- deepened knowledge of biological working methods
- ability to perform independent biological research
- teamwork
- ethics and professional behaviour
- project and time management

By actively participating in this module students acquire qualifications in the following fields:

**Biological oceanography, marine biology and marine ecology:**

- Geological formation history of the Mediterranean Sea and Atlantic Ocean, respectively, or the Red Sea and adjacent seas
- Oceanography and hydrology
- Development of the faunal and floral composition of the Atlantic Ocean, the Mediterranean Sea and the Mediterranean region or the Red Sea (biogeography)
- Commercial utilization of the seas and its impacts
- Biotopes and biotic communities
- Evolution, systematics, morphology, modes of life, and ecology of selected animal groups
- Applying theoretical knowledge to real-world organisms/systems
- Improved and specialized knowledge of species
- Adaptation of life cycles
- Interaction between organisms and environment
- Dynamics of reef-building and reef-degrading processes
- Threat to coral reefs/protection of marine environments

**Methods:**

- Formulation and definition of scientific approaches and selection of methods
- Observation and investigation of organisms and their habitats (snorkelling/diving)
- Documentation of small research projects in groups in the style of a scientific publication
- Editorial work to prepare a module report
- Popular presentation of results to be published by the media and to be presented at the University

**Further skills:**

- Social engagement in groups/teamwork in projects
- Independent scientific work in groups
- Improvement of scientific discussion culture
- Consciousness of the threat to coral reefs
- Practising English
- Dealing with the culture of the visited region

**Culture:**

- History, culture, politics, and religion

**Additionally:**

- Physiological aspects of apnoediving
- Measures in case of accidents (also caused by "poisonous" organisms)
Module contents
Biodiversity of littoral biotic communities – topographical field research

Reader's advisory
GRÜTER, W., 2001: Leben im Meer - Vielfalt und Zusammenhänge. Dr. Friedrich Pfeil Verlag, München. Should be read prior to a marine biological excursion! This book will arouse your curiosity about the submarine world. A reading book!

HEMPEL, G., HEMPEL, I. & S. SCHIEL (Hrsg.), 2006: Faszination Meeresforschung – Ein biologisches Lesebuch. Hauschild Verlag. This textbook is information and fun for all readers interested in marine life as well as in the protection of marine environments.

HOFRICHTER, R., 2001: Das Mittelmeer - Fauna, Flora, Ökologie. Spektrum Akademischer Verlag, Heidelberg - Berlin: Band I, II, III. The textbook for the Mediterranean Sea! The general 1st part provides valuable information on symbioses or feeding types, for example.


Literature study:
Web of science: externhttp://www.bis.uni-oldenburg.de – Data banks(DBIS) – Biology – TOP data banks, e.g. 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
Language of instruction
German

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
unlimited

Modullevel
MM (Mastermodul / Master module)

Modulart
Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge

Examination
Time of examination
Type of examination
Final exam of module
during the lectures
1. Report(s) (30 %)
2. Assignment (70 %) (project report in the style of a scientific publication)

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

Course type
Comment
SWS
Frequency
Workload attendance
Exercises
9.00
SuSe
126 h
Seminar
3.00
SuSe
42 h
Seminar
0.00
WiSe
0 h

Total time of attendance for the module
168 h
bio845 - Introduction to Development and Evolution

Module label: Introduction to Development and Evolution

Module code: bio845

Credit points: 6.0 KP

Workload: 180 h

Used in course of study:
- Master Biologie > Background Modules
- Master Biology > Background Modules
- Master Neuroscience > Background Modules

Contact person:
- Module responsibility
  - Ulrike Sienknecht
- Authorized examiners
  - Ulrike Sienknecht
  - Maike Claußen
- Module counseling
  - Maike Claußen

Entry requirements:
Upon successful completion of this course, students
- know the fundamental problems organisms share in development
- know the common basic steps of ontogenesis after comparing the life cycles of different species (both vertebrates and invertebrates)
- know the fundamentals of the genetic control of cell-fate specification, morphogenesis, and organo-genesis
- know the principles of gene regulatory networks in development and are able to explain examples
- are able to explain and discuss mechanisms of development across taxonomic groups and questions about the evolution of developmental mechanisms
- have in-depth knowledge of the development of animal nervous systems, including cellular and net-work properties

Skills to be acquired in this module:
- deepened biological expertise
- deepened knowledge of biological working methods
- interdisciplinary thinking
- critical and analytical thinking
- independent searching and knowledge of scientific literature
- ability to perform independent biological research
- teamwork

Module contents:
Lectures on the fundamentals and concepts of developmental biology, including evolutionary aspects. Parallel seminars matching the topics of the lectures and emphasizing discussion.

Lecture topics:
- Introduction to Developmental Biology
- Cell-Cell Communication
- Differential Gene Expression (I and II)
- Early Development of Vertebrates, Gastrulation
- Neurulation
- Brain Development
- Axonal Growth, Target Selection, Synaptogenesis and Refinement
- Neural Crest
- Mesoderm Development
- Limb Development
- Developmental Mechanisms of Evolutionary Change
- Model Organisms in Developmental Biology
- Transgenic Mice
- Medical Implications of Developmental Biology

Reader's advisory:
Literature:

Links:
Language of instruction: English
Duration (semesters): 1 Semester
Module frequency:
Module capacity: 20
  selection criteria: sequence of registration
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<tr>
<th>Reference text</th>
<th>associated with bio846 (previously neu120) (Lab Exercises in Development and Evolution)</th>
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<td>Wahlpflicht / Elective</td>
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<td>Lern-/Lehrform</td>
<td>Type of program</td>
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<td>Vorkenntnisse / Previous knowledge</td>
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<td>Time of examination</td>
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bio846 - Lab Exercises in Development and Evolution

Module label: Lab Exercises in Development and Evolution
Module code: bio846
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Master Biologie > Background Modules
- Master Biology > Background Modules
- Master Neuroscience > Background Modules

Contact person:
Module responsibility:
- Ulrike Sienknecht

Authorized examiners:
- Ulrike Sienknecht
- Hans Gerd Nothwang

Module counseling:
- Hans Gerd Nothwang

Entry requirements:
Skills to be acquired in this module:
- Upon successful completion of this course, students have skills in methods of developmental biology:
  - are capable of performing live embryo husbandry
  - are able to carry out in-ovo stainings
  - are familiar with the use of embryonic stage discrimination standards for model organisms
  - document the observed embryonic stages by drawings with anatomical labelling
  - are familiar with embryo handling, tissue preparation (including cryosectioning), dissection of inner ears, and the use of different histological staining methods
  - microscopy, data analysis, and photographic data documentation
  - know the standards of proper documentation of research data and the universal format of a lab note-book
  - know how to carry out formal laboratory reports (and the anatomy of a scientific paper)

  and in addition, have basic knowledge in the field of auditory system development:
  - have basic knowledge of the organisation of the auditory system across vertebrate groups
  - have basic knowledge of the development of the middle and inner ear, as well as selected auditory brain centres
  - are able to summarize current hypotheses about the evolution of the auditory system in vertebrates

  skills:

  ++ deepened biological expertise
  ++ deepened knowledge of biological working methods
  ++ data analysis skills
  ++ critical and analytical thinking
  + independent searching and knowledge of scientific literature
  + ability to perform independent biological research
  + data presentation and discussion in German and English (written and spoken)
  ++ teamwork
  + ethics and professional behaviour
  ++ project and time management

Module contents:
Lab exercises in comparative developmental biology on chicken and mouse embryos.

Practical introduction to methods, such as in-ovo live observation; developmental stage discrimination and description, tissue preparation for histology, sectioning, staining, and microscopy, including data analyses.

Lectures in the field of auditory system development, such as:
- Development of the Inner Ear
- Development of the Middle Ear
- Evolution of the Central and Peripheral Auditory System
- Development and Layout of the Central Auditory System

Reader's advisory:

Links:
Language of instruction: English
Duration (semesters): 1 Semester
Module frequency:
Module capacity: 6
selection criteria: sequence of registration

Reference text  Associated with bio845 (previously neu110) (Introduction to Development and Evolution)
Modullevel  MM (Mastermodul / Master module)
Modulart  Wahlpflicht / Elective

| Lern-/Lehrform / Type of program | | |
|---------------------------------|-----------------------------|
| Vorkenntnisse / Previous knowledge | organismic biology, evolutionary biology, neurobi-ology, genetics, molecular biology, experience with lab work |

<table>
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<td>0.50</td>
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<td>3.00</td>
<td>WiSe</td>
<td>42 h</td>
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| Total time of attendance for the module | 56 h |
### bio860 - Comparative Developmental Biology

**Module label**  
Comparative Developmental Biology

**Module code**  
bio860

**Credit points**  
6.0 KP

**Workload**  
180 h

**Used in course of study**  
- Master Biologie > Background Modules
- Master Biology > Background Modules

**Contact person**  
- Module responsibility
  - Ulrike Sienknecht
- Authorized examiners
  - Ulrike Sienknecht
- Module counseling
  - N. N.

**Entry requirements**

**Skills to be acquired in this module**

- **++ deepened biological knowledge**
- **++ deepened knowledge of techniques in biology**
- **++ knowledge in data analysis and presentation**
- **+ cross-disciplinary knowledge and thinking**
- **++ critical and analytical thinking**
- **+ independent searching and knowledge of scientific literature**
- **++ ability to perform independent biological research**
- **+ data presentation and discussion in German and English (written and spoken)**
- **+ team work**
- **+ ethics and professional behaviour**
- **++ project and time management**

**Module contents**  
Lectures and Lab exercises in topics of evolutionary developmental biology, i.e. comparative developmental biology, such as the development of sensory systems in different species.

**Reader's advisory**  

**Links**

**Language of instruction**  
English

**Duration (semesters)**  
1 Semester

**Module frequency**  
6

**Module capacity**  
6

**Reference text**  
associated with bio845 Introduction to Development and Evolution

**Modullevel**  
MM (Mastermodul / Master module)

**Modulart**  
Wahlpflicht / Elective

**Vorkenntnisse / Previous knowledge**  
organismic biology, experience with lab work

**Examination**

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<th>Examination</th>
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<th>Type of examination</th>
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<td>report (50%) and presentation (50%)</td>
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**Course type**

<table>
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<td>SuSe</td>
<td>42 h</td>
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**Total time of attendance for the module**  
56 h
Research Modules

bio810 - Independent Research

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<td>Module code</td>
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Contact person

- Module responsibility
  - Gerhard Wolfgang Zotz

- Authorized examiners
  - Gerhard Wolfgang Zotz
  - Lehrende der Biologie

Entry requirements

External research projects are done on an individual basis. They are supervised by one person from Oldenburg and a local supervisor at any university or research institution in Germany and abroad. Please contact Gerhard Zotz (Gerhard.zotz@uol.de) for details. See [https://uol.de/ibu/studium-und-lehre/fach-master-biology/downloads-und-links/](https://uol.de/ibu/studium-und-lehre/fach-master-biology/downloads-und-links/) (Learning Agreement for External Research Module)

Skills to be acquired in this module

- ++ deepened biological expertise
- ++ deepened knowledge of biological working methods
- ++ data analysis skills
- ++ critical and analytical thinking
- ++ independent searching and knowledge of scientific literature
- ++ ability to perform independent biological research
- ++ data presentation and discussion in German and English (written and spoken)
- teamwork
- ++ project and time management
- ++ statistics & scientific programming

Students perform individual research projects to learn:

- planning and organization of a research project in a group outside of University of Oldenburg
- formulate a scientific hypothesis
- planning, performing and analyzing experiments and / or simulations
- working with scientific background literature on the specific context of the project
- oral presentation and discussion of backgrounds and results in the lab seminar
- write a scientific report in publication format
- prepare and present a scientific poster

Module contents

Students are introduced to independent research in a specific area of biology by a scientific working group outside of the regular IBU Biology faculty at the University of Oldenburg (usually a university research institute in Germany or abroad)

The content and venue of this module is chosen in close coordination with the Prüfungsausschuss Master Biologie, possibly with consultations of other professors. Course work should cover all parts of a scientific project, i.e. data collection, data analysis and the presentation of the results. Irrespective of the particular venue (universities, research institutes) the student has to report to a professor in Oldenburg in form of a written report and an oral presentation, both in English.

Note:

- all members of the regular IBU Biology faculty at the University of Oldenburg can act as local supervisor, students should contact appropriate supervisors individually
- prior to project start, external and local supervisors must fill the learning agreement form
- the supervisor at the host institution is invited to submit a short written statement of assessment, final grading is done by the local supervisor
- participation in a joint poster presentation of concurrent research modules is highly recommended.

Reader's advisory

varies with chosen topic

Links

Languages of instruction

English, German

Duration (semesters)

1 Semester

Module frequency

halbjährlich

Module capacity

unlimited
<table>
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<td>Lern-/Lehrform / Type of program</td>
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<td>Vorkenntnisse / Previous knowledge</td>
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<td>Examination</td>
<td>Time of examination</td>
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<td>1.00</td>
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**Total time of attendance for the module** 154 h
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<tr>
<td></td>
<td>Georg Martin Klump</td>
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<tr>
<td>Entry requirements</td>
<td>++ deepened biological expertise</td>
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<tr>
<td></td>
<td>++ deepened knowledge of biological working methods</td>
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<tr>
<td></td>
<td>++ data analysis skills</td>
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<td>++ critical and analytical thinking</td>
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<td></td>
<td>++ independent searching and knowledge of scientific literature</td>
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<td>++ ability to perform independent biological research</td>
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<td></td>
<td>++ data presentation and discussion in German and English (written and spoken)</td>
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<td></td>
<td>+ teamwork</td>
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<td>++ project and time management</td>
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<td>++ statistics &amp; scientific programming</td>
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<td>Reader's advisory</td>
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<td>Duration (semesters)</td>
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<td>Modulart</td>
<td>je nach Studiengang Pflicht oder Wahlpflicht</td>
</tr>
<tr>
<td>Lern-/Lehrform / Type of program</td>
<td></td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td></td>
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<tr>
<td>Examination</td>
<td>Time of examination</td>
</tr>
<tr>
<td>Final exam of module</td>
<td>written report</td>
</tr>
<tr>
<td>Course type</td>
<td>Seminar</td>
</tr>
<tr>
<td>SWS</td>
<td>0.00</td>
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<tr>
<td>Frequency</td>
<td>--</td>
</tr>
<tr>
<td>Workload attendance</td>
<td>0 h</td>
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</table>
## Skills Modules

### bio870 - Communicating Plant Sciences

<table>
<thead>
<tr>
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<th>Communicating Plant Sciences</th>
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<tbody>
<tr>
<td>Module code</td>
<td>bio870</td>
</tr>
<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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</tbody>
</table>

**Used in course of study**
- Master Biologie > Skills Modules
- Master Biology > Skills Modules

**Contact person**
- Module responsibility
  - Gerhard Wolfgang Zotz
- Authorized examiners
  - Gerhard Wolfgang Zotz
  - Sascha Laubinger
  - Dirk Carl Albach
- Module counseling
  - Sascha Laubinger
  - Dirk Carl Albach

**Entry requirements**
- Skills to be acquired in this module
  - Communicating and practicing scientific presentation techniques (talk, publication, poster)
  - Presentation of data and discussion in spoken and written (english)
  - Communicating of techniques in problem treatment in free speech and scientific writing
  - Independent investigation and knowledge of scientific primary literature
  - + interdisciplinary thinking
  - ++ critical and analytical thinking
  - +++ independent searching and knowledge of scientific literature
  - +++ data presentation and discussion in German and English (written and spoken)

**Module contents**
- S: Working group seminar (2 SWS; Choice 1: Functional Ecology; Choice 2: Evolutionary genetics of plants; Choice 3: Plant biodiversity and evolution)
- S: Scientific Writing in Plant Science (2SWS)

**Reader's advisory**

**Languages of instruction**
- German, English

**Duration (semesters)**
- 1 Semester

**Module frequency**
- Module capacity 12

**Modulart**
- Wahlmodul / Opportunity

**Lern-/Lehrform / Type of program**
- Ecology, Flora, Genetics

**Vorkenntnisse / Previous knowledge**

**Examination**
- Time of examination
- Type of examination
  - Final exam of module
    - 1 presentation (25%)
    - 1 report (75%)

**Course type**
- Seminar

**SWS**
- 4.00

**Frequency**
- WiSe

**Workload attendance**
- 56 h
bio880 - Skills in Plant Systematics

Module label: Skills in Plant Systematics
Module code: bio880
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Master Biologie > Skills Modules
- Master Biology > Skills Modules

Contact person
Module responsibility
- Dirk Carl Albach

Authorized examiners
- Dirk Carl Albach
- Klaus Bernhard von Hagen
- Thijs Janzen

Module counseling
- Klaus Bernhard von Hagen

Entry requirements
Skills to be acquired in this module:
In this module, we provide the skills necessary to describe and distinguish species for floras and monographs/first publication of species. For that, an overview over the plant kingdom is provided. Further, various non-molecular methods of systematics are practiced, such as morphometry, SEM, identification key generation, nomenclature, species delimitation methods, and interpretation of phylogenetic analyses.

- deepened biological expertise
- deepened knowledge of biological working methods
- data analysis skills
- critical and analytical thinking
- independent searching and knowledge of scientific literature
- ability to perform independent biological research
- data presentation and discussion in German and English (written and spoken)
- teamwork
- statistics & scientific programming

Module contents:
In the seminar we provide an overview over the larger groups of plants and characters for their grouping. We analyse methods for phylogeny generation, angiosperm classification and description of new taxa.
In the exercises morphological characters are investigated in various ways and internet resources for further morphological characters presented. Species delimitation methods for molecular and morphological characters are used. Identification keys are generated and nomenclatural rules discussed.

Reader's advisory

Links
Languages of instruction: German, English
Duration (semesters): 1 Semester

Module frequency: 8
Module capacity: 8
Modullevel: MM (Mastermodul / Master module)
Modulart: Wahlmodul / Opportunity

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge: good knowledge of local flora

Examination
Time of examination
Type of examination
Final exam of module
1 presentation
1 report

Course type
Comment
SWS
Frequency
Workload attendance
Seminar
2.00
WiSe
28 h
Exercises
2.00
WiSe
28 h

Total time of attendance for the module: 56 h
**bio890 - Current Topics in Biology**

<table>
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<th>Module label</th>
<th>Current Topics in Biology</th>
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<tbody>
<tr>
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<td>bio890</td>
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<tr>
<td>Credit points</td>
<td>3.0 KP</td>
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<td>Workload</td>
<td>90 h</td>
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<td>Gabriele Gerlach</td>
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<td>Olaf Bininda-Emonds</td>
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<td>Module counseling</td>
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<td>Lehrende der Biologie</td>
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<tr>
<td>Entry requirements</td>
<td>+ biological knowledge</td>
</tr>
<tr>
<td></td>
<td>+ biologically relevant, natural / mathematical scientific basic knowledge</td>
</tr>
<tr>
<td></td>
<td>++ interdisciplinary knowledge and thinking</td>
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<tr>
<td></td>
<td>++ abstract, logical, and analytical thinking</td>
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<td></td>
<td>++ expanded knowledge in a specific biological field</td>
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<tr>
<td></td>
<td>++ presentation of results and factual discussion, both written and spoken</td>
</tr>
<tr>
<td></td>
<td>++ (scientific) communication skills</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>To develop skills in the critical analysis and interpretation of results and themes in diverse areas of modern biology, including (but not limited to) evolutionary biology, population genetics, biodiversity, ecology, genomics, ornithology, and neurobiology.</td>
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<tr>
<td>Module contents</td>
<td>Discussion and interpretations of one or more themes in modern biology. The themes and exact content will be provided by the instructor(s) at the beginning of the course.</td>
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<tr>
<td>Reader's advisory</td>
<td>Varies with chosen topic (will be provided by the instructor(s) at the beginning of the course)</td>
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<tr>
<td>Links</td>
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<tr>
<td>Languages of instruction</td>
<td>English, German</td>
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<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
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<tr>
<td>Module frequency</td>
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<tr>
<td>Module capacity</td>
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<td>Modullevel</td>
<td>MM (Mastermodul / Master module)</td>
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<td>Modulart</td>
<td>Wahlmodul / Opportunity</td>
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<tr>
<td>Lern-/Lehrform / Type of program</td>
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<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td>Attendance in one or more introductory modules in Master Biology.</td>
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<td>Examination</td>
<td>Time of examination</td>
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<tr>
<td></td>
<td>Type of examination</td>
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<td>Frequency</td>
<td>SuSe and WiSe</td>
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<tr>
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## Abschlussmodul

**mam - Master´s Thesis Module**

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<tr>
<td>Module code</td>
<td>mam</td>
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<tr>
<td>Credit points</td>
<td>30.0 KP</td>
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<td>Workload</td>
<td>900 h</td>
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**Used in course of study**
- Master Biology > Abschlussmodul

**Contact person**

**Entry requirements**

**Skills to be acquired in this module**

**Module contents**

**Reader’s advisory**

**Links**

**Languages of instruction**
- German, English

**Duration (semesters)**
- 1 Semester

**Module frequency**
- ---

**Module capacity**
- unlimited

**Modulart**
- je nach Studiengang Pflicht oder Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

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

**Final exam of module**
- G

**Course type**
- Colloquium

**SWS**
- 2.00

**Frequency**
- SuSe or WiSe

**Workload attendance**
- 28 h