Modules for Biology

Mastermodule

bio600 - Molecular Genetics and Cell Biology

Module label: Molecular Genetics and Cell Biology
Module code: bio600
Credit points: 15.0 KP
Workload: 450 h

Used in course of study: Master Biologie > Mastermodule

Contact person

Module responsibility
- John Neidhardt

Authorized examiners
- Alle hier genannten

Module counseling
- Karl-Wilhelm Koch
- Kathrin Thedieck

Entry requirements

BSc (Biology, Biochemistry)

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

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.

Module contents

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 and Human Genetics

Links

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

Language of instruction

English

Duration (semesters)

1 Semester

Module frequency

jährlich

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

written examination (70 %), presentation(s) 30 %; not graded: signed lab protocols, regular active participation is required for the module to be passed.

Course type

Comment

SWS

Frequency

Workload attendance

Lecture

2.00

WiSe

28 h

Seminar

2.00

28 h

Exercises

6.00

84 h
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<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tr>
<td>Total time of attendance for the module</td>
<td></td>
<td></td>
<td></td>
<td>140 h</td>
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bio610 - Basic Course in Neurosensory Science and Behaviour

<table>
<thead>
<tr>
<th>Module label</th>
<th>Basic Course in Neurosensory Science and Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio610</td>
</tr>
<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 h</td>
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<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
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<tr>
<td>Contact person</td>
<td>Module responsibility</td>
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<tr>
<td></td>
<td>• Georg Martin Klump</td>
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<tr>
<td></td>
<td>Authorized examiners</td>
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<tr>
<td></td>
<td>• Alle hier genannten</td>
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<tr>
<td></td>
<td>Module counseling</td>
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<tr>
<td></td>
<td>• Ulrike Langemann</td>
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<tr>
<td></td>
<td>• Christiane Margarete Thiel</td>
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<td></td>
<td>• Henrik Mouritsen</td>
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**Entry requirements**

**Skills to be acquired in this module**

++ deepened biological expertise
+ deepened knowledge of biological working methods
+ data analysis skills
++ interdisciplinary 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)

Fundamentals of behavioural ecology, neuroethology and cognitive neurosciences are acquired in lectures. The knowledge is improved in exercises and seminars. In addition to independent research, students learn to present and critically assess scientific data and approaches.

**Module contents**

The lecture "Neuroethology" yields an introduction to the mechanisms underlying the behaviour of animals. Subjects are, e.g., the mechanisms of perception, control of movement patterns, mechanisms of learning, orientation and navigation.

The lecture "Behavioural ecology" yields an introduction to the complex of subjects predator-prey interactions, optimal food utilization, spatial and temporal distribution of animals, social relations and group formation, mating systems and reproductive strategies, sexual selection, investment of parents in offspring, and communication.

In the seminar "Topical questions of Ethology", current original literature relating to behavioural biology is reported and discussed.

The lecture and exercise "Introduction to Cognitive Neuroscience" gives an insight into the cognitive functions (e.g. attention, learning, language) of the human brain.

The lecture “Psychopharmacology” imparts the connection between neurotransmitters and behaviour.

**Reader’s advisory**


**Links**

**Language of instruction**

English

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Modulart**

je nach Studiengang Pflicht oder Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td>as agreed following the winter semester</td>
<td>Presentation(s) (20 %) Two Written examination (40 % each) Regular active participation is required for the module to be passed.</td>
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**Course type**

<table>
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<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tr>
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<td>Course type</td>
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<td>Frequency</td>
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<tr>
<td>Exercises</td>
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<td>1.00</td>
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<tr>
<td>Seminar</td>
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<td>2.00</td>
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**Total time of attendance for the module**

154 h
bio620 - Basic Course in Neurobiology

Module label
Basic Course in Neurobiology

Module code
bio620

Credit points
15.0 KP

Workload
450 h

Used in course of study
- Master Biologie > Mastermodule

Contact person
Module responsibility
- Ulrike Janssen-Bienhold

Authorized examiners
- Alle hier genannten

Module counseling
- Karin Dedek
- Martin Greschner
- Jutta Kretzberg

Entry requirements
BSc (Biology, Biochemistry)

Skills to be acquired in this module
++ deepened biological expertise
++ deepened knowledge of biological working methods
++ data analysis skills
+ independent searching and knowledge of scientific literature
+ data presentation and discussion in German and English (written and spoken)
+ ethics and professional behaviour
+ statistics & scientific programming

For students putting emphasis on cell biology, neurobiology, genetics and/or biochemistry.

Theory: Improved theoretical and methodological knowledge in neurobiology. Presentation of scientific work and own results.

Practice: Performing advanced experiments of neurobiology. Gaining modern methodological skills. Introduction to the preparation and performance of research projects.

Module contents
Lecture: Introduction to current approaches to and results of sensorial biology and neurobiology with emphasis on methodological aspects.
Seminar: Presentation of original literature and results of own experiments.
Lab course part I: 3 weeks (of 20 hours each) neuroanatomical and biochemical experiments
Lab course part II: 3 weeks (of 20 hours each) electrophysiological experiments

Reader’s advisory
as presented in the lecture

Links

Language of instruction
English

Duration (semesters)
1 Semester

Module frequency
jährlich

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
1. Written examination (50 %)
2. Oral examination (50 %);
Portfolio (short tests, condensed report 90%)
Records (10%) not graded: signed protocol(s), presentations within the scope of the seminar

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

Course type
Comment
SWS
Frequency
Workload attendance
Lecture
2.00
28 h
Exercises
9.00
126 h
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<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tr>
<td>Seminar</td>
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<td>2.00</td>
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<td>28 h</td>
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<tr>
<td>Seminar</td>
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<td>0.00</td>
<td>SuSe and WiSe</td>
<td>0 h</td>
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**Total time of attendance for the module**

182 h
bio630 - Advanced Course in Neurobiology

Module label: Advanced Course in Neurobiology

Module code: bio630

Credit points: 15.0 KP

Workload: 450 h

Used in course of study:
- Master Biologie > Mastermodule

Contact person:
- Module responsibility
  - Ulrike Janssen-Bienhold
- Authorized examiners
  - Alle hier genannten
- Module counseling
  - Karin Dedek
  - Jutta Kretzberg
  - Martin Greschner

Entry requirements:
- BSc (Biology, Biochemistry)

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)
- + project and time management

Predominantly for students putting emphasis on sensory physiology. Acquiring advanced theoretical knowledge of sensory and neurophysiology. Independent planning and performance of own projects including literature research. Preparation of a scientific report. Presentation of own project. The module can serve the purpose of preparing a Master’s thesis.

Module contents:
1. Independent performance of an individual project in small groups (topic depending on working group!): 6 weeks at about 30 hours/week. Dates are individually arranged with the respective supervisor.
2. Participation in the working group seminar Neurobiology (5.02.016) including presentation of the project and the results obtained.

Reader's advisory:
Recent literature on Sensory Physiology

Links:
- English

Duration (semesters):
- 1 Semester

Module frequency:
- halbjährlich

Module capacity:
- unlimited

Modulelevel:
- ---

Modulart:
- je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

Examination:

Time of examination:

Type of examination:
- Seminar paper (project report) (100 %) not graded: Presentation(s) within the scope of the seminar.
- Regular active participation is required for the module to be passed.

Course type:
- Proektorientiertes Modul
- Seminar

Comment:
- 14.00
- 0.00

SWS:
- 14.00
- 0.00

Frequency:

Workload attendance:
- 196 h
- 0 h

Total time of attendance for the module:
- 196 h
### Module Information

**bio640 - Advanced Course in Neurosensory Science and Behaviour**

<table>
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<tr>
<th>Module label</th>
<th>Advanced Course in Neurosensory Science and Behaviour</th>
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<tr>
<td>Module code</td>
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<td>Credit points</td>
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<td>Workload</td>
<td>450 h</td>
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<td>• Master Biologie &gt; Mastermodule</td>
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</table>

**Contact person**
- Module responsibility
  - Georg Martin Klump
- Authorized examiners
  - Alle hier genannten
- Module counseling
  - Ulrike Langemann
  - Carsten Gießing
  - Christine Köppl
  - Henrik Mouritsen
  - Christiane Margarete Thiel

**Entry requirements**
- Skills to be acquired in this module
  - + deepened biological expertise
  - ++ deepened knowledge of biological working methods
  - ++ data analysis skills
  - + interdisciplinary thinking
  - + data presentation and discussion in German and English (written and spoken)
  - + project and time management
  - ++ statistics & scientific programming

The aim of the module is to intensify the different aspects of behavioural biology, of neurosensory science or neurocognition. Students participate in current projects and gain a deep insight into topical research, which prepares them for their Master theses. The project work particularly advances independent planning and performance of experiments.

**Module contents**
- Students have four options to choose from, at the beginning of the course:
  - **Option 1:** "Navigation mechanisms in nocturnal bird migration" comprises (1) lecture: Bird migration, (2) seminar: Neurosensory science of bird migration, and (3) a laboratory course project Navigation mechanisms in nocturnal bird migration including participation in investigations of navigation mechanisms in migratory birds (project focussing on behavioural biology, molecular biology or neuroanatomy).
  - **Option 2:** "Neurocognition" comprises (1) exercise: Introduction to MATLAB, (2) lecture Methods of Cognitive Neurosciences, and (3) a laboratory course project and seminar Experiments of Neurocognition including participation in planning, performance and analysis of a functional neuro-imaging study using MATLAB-based software. The studies are based in the field of attention and learning; these subjects are intensified in the seminar.
  - **Option 3:** "Neurosensory Science of Hearing" comprises (1) exercise Introduction to MATLAB, (2) lecture and seminar "Fundamentals in Auditory Physiology", and (3) a laboratory course project where alternatively psychoacoustical, physiological and anatomical investigations into the function of the auditory system are performed. Relevant specialized literature serves to introduce students into the specifics of their project.
  - **Option 4:** "Anatomy and physiology of hearing" comprises (1) exercise Introduction to MATLAB, (2) lecture and seminar "Fundamentals in Auditory Physiology", and (3) a laboratory course project where physiological or anatomical investigations into the function of the auditory system are performed. Relevant specialized literature serves to introduce students into the specifics of their project.

**Reader's advisory**

**Links**
- **Language of instruction** English
- **Duration (semesters)** 1 Semester
- **Module frequency** jährlich
- **Module capacity** unlimited
- **Modulart** je nach Studiengang Pflicht oder Wahlpflicht
### Examination

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<th>Examination</th>
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<th>Type of examination</th>
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<td>Final exam of module</td>
<td>End of summer semester</td>
<td>1. Protocol(s) or written examination (70 %)</td>
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<td></td>
<td>2. Presentation(s) (30 %)</td>
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<td>Regular active participation is required for the module to be passed.</td>
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### Course type

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

140 h
**bio650 - Basic Ornithology**

<table>
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<th>Module label</th>
<th>Basic Ornithology</th>
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<tbody>
<tr>
<td>Module code</td>
<td>bio650</td>
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<tr>
<td>Credit points</td>
<td>15.0 KP</td>
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<tr>
<td>Workload</td>
<td>450 h</td>
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<tr>
<td>Used in course of study</td>
<td>● Master Biologie &gt; Mastermodule</td>
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**Contact person**

- Module responsibility
  - Franz Bairlein
- Authorized examiners
  - Alle hier genannten
- Module counseling
  - Ulrike Langemann
  - Sandra Bouwghuis
  - Cas Elkenaar
  - Georg Martin Klump
  - Christine Köppl
  - Henrik Mouritsen
  - Heiko Schmaljohann

**Entry requirements**

**Skills to be acquired in this module**

- ++ 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)

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.

**Module contents**

The module is composed of the lecture “Ecology and Physiology of Birds” and different seminars.

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”:
In this seminar, students choose, present and discuss papers treating different aspects relevant to the protection of nature and species. Every student reads a paper on one article each and the respective research results and discusses them with the other participants.

Seminar “Migratory Strategies and Nutritional Ecology of Wading Birds”:
This seminar is based on current exemplary ecoethological cases and deals with the importance of the Wadden Sea as a pivot for migrating wading birds as well as water birds and various aspects of migratory strategies, nutrition, energy balance, fat deposition, annual periodicity, day and night rhythmicity, tidal rhythm, and predator-prey relations of wading and water birds.

**Reader’s advisory**

Please look at the german version!

**Links**


**Languages of instruction**

German, English

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Modullevel**

BC (Basiscurriculum / Base curriculum)

**Modulart**

je nach Studiengang Pflicht oder Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**
<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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<tr>
<td>Final exam of module</td>
<td>Written examination in the last week of semester</td>
<td>Presentation(s) (60 %)</td>
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<td>Registration proceeding: via StudIP</td>
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<table>
<thead>
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<tbody>
<tr>
<td>Lecture</td>
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<td>56 h</td>
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<td>Seminar</td>
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<td>84 h</td>
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**Total time of attendance for the module**: 140 h
bio660 - Advanced Ornithology

<table>
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<tr>
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<td><strong>Module code</strong></td>
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<td><strong>Credit points</strong></td>
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<td><strong>Workload</strong></td>
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<td><strong>Used in course of study</strong></td>
<td>Master Biologie &gt; Mastermodule</td>
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<th><strong>Contact person</strong></th>
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<tbody>
<tr>
<td>Module responsibility</td>
</tr>
<tr>
<td>- Franz Bairlein</td>
</tr>
<tr>
<td>Authorized examiners</td>
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<tr>
<td>- Alle hier genannten</td>
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<table>
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<tr>
<th><strong>Entry requirements</strong></th>
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<tr>
<td>MM 7 Fundamentals of Ornithology</td>
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<table>
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<tr>
<th><strong>Skills to be acquired in this module</strong></th>
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<tr>
<td>++ deepened biological expertise</td>
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<tr>
<td>++ deepened knowledge of biological working methods</td>
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<tr>
<td>++ data analysis skills</td>
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<tr>
<td>+ interdisciplinary thinking</td>
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<td>+ critical and analytical thinking</td>
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<tr>
<td>+ teamwork</td>
</tr>
<tr>
<td>+ project and time management</td>
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<tr>
<td>+ statistics &amp; scientific programming</td>
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</table>

The aim of the module is to consolidate various aspects of ornithology as well as to impart up-to-date methods applied in ornithological research.

<table>
<thead>
<tr>
<th><strong>Module contents</strong></th>
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</thead>
<tbody>
<tr>
<td>The module is comprised of three required elective courses (7.5 CP each), two of which have to be chosen. Required elective course 1: Laboratory course and seminar “Ecology of Colonial Seabirds” (7.5 CP). Observations and investigations of the common tern colony “Banter See” in Wilhelmshaven within the scope of a long-term study performed by the Institute of Avian Research. Students register behaviour independently, learn modern methods of automatically registering birds, their patterns of activity ranges and body masses, observe feeding in dependence on environmental factors and learn to understand the organization of a bird colony. Finally, the registered data are analysed statistically. The course aims at an extended knowledge about the composition, organization, and function of a bird colony, about courtship behaviour, the synchronisation of pair partners, regulation of behaviour by timers, time budgets, individuality and territoriality, selection of food and feeding strategies as well as about the importance of courtship feeding for reproduction. In the accompanying seminar, original publications are presented and discussed, in which the methods imparted in the laboratory course are applied to ecological studies of birds and yield results. Required elective course 2: Laboratory course and seminar “Communication in Birds” (7.5 CP). Students will analyse bird songs applying sonagraphic and statistical methods. For example, sounds are to be classified or a sound repertoire of individuals or populations is to be determined. Additional behavioural observations can be assessed in combination with sound analyses. In the accompanying seminar, fundamentals of acoustical communication in birds are studied using a standard publication on bird songs. Required elective course 3: Laboratory course and seminar “Nutritional Physiology of Birds” (7.5 CP). The basic questions and methods of feeding in birds are treated in independent laboratory experiments and field studies. Laboratory studies are performed with songbirds, field studies are predominantly performed with geese and shore birds. Laboratory course and seminar focus on aspects of metabolic physiology such as respirometry, food selection putting emphasis on the role of nutrients and secondary plant substances and their interactions as well as on aspects of the feeding strategy of geese in their natural environment. The seminar serves to extend the subject with the aid of recent publications.</td>
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<table>
<thead>
<tr>
<th><strong>Reader's advisory</strong></th>
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<tbody>
<tr>
<td>same as MM 7:</td>
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<table>
<thead>
<tr>
<th><strong>Links</strong></th>
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<tbody>
<tr>
<td><strong>Languages of instruction</strong></td>
</tr>
<tr>
<td>German, English</td>
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</table>
### Duration (semesters)
1 Semester

### Module frequency
jährlich

### Module capacity
unlimited

### Modularlevel
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### Modulart
je nach Studiengang Pflicht oder Wahlpflicht

### Lern-/Lehrform / Type of program

### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
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</table>
| Final exam of module | | 2 Protocol(s) (25 % each)
2 Presentation(s) (25 % each) Regular active participation is required for the module to be passed. |

### Course type

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Practical</td>
<td></td>
<td>10.00</td>
<td></td>
<td>140 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>0.00</td>
<td>SuSe and WiSe</td>
<td>0 h</td>
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### Total time of attendance for the module
168 h
bio670 - Molecular Ecology

<table>
<thead>
<tr>
<th>Module label</th>
<th>Molecular Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio670</td>
</tr>
<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>Arne Nolte</td>
</tr>
<tr>
<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>Gabriele Gerlach</td>
</tr>
</tbody>
</table>

**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)
- + statistics & scientific programming

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.

**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.

Seminar: Students will familiarize themselves with methods and background papers that they will present during seminar days.

**Reader’s advisory**

**Links**

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

**Languages of instruction**

- German, English

**Module capacity**

15

**Module level**

MM (Mastermodul / Master module)

**Modulart**

je nach Studiengang Pflicht oder Wahlpflicht

**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**

<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>during the module</td>
<td>Presentations (50%), Portfolio (50%). Regular participation is a prerequisite to pass in the module.</td>
</tr>
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**Course type**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>1.00</td>
<td>SuSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>10.00</td>
<td>SuSe</td>
<td>140 h</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>1.00</td>
<td>SuSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>0.00</td>
<td>SuSe and WiSe</td>
<td>0 h</td>
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**Total time of attendance for the module**

168 h
### bio680 - Molecular Sensory Neuroscience

<table>
<thead>
<tr>
<th>Module label</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio680</td>
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<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>• Master Biologie &gt; Mastermodule</td>
</tr>
</tbody>
</table>

**Contact person**
- Module responsibility
  - Karl-Wilhelm Koch
- Authorized examiners
  - Alle hier genannten
- Module counseling
  - Hans Gerd Nothwang
  - John Neidhardt
  - Anna-Maria Hartmann
  - Kathrin Thedieck

**Entry requirements**
- BSc (Biology, Biochemistry)

**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

For students putting emphasis on cell biological, molecular biological, genetic, biochemical and/or neurobiological fields. The module can serve the purpose of preparing a Master's thesis.

**Theory**: Advanced knowledge in molecular cell biology

**Practice**: Acquiring methodological skills in molecular cell biology. Advanced knowledge of how to perform research projects.

**Module contents**
- Molecular biology of the cell: Theory and practice.
- Independent treatment of an individual project (topic depending on working group; dates as arranged).
- Acquiring an advanced theoretical knowledge in selected fields of the molecular biology of the cell (points of emphasis: genetics, biochemistry, cell biology; topics depending on working groups).

**Reader's advisory**
- Textbooks of Cell Biology, Biochemistry, Genetics

**Links**
- Languages of instruction: German, English
- Duration (semesters): 1 Semester
- Module frequency: unregelmäßi
- Module capacity: unlimited
- Modulelevel: ---
- Modulart: je nach Studiengang Pflicht oder Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Final exam of module</th>
<th>Time of examination</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td>1 oral examination (30 min) in Cell Biology, Genetics or Biochemistry (depending on working group)</td>
<td>1 Semester</td>
<td>Signed project report</td>
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**Course type**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
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<td></td>
<td>10.00</td>
<td>SuSe and WiSe</td>
<td>140 h</td>
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<tr>
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**Total time of attendance for the module**: 140 h
bio690 - Biochemical Concepts in Signal Transduction

<table>
<thead>
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<th>Biochemical Concepts in Signal Transduction</th>
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<tbody>
<tr>
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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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<td>Used in course of study</td>
<td>• Master Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>• Karl-Wilhelm Koch</td>
</tr>
<tr>
<td></td>
<td>Authorized examiners</td>
</tr>
<tr>
<td></td>
<td>• Alle hier genannten</td>
</tr>
<tr>
<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>• Alexander Scholten</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>BSc in Biology or Biochemistry</td>
</tr>
<tr>
<td>Skills to be acquired in this module</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></td>
<td>+ interdisciplinary thinking</td>
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<td></td>
<td>++ critical and analytical thinking</td>
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<tr>
<td></td>
<td>+ independent searching and knowledge of scientific literature</td>
</tr>
<tr>
<td></td>
<td>++ data presentation and discussion in German and English (written and spoken)</td>
</tr>
<tr>
<td></td>
<td>+ teamwork</td>
</tr>
<tr>
<td></td>
<td>+ project and time management</td>
</tr>
</tbody>
</table>

Students understand fundamental principles of molecular mechanisms of signal processing in cells and learn by selected experiments, how to study them experimentally. They assess experimentally prepared data sets and have a good command of how to present them scientifically.

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).

Links

Languages of instruction: German, English

Duration (semesters): 1 Semester

Module frequency: Jährlich

Module capacity: unlimited

Module level: ---

Modulart: je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program

Vorkenntnisse / Previous knowledge

<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>Written examination of 90 minutes</td>
<td>Written examination (50 %) Protocol(s) (50 %) Presentation (not graded) Paper(s) are to be read. Regular active participation is required for the module to be passed.</td>
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Course type

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>1.00</td>
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<tr>
<td>Exercises</td>
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<td>8.00</td>
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<tr>
<td>Seminar</td>
<td></td>
<td>1.00</td>
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Total time of attendance for the module: 140 h
# bio700 - Biodiversity and Ecology of Plants

**Module label**: Biodiversity and Ecology of Plants  
**Module code**: bio700  
**Credit points**: 15.0 KP  
**Workload**: 450 h  
**Used in course of study**: Master Biologie > Mastermodule  
**Contact person**  
- Module responsibility
  - Dirk Carl Albach  
- Authorized examiners
  - Alle hier genanntnen  
- Module counseling
  - Michael Kleyer  
  - Gerhard Wolfgang Zotz  

**Entry requirements**

**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  
- + data presentation and discussion in German and English (written and spoken)

The module imparts an advanced knowledge of plant ecology and stimulates cross-scale thinking. The theoretical conceptions in the Functional Ecology of Plants such as biodiversity research are presented in the form of lectures and seminars. Students are enabled to summarize the current state of a limited area of Functional Ecology with the aid of the relevant primary literature and to present it in the subject-specific publication form in their assignment. Practical and methodical skills are acquired in the accompanying exercises.

**Module contents**

- L: Ecology of Plants (1 H/W)  
- L: Metabolic cycling in plants/Resource acquisition and use by plants (1 H/W)  
- L: Biodiversity of plants (2 H/W)  
- E: Methods of physiological ecology of plants/Biodiversity of plants (1 H/W)  
- SE: Recent papers on physiological ecology of plants/Biodiversity of plants (2 H/W)

**Reader's advisory**

Additional literature depending on how the respective area of work develops.

**Links**

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

**Languages of instruction**

German, English

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Modulart**

je nach Studiengang Pflicht oder Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Type of examination</th>
<th>Time of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation(s) (30 %)</td>
<td>Assignment (70 %)</td>
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Regular active participation is required for the module to be passed.

**Course type**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWH</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>4.00</td>
<td></td>
<td>56 h</td>
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<td>Exercises</td>
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<td>1.00</td>
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<td>14 h</td>
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<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
<td></td>
<td>28 h</td>
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</table>

**Total time of attendance for the module**

98 h
Module label: Functional Ecology of Plants

Module code: bio710

Credit points: 15.0 KP

Workload: 450 h

Used in course of study: Master Biologie > Mastermodule

Contact person:
- Module responsibility: Gerhard Wolfgang Zotz
- Authorized examiners: Alle hier genannten, Helena Einzmann
- Module counseling: Gerhard Wolfgang Zotz

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

Part I (lecture): Understanding the scale-dependence of spatial and temporal ecological processes
Part II (seminar): Treatment of special subjects of the functional ecology of plants yields insight into current research fields.
Part III: Project assignments will introduce students to scientific work by independent planning, performance, assessment and presentation. Skills in optical and oral presentation of own and other scientists’ research results are practised in seminar papers related to Parts II and III.

Module contents:
L: "Scaling": Physiological Ecology from individual organ to ecosystem
SE: Recent studies in experimental ecology
E: Independent research project

Reader's advisory:
Additional literature depending on how the respective area of work develops.
Comment: Web link: http://www.uni-oldenburg.de/fun_eco/

Links:

Language of instruction: English

Duration (semesters): 1 Semester

Module frequency: jährlich

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: 1. Presentation(s) (30 %)
2. Exercise (laboratory course report on project work) (70 %)
Regular active participation is required for the module to be passed.

Course type: Comment: SWS: Frequency: Workload attendance:

20 / 36
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>10.00</td>
<td></td>
<td>140 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>1.00</td>
<td></td>
<td>14 h</td>
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</table>

**Total time of attendance for the module** 182 h
Bio720 - Basic Marine Biodiversity

Module label: Basic Marine Biodiversity
Module code: bio720
Credit points: 15.0 KP
Workload: 450 h

Used in course of study:
- Master Biologie > Mastermodule

Contact person:
Module responsibility:
- Pedro-Miguel Martinez-Arbizu

Authorized examiners:
- Alle hier genannten

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
E: Biogenic sedimentation, Interaction benthos-sediment; (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) conceptions and hypotheses of marine biodiversity, biodiversity of marine vertebrates; (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
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
Written examination (60 %)
Presentation(s) (40 %)
Regular active participation is required for the module to be passed.

Course type Comment SWS Frequency Workload attendance
Lecture
3.00 42 h
Exercises
9.00 126 h
Seminar
1.00 14 h
<table>
<thead>
<tr>
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<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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</thead>
<tbody>
<tr>
<td>Total time of attendance for the module</td>
<td></td>
<td></td>
<td></td>
<td>182 h</td>
</tr>
</tbody>
</table>
bio730 - Introductory Evolutionary Biology

Module label: Introductory Evolutionary Biology
Module code: bio730
Credit points: 15.0 KP
Workload: 450 h

Used in course of study:
- Master Biologie > Mastermodule

Contact person:
- Module responsibility: Gabriele Gerlach
- Authorized examiners: Alle hier genannten
- Module counseling:
  - Wilko Ahlrichs
  - Olaf Bininda-Emonds
  - Dirk Carl Albach
  - Klaus Bernhard von Hagen

Entry requirements: BSc Biology

Skills to be acquired in this module:
++ deepened biological expertise
++ deepened knowledge of biological working methods
++ data analysis skills
+ critical and analytical thinking
++ data presentation and discussion in German and English (written and spoken)
+ statistics & scientific programming

Knowledge of current subjects in Evolution Biology
Study and critical assessment of the scientific literature
Learning the molecular genetic and morphological methods
Improvement of English proficiency

Module contents:
A lecture imparts evolution biological theories, methods and research results (bioinformatics, morphological and molecular phylogeny, population genetics, selection, adaptation).
In the seminar, research papers are presented and discussed.
In the laboratory course/exercises, students learn molecular genetic and morphological methods applied to determine the variability of individuals, populations or species. Data are analysed and interpreted with the aid of computers.

Reader’s advisory:
Current papers in Evolutionary Biology
Futuyama D. Evolutionary Biology, Elsevier, Hartl & Clark Principles of Population Genetics, Sinauer
Additional literature depending on how the respective area of work develops.

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

Lern-Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

Examination Time of examination Type of examination
Final exam of module
1. Portfolio (60 %)
2. Presentation(s) 40 %
Regular active participation is required for the module to be passed.

Course type Comment SWS Frequency Workload attendance
Lecture 3.00 42 h
Exercises 4.00 56 h
Seminar 1.00 14 h
Total time of attendance for the module 112 h
bio740 - Advanced Marine Biodiversity

Module label: Advanced Marine Biodiversity

Module code: bio740

Credit points: 15.0 KP

Workload: 450 h

Used in course of study: Master Biologie > Mastermodule

Contact person:
- Module responsibility: Pedro-Miguel Martinez-Arbizu
- Authorized examiners: Alle hier genannten
- Module counseling: Thomas Glatzel

Entry requirements: BSc Biology, graduate from Master I or adequate knowledge

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

Current subjects of marine biodiversity research are defined and developed to an own research project before the background of the latest scientific results. Students develop experiments, learn and apply methods, derive, analyse and evaluate data.

Module contents:
SE: Presentation and later on discussion of the own research project
E: Own research projects are performed in the working group of the respective lecturer and also outside Oldenburg University: Deutsches Zentrum für Marine Biodiversitätsforschung DZMB (Wilhelmshaven) (German Centre of Marine Biodiversity Research) or Alfred-Wegener Institute (Bremerhaven)

Reader’s advisory: as announced

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

Lern-Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination Time of examination Type of examination
Final exam of module Presentation(s) (100 %)

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

Course type Comment SWS Frequency Workload attendance
Exercises 10.00
Seminar 3.00

Total time of attendance for the module: 182 h
bioc750 - Advanced Evolutionary Biology

<table>
<thead>
<tr>
<th>Module label</th>
<th>Advanced Evolutionary Biology</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio750</td>
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<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 h</td>
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<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
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<tr>
<td>Contact person</td>
<td></td>
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<tr>
<td>Module responsibility</td>
<td></td>
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<tr>
<td>Authorized examiners</td>
<td>Olaf Bininda-Emonds</td>
</tr>
<tr>
<td>Authorized examiners</td>
<td>Alle hier genannten</td>
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<tr>
<td>Module counseling</td>
<td>Wilko Ahlrichs</td>
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<td>Module counseling</td>
<td>Dirk Carl Albach</td>
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<tr>
<td>Module counseling</td>
<td>Gabriele Gerlach</td>
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<tr>
<td>Module counseling</td>
<td>Klaus Bernhard von Hagen</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>BSc Biology, successful completion of Evolutionary Biology Master I (or equivalent knowledge)</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>++ deepened biological expertise</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>+ deepened knowledge of biological working methods</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>++ data analysis skills</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>+ critical and analytical thinking</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>+ independent searching and knowledge of scientific literature</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>++ ability to perform independent biological research</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>++ data presentation and discussion in German and English (written and spoken)</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>++ project and time management</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>+ statistics &amp; scientific programming</td>
</tr>
<tr>
<td>Current subjects in evolutionary biology research are delineated to form the basis for individual research projects in which the students will learn to develop experiments; apply cutting-edge methods; and to derive, analyse and evaluate scientific data.</td>
<td></td>
</tr>
<tr>
<td>Module contents</td>
<td>Seminar: Presentation and subsequent discussion of the individual research projects. Practical: Research projects to be performed in the working group of the respective lecturer.</td>
</tr>
<tr>
<td>Reader's advisory</td>
<td>Project-related literature will be announced at the start of the module.</td>
</tr>
<tr>
<td>Links</td>
<td></td>
</tr>
<tr>
<td>Language of instruction</td>
<td>English</td>
</tr>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
</tr>
<tr>
<td>Module frequency</td>
<td>jährlich</td>
</tr>
<tr>
<td>Module capacity</td>
<td>unlimited</td>
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<tr>
<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>
</tr>
<tr>
<td>Examination</td>
<td>Time of examination</td>
</tr>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module; protocols can be handed in until the last day of the course.</td>
</tr>
<tr>
<td>Course type</td>
<td>Comment</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
</tr>
<tr>
<td>Practical</td>
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<tr>
<td>Total time of attendance for the module</td>
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</table>
**bio760 - Evolution and Ecology of Plants**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Evolution and Ecology of Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio760</td>
</tr>
<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 h</td>
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<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
</tr>
</tbody>
</table>

**Contact person**
- Module responsibility
  - Dirk Carl Albach
- Authorized examiners
  - Alle hier genannten
- Module counseling
  - Michael Kleyer
  - Klaus Bernhard von Hagen

**Entry requirements**
- BSc (Biology)

**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
- statistics & scientific programming

**Knowledge of indigenous units of vegetation**
- Survey of the plant kingdom
- Learning different (nonmolecular) methods of systematics

**Module contents**
Lecture and seminar give a survey of the ecological and taxonomical diversity of plants. The lecture offers a survey of the Central European vegetation units and gives a general idea of the environmental factors influencing these vegetation units. The seminar gives a survey of the supergroups of plants and their characteristics.

In the exercises, the relations between ecology and taxonomy are studied phylogenetically. Ecological, morphological and similar data sets are compiled for various plant groups (partly from existing data banks presented in the exercises, partly by own, e.g., microscopic studies) and analysed/assessed in their phylogenetic context with the aid of different computer software.

**Reader’s advisory**

**Links**
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: im 2-Jahres-Zyklus
- Module capacity: unlimited
- Modulart: je nach Studiengang Pflicht oder Wahlpflicht

**Lern-Lehrform / Type of program**

**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>1. Report(s) (70 %)</td>
<td>2. Portfolio (30 %)</td>
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</table>

Regular active participation in all three lectures is required for the module to be passed.

**Course type**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tr>
<td>Lecture</td>
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<td>4.00</td>
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<td>56 h</td>
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<td>Exercises</td>
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<td>3.00</td>
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<td>42 h</td>
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<tr>
<td>Seminar</td>
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<td>3.00</td>
<td></td>
<td>42 h</td>
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**Total time of attendance for the module**
- 140 h
bio770 - Field Methods in Organismic Biology

Module label: Field Methods in Organismic Biology

Module code: bio770

Credit points: 15.0 KP

Workload: 450 h

Used in course of study: Master Biologie > Mastermodule

Contact person:

Module responsibility
- Gerhard Wolfgang Zotz

Authorized examiners
- Alle hier genannten

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: unlimited

Modulelevel: ---

Modulart: je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

Examination Time of examination Type of examination

Presentation(s) (30 %)
Laboratory course report on project work (70 %)

Final exam of module

Course type Comment SWS Frequency Workload attendance

Exercises 10.00
Seminar 2.00 28 h
Seminar 0.00 SuSe and WiSe 0 h

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 > Mastermodule

**Contact person**

- Module responsibility
  - Thomas Glatzel
- Authorized examiners
  - Alle hier genannten
- 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)
<table>
<thead>
<tr>
<th>Module contents</th>
<th>Biodiversity of littoral biotic communities – topographical field research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reader's advisory</td>
<td>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!</td>
</tr>
<tr>
<td></td>
<td>HEMPEL, G., HEMPEL, I. &amp; 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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

**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**
---

**Modulart**
je nach Studiengang Pflicht oder Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**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>during the lectures</td>
<td></td>
<td>1. Report(s) (30 %)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Assignment (70 %) (project report in the style of a scientific publication)</td>
</tr>
</tbody>
</table>

Regular active participation in all three lectures is required for the module to be passed.

**Course type**

| Exercises | 9.00 | 126 h |
| Seminar   | 3.00 | 42 h  |
| Seminar   | 0.00 | 0 h   |

**Total time of attendance for the module**

168 h
### bio810 - Independent Research

<table>
<thead>
<tr>
<th>Module label</th>
<th>Independent Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio810</td>
</tr>
<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
</tr>
</tbody>
</table>

#### Contact person
- Module responsibility
  - Gerhard Wolfgang Zotz
- Authorized examiners
  - Alle hier genannten

#### Entry requirements
- ++ 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

Most modules in the MSc Biologie at Oldenburg are still rather rigorously structured course work and lectures and provide relatively little opportunity for independent research. Some students do not want to wait until starting their master thesis to get first-hand experience in actual research in their field of interest. This module opens the possibility for students to practice both geographical flexibility and gain important experience by active participation in on-going research in a working group from Oldenburg or any other place before starting their master thesis. "Learning on the job" is the basic motto.

#### Module contents
The content and venue of this module is chosen in close coordination with the Prüfungsausschuss Master Biologie, possibly with consultations of other professors. The 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 (University Oldenburg, other national or international universities, research institutes) the student has to report to a professor in Oldenburg in the form of a written report and an oral presentation, both in English.

#### Reader's advisory
varies with chosen topic

#### Links
Language of instruction | English
Duration (semesters) | 1 Semester
Module frequency | halbjährlich
Module capacity | unlimited
Module level | ---
Modulart | je nach Studiengang Pflicht oder Wahlpflicht

### Lern-Lehrform / Type of program

#### 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>oral presentation (25%), written project report (75%)</td>
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</tr>
</tbody>
</table>

#### Course type

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>1.00</td>
<td></td>
<td></td>
<td>14 h</td>
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<tr>
<td>Practical</td>
<td>10.00</td>
<td></td>
<td></td>
<td>140 h</td>
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</table>

**Total time of attendance for the module**: 154 h
<table>
<thead>
<tr>
<th><strong>Module label</strong></th>
<th>Forschungsmodul Fast Track</th>
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<tbody>
<tr>
<td><strong>Module code</strong></td>
<td>bio820</td>
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<tr>
<td><strong>Credit points</strong></td>
<td>15.0 KP</td>
</tr>
<tr>
<td><strong>Workload</strong></td>
<td>450 h</td>
</tr>
<tr>
<td><strong>Used in course of study</strong></td>
<td>Master Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td><strong>Contact person</strong></td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>Georg Martin Klump</td>
</tr>
</tbody>
</table>

**Entry requirements**

++ 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

**Module contents**

**Reader's advisory**

**Links**

**Languages of instruction**

Duration (semesters) 1 Semester  
Module frequency unregelmäßig  
Module capacity unlimited  
Module level ---  
Moduleart 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 written report  
Course type Seminar

**SWS**

**Frequency**

**Workload attendance** 0 h
**bio840 - Basic Module – Developmental Biology and Evolution**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Basic Module – Developmental Biology and Evolution</th>
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<tbody>
<tr>
<td>Module code</td>
<td>bio840</td>
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<tr>
<td>Credit points</td>
<td>15.0 KP</td>
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<tr>
<td>Workload</td>
<td>450 h</td>
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<tr>
<td>Used in course of study</td>
<td>• Master Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>• Ulrike Sienknecht</td>
</tr>
<tr>
<td></td>
<td>Authorized examiners</td>
</tr>
<tr>
<td></td>
<td>• Alle hier genannten</td>
</tr>
<tr>
<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>• Hans Gerd Nothwang</td>
</tr>
<tr>
<td></td>
<td>• Christine Köppl</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>++ deepened biological expertise</td>
</tr>
<tr>
<td></td>
<td>++ deepened knowledge of biological working methods</td>
</tr>
<tr>
<td></td>
<td>++ data analysis skills</td>
</tr>
<tr>
<td></td>
<td>++ interdisciplinary thinking</td>
</tr>
<tr>
<td></td>
<td>++ critical and analytical thinking</td>
</tr>
<tr>
<td></td>
<td>++ independent searching and knowledge of scientific literature</td>
</tr>
<tr>
<td></td>
<td>++ ability to perform independent biological research</td>
</tr>
<tr>
<td></td>
<td>+ data presentation and discussion in German and English (written and spoken)</td>
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<tr>
<td></td>
<td>+ teamwork</td>
</tr>
<tr>
<td></td>
<td>+ ethics and professional behaviour</td>
</tr>
<tr>
<td></td>
<td>+ project and time management</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>Fundamentals and concepts of developmental and evolutionary biology</td>
</tr>
<tr>
<td>Module contents</td>
<td>Lectures on the fundamentals and concepts of developmental biology, and introduction to the development of the auditory system, including evolutionary aspects. Parallel seminars matching the topics of the lectures. Lab exercises in comparative developmental biology on mouse and chicken embryos. Methods: in-o-vo live observation; developmental stage discrimination and description, tissue preparation for histology, sectioning, staining, and microscopy</td>
</tr>
<tr>
<td>Links</td>
<td>Language of instruction</td>
</tr>
<tr>
<td></td>
<td>Duration (semesters)</td>
</tr>
<tr>
<td></td>
<td>Module frequency</td>
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<tr>
<td></td>
<td>Module capacity</td>
</tr>
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<td>Modulelevel</td>
</tr>
<tr>
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<td>Modulart</td>
</tr>
<tr>
<td>Lern-/Lehrform / Type of program</td>
<td>Examination</td>
</tr>
<tr>
<td></td>
<td>Final exam of module</td>
</tr>
<tr>
<td>Course type</td>
<td>Comment</td>
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<tr>
<td>Lecture</td>
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<td>Exercises</td>
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<td>Seminar</td>
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<tr>
<td>Total time of attendance for the module</td>
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</table>
bio850 - Advanced Development and Evolution of the Auditory System

Module label: Advanced Development and Evolution of the Auditory System

Module code: bio850

Credit points: 15.0 KP

Workload: 450 h

Used in course of study: Master Biologie > Mastermodule

Contact person:

Module responsibility
- Ulrike Sienknecht

Authorized examiners
- Alle hier genannten

Module counseling
- Hans Gerd Nothwang
- Christine Köppl

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)
+ teamwork
+ ethics and professional behaviour
++ project and time management

Introduction to experimental research work in the field of development and evolution of the auditory system

Module contents:
Research lab, individual or small-group lab projects, participation in the supervisor’s ongoing research, and in the group seminar

Reader’s advisory:
Springer Handbook of Auditory Research (SHAR);
Sanes et al. eds. Development of the Nervous System, Academic Press;
and research papers (original papers and reviews)

Links:

Language of instruction: English

Duration (semesters): 1 Semester

Module frequency: halbjährlich

Module capacity: unlimited

Module level: ---

Modulart: je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program

Vorkenntnisse / Previous knowledge:

Examination Time of examination Type of examination
Final exam of module within 2 months after completion of experimental work portfolio (presentation, internship report)

Course type: Exercises

SWS: 10.00

Frequency

Workload attendance: 140 h
## Abschlussmodul

**mam - Master´s Thesis Module**

<table>
<thead>
<tr>
<th>Label</th>
<th>Master´s Thesis Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>mam</td>
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<tr>
<td>Credit points</td>
<td>30.0 KP</td>
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<tr>
<td>Workload</td>
<td>900 h</td>
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<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Abschlussmodul</td>
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<tr>
<td>Contact person</td>
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<tr>
<td>Entry requirements</td>
<td></td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td></td>
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<tr>
<td>Module contents</td>
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</tr>
<tr>
<td>Reader’s advisory</td>
<td></td>
</tr>
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<td>Languages of instruction</td>
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</tr>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
</tr>
<tr>
<td>Module frequency</td>
<td></td>
</tr>
<tr>
<td>Module capacity</td>
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<tr>
<td>Modulelevel</td>
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<tr>
<td>Modulart</td>
<td>je nach Studiengang Pflicht oder Wahlpflicht</td>
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<tr>
<td>Lern-/Lehrform / Type of program</td>
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<tr>
<td>Vorkenntnisse / Previous knowledge</td>
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<td>Examination</td>
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<td>Time of examination</td>
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<td>Type of examination</td>
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<td>Final exam of module</td>
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<td>Seminar</td>
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<td>SWS</td>
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<tr>
<td>Frequency</td>
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