# Modules for Biology

## Mastermodule

**bio600 - Molecular Genetics and Cell Biology**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Molecular Genetics and Cell Biology</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio600</td>
</tr>
<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
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<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td>Ansprechpartner/-in</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>John Neidhardt</td>
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<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>Karl-Wilhelm Koch</td>
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<tr>
<td></td>
<td>Kathrin Thedieck</td>
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</tbody>
</table>

**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.

**Literaturempfehlungen**  
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**

**Examination / Prüfungszeiten**  

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

**Course type**  

<table>
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<th>Workload attendance</th>
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<tr>
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<td>Präsenzzeit Modul insgesamt</td>
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bio610 - Basic Course in Neurosensory Science and Behaviour

<table>
<thead>
<tr>
<th>Module label</th>
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<tr>
<td>Module code</td>
<td>bio610</td>
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<tr>
<td>Credit points</td>
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<td>Workload</td>
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<td></td>
<td>• Georg Martin Klump</td>
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<td>Module counseling</td>
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<td></td>
<td>• Ulrike Langemann</td>
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<td>• Christiane Margarete Thiel</td>
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<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.

Literaturempfehlungen


Links

Language of instruction
English

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
unlimited

Module level
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Modulart
je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program

Vorkenntnisse / Previous knowledge

<table>
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<th>Examination</th>
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Course type

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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

Ansprechpartner/-in:
- Ulrike Janssen-Bienhold
- Allle 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

Literaturempfehlungen:
as presented in the lecture

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

Module level:
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Modulart:
je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

Examination Prüfungszeiten Type of examination

Final exam of module:
1. Written examination (50 %)
2. Oral examination (50 %);
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.

Records (10%)

Type of examination

Course type Comment SWF Frequency Workload attendance
Lecture 2.00 28 h
Exercises 9.00 126 h

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### 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

**Ansprechpartner/-in**  
- Module responsibility: Ulrike Janssen-Bienhold
  - Prüfungsberechtigt
  - 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.

**Literaturempfehlungen**  
Recent literature on Sensory Physiology

**Links**

**Language of instruction**  
English

**Duration (semesters)**  
1 Semester

**Module frequency**  
halbjährlich

**Module capacity**  
unlimited

**Module level**  
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**Modulart**  
je nach Studiengang Pflicht oder Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**  

**Prüfungszeiten**  

**Type of examination**  

**Final exam of module**

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**  

**Comment**  

**SWS**  

**Frequency**  

**Workload attendance**  

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

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<tr>
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<td>450 h</td>
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<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
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**Module responsibility**
- Georg Martin Klump

Prüfungsberechtigt
- 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 focusing 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.

**Literatureempfehlungen**


**Option 3 and 4:** Pickles JO (2012) Introduction to the Physiology of Hearing. Academic Press

**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

<table>
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<tr>
<th>Vorkenntnisse / Previous knowledge</th>
<th>Type of examination</th>
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<td>Final exam of module</td>
<td>End of summer semester</td>
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1. Protocol(s) or written examination (70 %)
2. Presentation(s) (30 %)

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

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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>Lecture</td>
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<td>WiSe</td>
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<td>Practical</td>
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<td>Seminar</td>
<td>0.00</td>
<td>SoSe und WiSe</td>
<td>0 h</td>
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**Präsenzzeit Modul insgesamt**

140 h
bio650 - Basic Ornithology

Module label: Basic Ornithology
Module code: bio650
Credit points: 15.0 KP
Workload: 450 h

Used in course of study:
- Master Biologie > Mastermodule

Ansprechpartner/-in:
- Module responsibility:
  - Franz Bairlein
  - Alle hier genannten

Prüfungsberechtigt:
- Prüfungsberechtigt

Module counseling:
- Ulrike Langemann
- Sandra Bouwhuis
- Cas Eikenaar
- Georg Martin Klump
- Christine Köpfl
- 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 behavioral 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.

Literatureempfehlungen:
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:
### Examination

<table>
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<th>Prüfungszeiten</th>
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<tbody>
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<td>Written examination in the last week of semester</td>
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<td>Registration proceeding: via StudIP</td>
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<td>Regular active participation is required for the module to be passed.</td>
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### Course type

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<tr>
<th>Course type</th>
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**Präsenzzeit Modul insgesamt** 140 h
### Module: Advanced Ornithology (bio660)

**Module Code:** bio660  
**Credit Points:** 15.0 KP  
**Workload:** 450 h  
**Used in Course of Study:** Master Biologie > Mastermodule

#### 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**
- **+ statistics & scientific programming**

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.

#### Module Contents

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.

#### Literature Empfehlungen

same as MM 7:

**additionally for required elective course 2:** Catchpole CK, Slater PJB (2008) Bird Song: Biological Themes and Variations, Cambridge University Press

#### Languages of Instruction

German, English
<table>
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<tr>
<th></th>
<th>Duration (semesters)</th>
<th>Module frequency</th>
<th>Module capacity</th>
<th>Modullevel</th>
<th>Modulart</th>
<th>Lern-/Lehrform / Type of program</th>
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<tbody>
<tr>
<td></td>
<td>1 Semester</td>
<td>jährlich</td>
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<td>je nach Studiengang Pflicht oder Wahlpflicht</td>
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### Vorkenntnisse / Previous knowledge

<table>
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<th>Prüfungszeiten</th>
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<tr>
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<td>2 Protocol(s) (25 % each)</td>
<td>2 Presentation(s) (25 % each) Regular active participation is required for the module to be passed.</td>
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### Course type

<table>
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<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>2.00</td>
<td></td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Practical</td>
<td>10.00</td>
<td></td>
<td></td>
<td>140 h</td>
</tr>
<tr>
<td>Seminar</td>
<td>0.00</td>
<td></td>
<td></td>
<td>SoSe und WiSe</td>
</tr>
<tr>
<td>Präsenzzeit Modul insgesamt</td>
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<td></td>
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<td>168 h</td>
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**bio670 - Molecular Ecology**

<table>
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<tr>
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<th>Molecular Ecology</th>
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<tbody>
<tr>
<td>Module code</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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<td>Used in course of study</td>
<td>• Master Biologie &gt; Mastermodule</td>
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<tr>
<td>Ansprechpartner/-in</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>o Arne Nolte</td>
</tr>
<tr>
<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>o Gabrielle 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.

**Literaturempfehlungen**

**Links**

Languages of instruction German, English

Duration (semesters) 1 Semester

Module frequency 15

Module capacity 15

Modullevel 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 Prüfungszeiten Type of examination

Final exam of module during the module Presentations (50%), Portfolio (50%).

Regular participation is a prerequisite to pass in the module.

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>1.00</td>
<td>SoSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>10.00</td>
<td>SoSe</td>
<td>140 h</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>1.00</td>
<td>SoSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>0.00</td>
<td>SoSe und WiSe</td>
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</tr>
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Präsenzzeit Modul insgesamt 168 h
### Module: Molecular Sensory Neuroscience (bio680)

**Module label:** Molecular Sensory Neuroscience  
**Module code:** bio680  
**Credit points:** 15.0 KP  
**Workload:** 450 h  
**Used in course of study:**  
- Master Biologie > Mastermodule

**Ansprechpartner/-in**
- Module responsibility: Karl-Wilhelm Koch  
- Prüfungsberechtigt: 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 basic 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).

**Literaturempfehlungen**
- Textbooks of Cell Biology, Biochemistry, Genetics

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

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination / Prüfungszeiten / Type of examination**
- **Final exam of module:** 1 oral examination (30 min) in Cell Biology, Genetics or Biochemistry (depending on working group).  
  - Participation in seminar,  
  - Signed project report

**Course type / Comment / SWS / Frequency / Workload attendance**
- **Projektorientiertes Modul:**  
  - 10.00 SWS  
  - Frequency: 1 Semester  
  - Workload attendance: 140 h
- **Seminar:**  
  - 0.00 SWS  
  - Frequency: SoSe und WiSe  
  - Workload attendance: 0 h
- **Präsenzzeit Modul insgesamt:**  
  - Workload attendance: 140 h
bio690 - Biochemical Concepts in Signal Transduction

<table>
<thead>
<tr>
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<tbody>
<tr>
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</tr>
<tr>
<td></td>
<td>Karl-Wilhelm Koch</td>
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<td>Prüfungsberechtigt</td>
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<tr>
<td></td>
<td>Alle hier genannten</td>
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<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>
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</table>

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)
- + team work
- + project and time management

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.

Literaturempfehlungen

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

Modulart

- je nach Studiengang Pflicht oder Wahlpflicht

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination

- Written examination of 90 minutes
- 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.

Course type

<table>
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<tr>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
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<tr>
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Präsenzzeit Modul insgesamt

- 140 h
### bio700 - Biodiversity and Ecology of Plants

<table>
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<th>Module label</th>
<th>Biodiversity and Ecology of Plants</th>
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<tr>
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<td>bio700</td>
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<tr>
<td>Credit points</td>
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<td>Master Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td>Ansprechpartner/-in</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>* Dirk Carl Albach</td>
</tr>
<tr>
<td></td>
<td>* Alle hier genannten</td>
</tr>
<tr>
<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>* Michael Kleyer</td>
</tr>
<tr>
<td></td>
<td>* Gerhard Wolfgang Zotz</td>
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<td>Entry requirements</td>
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<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>++ interdisciplinary thinking</td>
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<tr>
<td></td>
<td>++ critical and analytical thinking</td>
</tr>
<tr>
<td></td>
<td>+ independent searching and knowledge of scientific literature</td>
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<tr>
<td></td>
<td>+ data presentation and discussion in German and English (written and spoken)</td>
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</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Module contents</th>
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<tbody>
<tr>
<td>L: Ecology of Plants (1 H/W)</td>
<td></td>
</tr>
<tr>
<td>L: Metabolic cycling in plants/Resource acquisition and use by plants (1 H/W)</td>
<td></td>
</tr>
<tr>
<td>L: Biodiversity of plants (2 H/W)</td>
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</tr>
<tr>
<td>E: Methods of physiological ecology of plants/Biodiversity of plants (1 H/W)</td>
<td></td>
</tr>
<tr>
<td>SE: Recent papers on physiological ecology of plants/Biodiversity of plants (2 H/W)</td>
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<table>
<thead>
<tr>
<th>Literatureempfehlungen</th>
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<tbody>
<tr>
<td>Additional literature depending on how the respective area of work develops.</td>
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| Links | http://www.uni-oldenburg.de/fun_eco/ |

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<tr>
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<td>Modulart</td>
<td>je nach Studiengang Pflicht oder Wahlpflicht</td>
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<table>
<thead>
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<table>
<thead>
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<th>Examination</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td>Final exam of module</td>
<td>Presentation(s) (30 %) Assignment (70 %)</td>
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<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
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<td>28 h</td>
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<td>Präsenzezeit Modul insgesamt</td>
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**bio710 - Functional Ecology of Plants**

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<td>Master Biologie &gt; Mastermodule</td>
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**Ansprechpartner/-in**

- Module responsibility
- Gerhard Wolfgang Zotz

**Prüfungsberechtigt**

- 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

**Literaturempfehlungen**


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

**Comment:**

Web link: [http://www.uni-oldenburg.de/fun_eco/](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** | Prüfungszeiten | Type of examination
---|---|---
Final exam of module | 1. Presentation(s) (30 %) 2. Exercise (laboratory course report on project work) (70 %) | 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
---|---|---|---|---
<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>2.00</td>
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<td>28 h</td>
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<tr>
<td>Exercises</td>
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<td>10.00</td>
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<td>140 h</td>
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<tr>
<td>Seminar</td>
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<td>Präsenzzeit Modul insgesamt</td>
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<td></td>
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</table>
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

Ansprechpartner/-in:
- Module responsibility: Pedro-Miguel Martinez-Arbizu
- Prüfungsberechtigt: 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.

Literaturempfehlungen:
- as announced in the lecture

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

Lern-Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

<table>
<thead>
<tr>
<th>Examination</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
</tr>
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<tbody>
<tr>
<td>Final exam of module</td>
<td></td>
<td>Written examination (60 %) Presentation(s) (40 %)</td>
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</tbody>
</table>

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>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Präsenzzeit Modul insgesamt</td>
<td></td>
<td></td>
<td></td>
<td>182 h</td>
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</tbody>
</table>
### 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.

### Literatureempfehlungen
Current papers in Evolutionary Biology
Futuyama D. Evolutionary Biology, Elsevier, Hartl & Clark Priciples of Population Genetics, Sinauer
Additional literature depending on how the respective area of work develops.

### Links

<table>
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<th>English</th>
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<td>Duration (semesters)</td>
<td>1 Semester</td>
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<td>Module capacity</td>
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</table>

### Module Frequency / Type of program

je nach Studiengang Pflicht oder Wahlpflicht

### Final Exam of Module
1. Portfolio (60 %)
2. Presentation(s) 40 %
Regular active participation is required for the module to be passed.

<table>
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<tr>
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<th>Comment</th>
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<tr>
<td>Lecture</td>
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<td>56 h</td>
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</table>

Präsenzzzeit Modul insgesamt:

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

Ansprechpartner/-in:
- Module responsibility:
  - Pedro-Miguel Martinez-Arbizu
  - Prüfungsberechtigt
- 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)

Literaturempfehlungen:
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:

Prüfungszeiten: 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: 10.00 140 h
Seminar: 3.00 42 h
Präsenzzeit Modul insgesamt: 182 h
**bio750 - Advanced Evolutionary Biology**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Advanced Evolutionary Biology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio750</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>

**Ansprechpartner/-in**
- Module responsibility
  - Olaf Bininda-Emonds
  - Alle hier genannten
- Module counseling
  - Wilko Ahlrichs
  - Dirk Carl Albach
  - Gabriele Gerlach
  - Klaus Bernhard von Hagen

**Entry requirements**
BSc Biology, successful completion of Evolutionary Biology Master I (or equivalent knowledge)

**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
+ statistics & scientific programming

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.

**Module contents**
- Seminar: Presentation and subsequent discussion of the individual research projects.
- Practical: Research projects to be performed in the working group of the respective lecturer.

**Literaturrempfehlungen**
Project-related literature will be announced at the start of the module.

**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**

<table>
<thead>
<tr>
<th>Vorkenntnisse / Previous knowledge</th>
<th>Examination</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<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>
<td>1. Protocol(s) (60 %)</td>
<td>2. Presentation(s) (40 %)</td>
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</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></td>
<td>2.00</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Practical</td>
<td></td>
<td>8.00</td>
<td></td>
<td>112 h</td>
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<tr>
<td>Präsenzzeit Modul insgesamt</td>
<td></td>
<td></td>
<td></td>
<td>140 h</td>
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</table>

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## bio760 - Evolution and Ecology of Plants

<table>
<thead>
<tr>
<th>Module label</th>
<th>Evolution and Ecology of Plants</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio760</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>
</tr>
</tbody>
</table>

### 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.

### Literatureempfehlungen

### Links
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: im 2-Jahres-Zyklus
- 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>Prüfungszeiten</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Report(s) (70 %)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Portfolio (30 %)</td>
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<td></td>
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</tbody>
</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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<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>4.00</td>
<td></td>
<td>56 h</td>
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<tr>
<td>Exercises</td>
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<td>3.00</td>
<td></td>
<td>42 h</td>
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<tr>
<td>Seminar</td>
<td></td>
<td>3.00</td>
<td></td>
<td>42 h</td>
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<tr>
<td>Präsenzzeit Modul insgesamt</td>
<td></td>
<td></td>
<td></td>
<td>140 h</td>
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</table>
### bio770 - Field Methods in Organismic Biology

<table>
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<tr>
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<th>Field Methods in Organismic Biology</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio770</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>

**Ansprechpartner/-in**

- Gerhard Wolfgang Zotz
- Prüfungsberechtigt
- 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

### Literaturempfehlungen

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

### Module level

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### Modulart

je nach Studiengang Pflicht oder Wahlpflicht

### Lern-Lehrform / Type of program

Vorkenntnisse / Previous knowledge

### Examination

<table>
<thead>
<tr>
<th>Examination</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation(s) (30 %)</td>
<td>Laboratory course report on project work (70 %)</td>
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</table>

### Final exam of module

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises</td>
<td></td>
<td>10.00</td>
<td></td>
<td>140 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>0.00</td>
<td>SoSe und WiSe</td>
<td>0 h</td>
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<tr>
<td>Präsenzzeit Modul insgesamt</td>
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<td></td>
<td></td>
<td>168 h</td>
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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

Ansprechpartner/-in:
- Thomas Glatzel

Prüfungsberechtigt:
- 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 (snorkeling/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

Literatureempfehlungen

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!*

*This textbook is information and fun for all readers interested in marine life as well as in the protection of marine environments.*

The textbook for the Mediterranean Sea! The general 1st part provides valuable information on symbioses or feeding types, for example.

*Very compact, explanatory! Not expensive! A must for biological oceanography! Recommended for preparing examinations! Provides basic information!*

*Highly illustrative! Much additional information on different fields! The authors provide a unique ecological approach that helps students understand the real-world relevance of marine biology by exploring how organisms interact within their individual ecosystems.*

*Connecting biological oceanography with theoretical ecology!*

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

Module level ---

Modulart je nach Studiengang Pflicht oder Wahlpflicht

Lern-Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination Prüfungszeiten 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)

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

Course type Comment SWS Frequency Workload attendance

Exercises 9.00 126 h

Seminar 3.00 42 h

Seminar 0.00 SoSe und WiSe 0 h

Präsenzzeit Modul insgesamt 168 h
bio810 - Independent Research

Module label: Independent Research
Module code: bio810
Credit points: 15.0 KP
Workload: 450 h

Used in course of study:
- Master Biologie > Mastermodule

Ansprechpartner/-in:
- Module responsibility
  - Gerhard Wolfgang Zotz
  - Prüfungsberechtigt
  - 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 Master 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 to 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 form of a written report and an oral presentation, both in English.

Literaturempfehlungen:
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:

Examination:

Prüfungszeiten:

Type of examination:
oral presentation (25%),
written project report (75%)

Course type:

Comment:

SWS:

Frequency:

Workload attendance:

Seminar:
1.00
14 h

Practical:
10.00
140 h

Präsenzzeit Modul insgesamt:
154 h
**bio820 - Forschungsmodul Fast Track**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Forschungsmodul Fast Track</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio820</td>
</tr>
<tr>
<td>Credit points</td>
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<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>Ansprechpartner/-in</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>o Georg Martin Klump</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  
++ 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**

**Literaturempfehlungen**

**Links**

**Languages of instruction**

Duration (semesters) 1 Semester

**Module frequency**  unregelmäßig

**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>
</tr>
</thead>
<tbody>
<tr>
<td>written report</td>
</tr>
</tbody>
</table>

**Course type**  

Seminar

**SWS**

Frequency  Workload attendance 0 h
bio840 - Grundmodul - Entwicklungsbiologie und Evolution

Module label
Grundmodul - Entwicklungsbiologie und Evolution

Module code
bio840

Credit points
15.0 KP

Workload
450 h

Used in course of study
• Master Biologie > Mastermodule

Ansprechpartner/-in
Module responsibility
• Ulrike Sienknecht
Prüfungsberechtigt
• 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

Fundamentals and concepts of developmental and evolutionary biology

Module contents
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-ovo live observation; developmental stage discrimination and description, tissue preparation for histology, sectioning, staining, and microscopy

Literaturempfehlungen
Gilbert S.F., Development, Macmillan Publishers Ltd;

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
Prüfungszeiten
Type of examination
Final exam of module
same winter term
oral exam of 30 minutes (70%)
report(s) (30%)

Course type
Comment
SWS
Frequency
Workload attendance
Lecture
3.00
42 h
Exercises
4.00
56 h
Seminar
3.00
42 h
Präsenzzeit Modul insgesamt
140 h
**bio850 - Advanced Development and Evolution of the Auditory System**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Advanced Development and Evolution of the Auditory System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>bio850</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
<td>450 h</td>
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<td>Used in course of study</td>
<td>Master Biologie &gt; Mastermodule</td>
</tr>
<tr>
<td>Ansprechpartner/-in</td>
<td>Ulrike Sienknecht</td>
</tr>
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<td>Prüfungsberechtigt</td>
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<td>Alle hier genannten</td>
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<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></td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td></td>
</tr>
<tr>
<td>++ deepened biological expertise</td>
<td></td>
</tr>
<tr>
<td>++ deepened knowledge of biological working methods</td>
<td></td>
</tr>
<tr>
<td>+ data analysis skills</td>
<td></td>
</tr>
<tr>
<td>++ critical and analytical thinking</td>
<td></td>
</tr>
<tr>
<td>++ independent searching and knowledge of scientific literature</td>
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<td>++ ability to perform independent biological research</td>
<td></td>
</tr>
<tr>
<td>++ data presentation and discussion in German and English (written and spoken)</td>
<td></td>
</tr>
<tr>
<td>+ teamwork</td>
<td></td>
</tr>
<tr>
<td>+ ethics and professional behaviour</td>
<td></td>
</tr>
<tr>
<td>++ project and time management</td>
<td></td>
</tr>
<tr>
<td>Introduction to experimental research work in the field of development and evolution of the auditory system</td>
<td></td>
</tr>
<tr>
<td>Module contents</td>
<td>Research lab, individual or small-group lab projects, participation in the supervisor’s ongoing research, and in the group seminar</td>
</tr>
<tr>
<td>Literaturempfehlungen</td>
<td>Springer Handbook of Auditory Research (SHAR); Sanes et al. eds. Development of the Nervous System, Academic Press; and research papers (original papers and reviews)</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>halbjährlich</td>
</tr>
<tr>
<td>Module capacity</td>
<td>unlimited</td>
</tr>
<tr>
<td>Modulelevel</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></td>
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<tr>
<td>Prüfungszeiten</td>
<td></td>
</tr>
<tr>
<td>Type of examination</td>
<td></td>
</tr>
<tr>
<td>Final exam of module</td>
<td>within 2 months after completion of experimental work</td>
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<tr>
<td></td>
<td>portfolio (presentation, internship report)</td>
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<td>Exercises</td>
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<tr>
<td>SWS</td>
<td>10.00</td>
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<td>Workload attendance</td>
<td>140 h</td>
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Abschlussmodul

mam - Master’s Thesis Module

<table>
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<th>Master’s Thesis Module</th>
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<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
<td>30.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>900 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>Master Biologie &gt; Abschlussmodul</td>
</tr>
</tbody>
</table>

Entry requirements

Skills to be acquired in this module

Module contents

Literaturempfehlungen

Links

Languages of instruction

Duration (semesters) | 1 Semester |

Module frequency

Module capacity | unlimited |

Modullevel | --- |

Modulart | je nach Studiengang Pflicht oder Wahlpflicht |

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination | Prüfungszeiten | Type of examination |
<table>
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<tbody>
<tr>
<td>Final exam of module</td>
<td>G</td>
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</tbody>
</table>

Course type | Seminar |

SWS

Frequency

Workload attendance | 0 h |