Bachelor programme Biological Sciences

List of courses offered in English if international students are enrolled

The duration of each course is 6 weeks, either in the 1st or 2nd half of the semester.

Summer semester

- BSc-Biow-12A - Plant Ecology, 1st half of semester (starting in 2023), 6 ECTS credits
- BSc-Biow-12B - Animal Physiology, 1st half of semester, 6 ECTS credits
- BSc-Biow-13B - Neurobiology I, 2nd half of semester, 6 ECTS credits
- BSc-Biow-13C - Molecular Plant Physiology, 2nd half of semester, 6 ECTS credits

Winter semester

- BSc-Biow-14B - Cell Biology, 1st half of semester, 6 ECTS credits
- BSc-Biow-15A - Evolutionary Biology and Diversity of Animals, 2nd half of semester, 6 ECTS credits
- BSc-Biow-15B - Neurobiology II, 2nd half of semester, 6 ECTS credits

Course descriptions
Course descriptions

BSc-Biow-12A - **Plant Ecology**, 1st half of semester, starting in 2023, 6 ECTS credits

<table>
<thead>
<tr>
<th>BSc-Biow-12A</th>
<th>Plant Ecology</th>
<th>Elective module</th>
<th>6 CP (total) = 180 h</th>
<th>Contact study 4 SWS / 60 h</th>
<th>Self-study 120 h</th>
<th>4 SWS</th>
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**Contents**

The practical course teaches basic methods of plant ecological research using selected native ecosystems as examples. This practical approach serves to deepen the theoretical knowledge acquired in the lecture "Ecology". In addition, characteristic species of the respective ecosystems as well as important indicator species for certain site characteristics are to be learned. Knowledge about the effects of abiotic factors on plant occurrence and performance will be imparted.

**Educational Objectives / Competences**

Students will master key ecological study methods and be familiar with the most important native ecosystems in terms of area. They will recognize selected ecologically significant species (character species of ecosystems, indicator species for specific site characteristics). They will understand the effect of abiotic factors on plant occurrence and performance.

**Requirements for Participation**

Requirement for participation is the successful completion of the modules BSc-Biw-1 (Structure and Function of Organisms), BSc-Biow-6a and BSc-Biow-6b (Diversity of Organisms) and BSc-Biow-9 (Ecology and Evolutionary Biology). Exceptions for students on courses other than BSc Biosciences require approval on a case-by-case basis by the module leader prior to allocation of places.

**Recommended Requirements**

Successful completion of the module BSc-Biow-11 (Plant Physiology and Microbiology).

**Special notes**

In the case of field work, travel costs may be incurred by the internship participants. Since part of the internship will be conducted in the field, participants are advised to get immunized against TBE in time by vaccination.

**Dates and Module Frequency**

Once a year in the summer semester.

**Duration**

1/2 semester

**Module responsible**

Prof. Dr. J.F. Niek Scheepens

**Proof of participation**

Active participation in the practical course

**Course Assessment**

Protocols

**Forms of Teaching**

Practical course, seminar

**Module Completion Test**

none

**Module Completion Test consists of:**

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BSc-Biow-12B - Animal Physiology, 1st half of semester, 6 ECTS credits

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Contents
The practical course provides insights into experimental investigation methods for comparative physiology in humans and animals (e.g. energy balance, excretion, blood, circulation, respiration, musculature and nutrition)

Educational Objectives / Competences
Students will master important physiological investigation methods in the laboratory. They are able to evaluate evolutionary adaptation strategies and their individual development and know the importance of abiotic factors on reaction mechanisms and their selective effect on competition.

Requirements for Participation
Requirement for participation is the successful completion of the modules BSc-Biow-1 (Structure and Function of Organisms), BSc-Biow-6a and BSc-Biow-6b (Diversity of Organisms) and BSc-Biow-7 (Biochemistry and Animal Physiology).

Recommended Requirements

Special notes

Dates and Module Frequency
Once a year in the summer semester.

Duration
1/2 semester

Module responsible
Prof. Dr. Sven Klimpel

Proof of Study

Proof of participation
Active participation in the practical course

Course Assessment
Protocols

Forms of Teaching
Practical course, seminar

Module Completion Test consists of:

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BSc-Biow-13B - **Neurobiology I**, 2nd half of semester, 6 ECTS credits

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<td>Contact study 4 SWS / 60 h</td>
<td>Self-study 120 h</td>
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### Contents

Teaching and learning of basic methods of neurobiology, including histological examinations of nervous tissue and of sensory organs, basic electrophysiological experimental setups, psychophysical approaches to examination, simulation of neuronal activity.

### Educational Objectives / Competences

Students will learn basic neurobiological working methods to understand experimental approaches in neurobiology and to prepare for an appropriate bachelor thesis.

### Requirements for Participation

Requirement for participation is the successful completion of the modules BSc-Biow-1 (Structure and Function of Organisms), BSc-Biow-6a and BSc-Biow-6b (Diversity of Organisms) and BSc-Biow-10 (Neurobiology, Cell and Developmental Biology).

### Recommended Requirements

### Special notes

### Dates and Module Frequency

Once a year in the summer semester.

### Duration

1/2 semester

### Module responsible

Prof. Dr. Bernd Grünwald, PD Dr. Bernhard Gaese

### Proof of Study

Active participation in the practical course

### Course Assessment

Protocols

### Forms of Teaching

Practical course, seminar

### Module Completion Test

Module Completion Test consists of:

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## Course Assessment

Protocols

## Forms of Teaching

Practical course, seminar
BSc-Biow-13C - Molecular Plant Physiology, 2nd half of semester6 ECTS credits

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<td>120 h</td>
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Contents
Teaching and learning of basic methods in molecular plant physiology and developmental physiology, including basic methods of plant biochemistry and methods to examine metabolic regulation.

Educational Objectives / Competences
Students possess practical skills in basic laboratory techniques in plant physiology, biochemistry and biophysics. In addition, students have the ability to quantitatively analyse and to critically evaluate experimental data. They are trained in experimental concepts as a prerequisite for a corresponding bachelor thesis.

Requirements for Participation
Prerequisite for participation is the successful completion of the modules BSc-Biow-1 (Structure and Function of Organisms), BSc- Biow-6a and BSc-Biow-6b (Diversity of Organisms) and the successful completion of the module BSc-Biow-11 (Plant Physiology and Microbiology).

Recommended Requirements
Successful completion of modules BSc-Biow-2a and -2b (General and Inorganic Chemistry), BSc-Biow-3a and -3b ("Organic Chemistry for Natural Scientists and Teachers L2") and BSc-Biow-5 (Statistics).

Special notes

Dates and Module Frequency
Once a year in the summer semester.

Duration
1/2 semester

Module responsible
Prof. Dr. Claudia Büchel

Proof of Study

Course Assessment
Protocols

Forms of Teaching
Practical course, seminar

Module Completion Test
none

Module Completion Test consists of:

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Proof of participation
Active participation in the practical course
In the practical course, typical experimental approaches of the subject are carried out in practice. This includes e.g. different microscopic procedures, staining techniques and use of low molecular weight substances to influence cellular functions.

The students know the structure of eukaryotic and prokaryotic cells and understand the function of the different cell components. They acquire in-depth knowledge of different cell types, their differentiation and development.

Requirement for participation is the successful completion of the modules BSc-Biow-1 (Structure and Function of Organisms), BSc-Biow-6a and BSc-Biow-6b (Diversity of Organisms) and BSc-Biow-10 (Neurobiology, Cell and Developmental Biology).

Successful completion of the module BSc-Biow-7 (Biochemistry and Animal Physiology).

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## Contents

In this module different contents of evolutionary biology and biodiversity of animal organisms are presented exemplarily. On the one hand, this is done through laboratory practical courses (possibly also in the field), which include a demonstration and explanation part, but also practical components to be carried out independently. On the other hand, exercises, statistical calculations and drawing-graphical implementations are also trained. The students receive basic theoretical introductions to the respective topic of the day and are stimulated in discussion or seminar rounds to penetrate the content of the material. The content and the model organisms come predominantly from the research areas of the participating lecturers (vertebrates, invertebrates, data sets from research projects, others), whereby the students at the same time gain an insight into their respective research field and the project-specific analysis approaches.

## Educational Objectives / Competences

The students are able to realistically assess the biological diversity in the animal kingdom, how it is represented within species and between species. They will be able to independently formulate (within the context of the examples covered) approaches to analysis in evolutionary biology and evaluate results. They will be familiar with selected laboratory and computational techniques used for analyses of evolutionary and behavioral biology, evolutionary ecology and phylogeny, and biodiversity, communities, and populations.

## Requirements for Participation

Requirement for participation is the successful completion of the modules BSc-Biow-1 (Structure and Function of Organisms), BSc-Biow-6a and BSc-Biow-6b (Diversity of Organisms) and BSc-Biow-9 (Ecology and Evolutionary Biology).

## Recommended Requirements

For some of the module days, appropriate dissecting equipment should be kept on hand. Some of the content involves work and analysis on PCs. In case of field work, minor travel costs may be incurred (no overnight stays). For organizational reasons, the module may be offered as a block course in the intermediate semester.

## Dates and Module Frequency

Once a year in the winter semester.

## Module responsible

Prof. Dr. Henner Hollert

## Proof of Study

Active participation in the practical course

## Forms of Teaching

Practical course, exercises, seminar

## Module Completion Test

None

## Module Completion Test consists of:

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<tr>
<th>LV-Form</th>
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### Notes

- Requirement for participation is the successful completion of the modules BSc-Biow-1 (Structure and Function of Organisms), BSc-Biow-6a and BSc-Biow-6b (Diversity of Organisms) and BSc-Biow-9 (Ecology and Evolutionary Biology).
- For some of the module days, appropriate dissecting equipment should be kept on hand. Some of the content involves work and analysis on PCs. In case of field work, minor travel costs may be incurred (no overnight stays). For organizational reasons, the module may be offered as a block course in the intermediate semester.
- Once a year in the winter semester.
- Proof of participation: Active participation in the practical course.
- Forms of Teaching: Practical course, exercises, seminar.
- Module Completion Test: None.
- Module Completion Test consists of:
  - Evolution and Diversity of Animals: P, CP 3, Semester 5, X
  - Evolution and Diversity of Organisms: S, CP 1, Semester 1, X
  - Module examination: None
  - Sum: CP 4, Semester 6
### Contents

Basic methods of neurobiology are applied practically. The main focus is on cellular and molecular neurobiology.

### Educational Objectives / Competences

The students acquire an overview of the molecular functions of nerve cells and their interactions by using cell biological and molecular biological examination techniques including neurons in culture, 2D and 3D analysis of mouse brain.

### Requirements for Participation

Requirement for participation is the successful completion of the modules BSc-Biow-1 (Structure and Function of Organisms), BSc-Biow-6a and BSc-Biow-6b (Diversity of Organisms) and BSc-Biow-10 (Neurobiology, Cell and Developmental Biology).

### Recommended Requirements

None

### Dates and Module Frequency

Once a year in the winter semester.

### Duration

1/2 semester

### Module responsible

Prof. Dr. Amparo Acker-Palmer

### Proof of Study

None

### Proof of participation

Active participation in the practical course

### Course Assessment

Protocols

### Forms of Teaching

Practical course, seminar

### Module Completion Test

Module Completion Test consists of:

<table>
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