Module handbook

for the degree programme

Master of Science (M.Sc.)

BioGeosciences

Version number: 20187-2

(valid from the winter semester 2026/27)

at the

Koblenz

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Programme description:

1. Contact persons for individual modules of the Master's programme

BioGeosciences: Prof. Dr K. Fischer Geography: Prof. Dr B. Köppen
Biology: Prof. Dr E. Fischer

2. Courses, assessments and examination-related academic achievements

The courses offered on the Master's programme are divided into a compulsory core component and a flexible elective component. The compulsory core component consists of seven modules taught in English, totalling 48 ECTS credits. The compulsory elective section comprises 16 modules, 7 of which – totalling 42 ECTS – can be freely chosen from the range of courses offered by the Departments of Biology and Geography at the University of Koblenz-Landau. The modules are designed so that they can generally be completed within one semester, including the module examinations. A further 30 ECTS are awarded for the MSc dissertation, including the final examination.

Assessment for the individual courses may, depending on the module, take the form of final module examinations or partial module examinations in the form of written examinations, oral examinations or term papers (for details, see the Examination Regulations and Section 7 of the module handbook). The dates of the examinations will be announced at the start of the first teaching session of the module. Module final examinations are held at the end of the lecture period of the semester in which the relevant teaching sessions took place. Candidates must register for one of the two examination dates no later than two weeks before the first examination date. If a candidate fails to withdraw from the examination or
failure to attend the examination, the module examination is deemed to have been failed on the first attempt. An assessment marked as 'unsatisfactory' may be retaken twice. If the second retake is also not marked at least 'satisfactory' (4.0), the module is deemed definitively not to have been passed; a further retake of the same module is not permitted. If this occurs in the case of a compulsory module, the degree cannot be awarded.

The headings of the module descriptions below provide details of the type and title of the module, the ECTS credits to be earned, the number of weekly contact hours per semester, the workload and the frequency of the course. The courses are categorised as lectures (V), laboratory exercises (LÜ), field exercises (FÜ), excursions (E), practicals (P), projects (Pro) and seminars (S). Section 2 describes the expected learning outcomes and the subject-specific competences that students are expected to acquire by the end of their degree programme, to which each module contributes in a specific way.

Section 3, ‘Contents’, contains a brief description of the main topics covered in the courses.
This is followed by further details on the frequency, entry requirements, assessment methods, language of instruction, reading list, departments involved and the module coordinators.

Enrolment in the compulsory modules does not require any prior knowledge beyond that acquired during the Bachelor’s programme, whilst some compulsory-elective modules require the successful completion of other modules or evidence of the necessary knowledge obtained elsewhere.

The third semester may be used as a semester abroad following consultation with and prior approval by the Examination Board. The ECTS credits earned at the host university will be recognised in the compulsory-elective area up to a maximum of 30 ECTS. The Master’s thesis may also be completed abroad, subject to agreement with the Examination Board.

3. Competences and key qualifications

Graduates of the Master’s programme are expected to acquire the following competences and key qualifications during the course of their studies:

I. Subject-specific qualifications

1.1 Ability to identify and analyse complex (landscape) ecological relationships
1.2 Ability to assess the current state of limnic-terrestrial ecosystems and to forecast changes therein
1.3 Ability to collect valid scientific data in the field and in the laboratory
1.4 Ability to work with databases, to process data statistically and to present it in the form of tables, diagrams, maps and text
1.5 In-depth knowledge of biology and ecology
1.6 In-depth knowledge of geo-ecology, physical geography and human geography
1.7 Ability to balance ecological and socio-economic requirements
1.8 Ability to conduct research in the field of biogeosciences

II. Social and communication skills

2.1 Ability to work in a team
2.2 Ability to present the results of scientific analyses and forecasts in writing and orally
2.3 Ability to present the results of scientific analyses and forecasts in writing and orally in English

4. Study Plan

The following study plan is a suggested outline showing how the standard duration of study can be adhered to by appropriately distributing compulsory and compulsory-elective modules. The plan shown here is an example for students commencing their studies in the summer semester.

Semester	Code	Module	LP
1 (SS)	03BI2328	Conservation Biology	6
1 (SS)	03BI2329	Diversity of Angiosperms	6
1 (SS)	03GE2330	Methods in Geoecology	6
1 (SS)		Compulsory elective module	12
		Total	**30**
2 (WS)	03GE2331	Physical Geography	6
2 (WS)	03BI2330	Aquatic Ecology and Management (Part 1: 3223301)	3
2 (WS)		Compulsory elective module	21
		Total	**30**
3 (SS)	03GE2314	Landscape Ecology	6
2 (WS)	03BI2330	Aquatic Ecology and Management (Part 2: 3223302)	3
3 (SS)	03XX2302	Research Practical	12
3 (SS)		Compulsory elective module	9
		Total	**30**
4 (winter semester)	03XX2390	Master's thesis in BioGeosciences	27
4 (winter semester)	03XX2399	Final oral examination	3
		Total	**30**
		Total	**120 LP**

Module description: BioGeosciences Table of contents

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Compulsory elective area

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Master's thesis

03XX2390	Master's thesis in BioGeosciences	76
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Compulsory modules

To successfully complete the Master's programme, students must achieve a minimum of 120 credit points, of which 78 credit points must be from compulsory modules (including the Master's thesis and oral examination).

Module 01 **03BI2328**	**Conservation Biology**								6 credit points Compulsory module
Workload 180 hours				**Semester** 1st semester (recommended)			**Duration** 1 semester		
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	1.1	V	Conservation Biology	3223281	Compulsory	2 contact hours per week 30 hours	60 hours	30	3
	1.2	S	Conservation Biology	3223282	Compulsory	2 SWS 30 hours	60 hours	30	3

2 **Learning outcomes / competences**

3223281 - Conservation Biology (V)

The students

- gain in-depth knowledge of the field of conservation biology and the associated challenges.

3223282 - Conservation Biology (S)

The students

- are able to critically analyse primary scientific literature in the context of conservation biology and to summarise the key findings in a scientific presentation.

3 **Contents**

3223281 - Conservation Biology (V)

- Introduction to Conservation Biology
- Threats to Biodiversity
- Habitat Degradation, Loss and Fragmentation
- Habitat Fragmentation
- Overexploitation
- Invasive Species
- Biological Impacts of Climate Change
- Conservation genetics
- Species- and Landscape-Based Approaches to Conservation
- Goals, Limitations and Design of Protected Areas
- Corridors in Conservation Biology

3223282 - Conservation Biology (S)

- Reading and discussing primary scientific literature in the context of conservation biology.
- Delivering a scientific presentation on selected topics within the field of conservation biology.

4 **Frequency of offering**

offered only in the summer term

3223281 - Conservation Biology (V)

	offered in the summer semester only **3223282 - Conservation Biology (S)** offered in the summer semester only
5	**Language of instruction** **3223281 - Conservation Biology (V)** English **3223282 - Conservation Biology (S)** English
6	**Entry requirements** None
7	**Examination formats** Module examination in Conservation Biology: written examination (60 mins)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223281 - Conservation Biology (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223282 - Conservation Biology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography** • Groom, Meffe, Carroll: Principles of Conservation Biology. Sinauer Associates Inc.; • Pullin: Conservation Biology. Cambridge; • Primack: Essentials in Conservation Biology. Sinauer Associates Inc.;
13	**Use in the degree programme** M.Sc. BioGeoSciences (20187)
14	**Further information** **3223281 - Conservation Biology (V)** This course can be included and credited towards Module 13 of the Master of Education in Biology for Upper Secondary School Teacher Training. **3223282 - Conservation Biology (S)**

	This course can be included and credited towards Module 13 of the teacher-training Master of Education in Biology for Upper Secondary Schools.

Module 02 03BI2329	Diversity of Angiosperms	6 credit points Compulsory module

Workload 180 hours	Semester 1st semester (recommended)	Duration 1 semester

1	Courses				Compulsory/Compulsory elective	Contact hours	Self-study	Planned group size	LP
	2.1	V	Diversity of Angiosperms	3223291	Compulsory	2 contact hours per week 30 hours	60 hours	30	3
	2.2	LÜ	Diversity of Angiosperms	3223292	Compulsory	2 contact hours per week 30 hours	60 hours	30	3

2 **Learning outcomes / competences**

3223291 - Diversity of Angiosperms (V)

The students

- gain in-depth knowledge of the phylogeny and diversity of angiosperms.

3223292 - Diversity of Angiosperms (LÜ)

The students

- are able to critically analyse the phylogeny of angiosperms and to identify groups that serve as sensitive bioindicators and are suitable for a Rapid Biodiversity Assessment

3 **Contents**

3223291 - Diversity of Angiosperms (V)

- Introduction to phylogenetic methods: Autapomorphic characters of angiosperms
- Molecular systematics of angiosperms and their importance for phylogenetic systematics
- Pollination as a driver of angiosperm evolution
- Basal angiosperms (Magnoliidae)
- Magnolianae (basal ‘dicotyledoneae’)
- Lillianae (“Monocotyledoneae”)
- Rosidae (more highly evolved “dicotyledoneae”)

3223292 - Diversity of Angiosperms (LÜ)

- Practical examination of living plants
- Overview of the angiosperms
- Reflection on autapomorphic and synapomorphic characters
- Identification of plant families
- Identification of bioindicators in tropical environments
- Identification of plant groups suitable for Rapid Biodiversity Assessment
- Examination of different pollination syndromes

4 **Frequency of the course**

offered in the summer term only

3223291 - Diversity of Angiosperms (V)

offered in the summer term only

3223292 - Diversity of Angiosperms (LÜ)

	offered only in the summer term
5	**Language of instruction** **3223291 - Diversity of Angiosperms (L)** English **3223292 - Diversity of Angiosperms (LÜ)** English
6	**Entry requirements** None
7	**Assessment methods** Module examination on 'Diversity of Angiosperms' as a term paper (written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Eberhard Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223291 - Diversity of Angiosperms (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223292 - Diversity of Angiosperms (LÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Further reading** To be announced in the relevant courses.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information** **3223291 - Diversity of Angiosperms (V)** This course can be included and credited towards Module 13 of the Master of Education in Biology for Upper Secondary School Teacher Training. **3223292 - Diversity of Angiosperms (LÜ)** This course can be included and credited towards Module 13 of the teacher-training Master of Education in Biology for Upper Secondary Schools.

Module 03 03BI2330	Aquatic Ecology and Management	6 credit points Compulsory module

Workload 180 hours	Semester N/A	Duration 2 semesters

1	Courses				Compulsory/Compulsory elective	Contact hours	Self-study	Planned group size	LP
	3.1	V	Aquatic Ecology	3223301	Compulsory	2 contact hours per week 30 hours	60 hours	60	3
	3.2	V	Management of Inland Waters	3223302	Compulsory	2 contact hours per week 30 hours	60 hours	60	3

2 **Learning outcomes / competences**

3223301 - Aquatic Ecology (V)

The students

- understand the identity and capabilities of key eukaryotic and prokaryotic organisms in the aquatic food web
- have advanced knowledge of the important functions and ecosystem services of aquatic ecosystems
- are able to assess the impact of anthropogenic stressors on the integrity of freshwater ecosystems
- are able to apply their knowledge of mutualistic interactions in freshwater ecosystems to practical environmental issues

3223302 - Management of Inland Waters (V)

The students

- gain a basic understanding of data management and handling
- are able to document the steps involved in data processing and to create metadata
- are familiar with general and statistical models and can apply general concepts in theoretical aquatic ecology
- are familiar with the basic regulatory concepts of water management in Germany and the EU

3 **Course content**

3223301 - Aquatic Ecology (V)

- Advanced concepts relating to the structure and function of aquatic ecosystems (pelagic and benthic food webs, hydromorphology, environmental conditions) in freshwater systems
- Functions and ecosystem services of aquatic ecosystems (ecophysiology, species interactions, fluxes of matter and energy)
- Mutualistic interactions between organisms in freshwater ecosystems
- Impact of direct and indirect stressors in the aquatic environment
- Preservation of biodiversity in water bodies under anthropogenic stressors

3223302 - Management of Inland Waters (V)

- Basic concepts in the acquisition, access, structuring, architecture, quality assurance, processing and storage of data
- Introduction to the basic concepts of data processing and modelling software
- Introduction to multivariate statistics and ecological modelling
- Concepts in theoretical aquatic ecology
- Regulatory concepts in environmental management

4 **Frequency of the course**

From the winter semester

	3223301 - Aquatic Ecology (V) Winter semester only **3223302 – Management of Inland Waters (V)** only in the summer semester
5	**Language of instruction** **3223301 - Aquatic Ecology (V)** English **3223302 - Management of Inland Waters (V)** English
6	**Entry requirements** None
7	**Examination formats** Module component examination 3223301: Aquatic Ecology – written examination (45 mins) Module component examination 3223302: Management of Inland Waters – written examination (45 mins)
8	**Requirements for the award of credit points 3223301 – Aquatic Ecology (V)** Passing the module component examination **3223302 – Management of Inland Waters (V)** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Kenneth Dumack
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223301 - Aquatic Ecology (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223302 - Management of Inland Waters (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography** Details of the reading list are updated at the start of each course.
13	**Use in degree programmes** M.Sc. BioGeoSciences (20187) M.Sc. Applied Natural Sciences (20193)

	M.Sc. Hydrology and Water Management (20233)
14	**Further information 3223301 – Aquatic Ecology** **(V)** This course can be included and credited towards Module 13 of the teacher training programme Master of Education in Biology for Upper Secondary Schools. **3223302 – Management of Inland Waters (L)** This course can be included and credited towards Module 13 of the teacher-training Master of Education in Biology for Upper Secondary Schools.

Module 04 **03GE2330**	**Methods in Geoecology**	6 credit points Compulsory module

Workload 180 hours	**Semester** 1st semester (recommended)	**Duration** 1 semester

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	4.1	S	Methods in Geoecology	3423301	Compulsory	1 SWS 15 hours	45 hours	30	2
	4.2	P	Methods in Geoecology	3423302	Compulsory	3 contact hours per week 45 hours	75 hours	30	4

2 **Learning outcomes / competences**

3423301 - Methods in Geoecology (S)

The students

- gain a basic understanding of the assessment of geoecological structures and processes in the field
- gain a structured theoretical overview of various geoecological field methods
- are able to select suitable geoecological laboratory methods for addressing specific questions in geoecology and landscape ecology
- gain knowledge of field and laboratory methods for the advanced monitoring of relief, soil, climate and water parameters

3423302 - Methods in Geoecology (P)

The students

- learn methods for processing and interpreting landscape data
- interpret the results of selected geoecological field methods
- are able to carry out selected geoecological field methods independently
- develop the ability to plan field campaigns – from the selection and design of methods and the implementation of field measurements to data analysis and interpretation.

3 **Contents**

3423301 - Methods in Geoecology (S)

- field and laboratory methods in geomorphology, hydrology, soil science and climatology
- geoecological field studies
- landform parameters
- soil profiles and soil properties
- runoff and sediment transport

3423302 - Methods in Geoecology (P)

- laboratory methods
- selected field methods in soil science
- selected field methods in geomorphology
- selected field methods in hydrology
- selected field methods in climatology
- Selection and design of methods
- carrying out field measurements
- data analysis and interpretation

4 **Frequency of the course**

	offered only in the summer term **3423301 - Methods in Geoecology (S)** offered in the summer semester only **3423302 – Methods in Geoecology (P)** offered in the summer semester only
5	**Language of instruction** **3423301 - Methods in Geoecology (S)** English **3423302 - Methods in Geoecology (P)** English
6	**Entry requirements** None
7	**Assessment methods** Module examination in 'Methods in Geoecology' as a written assignment (2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Dr Julian Zemke
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423301 - Methods in Geoecology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423302 - Methods in Geoecology (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** To be announced in the relevant courses.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Other information**

Module 05 **Landscape Ecology** 6 credit points
03GE2314 Compulsory module

Workload	**Semester**	**Duration**
180 hours	3rd semester (recommended)	1 semester

1 **Courses**

					Compulsory/Compulsory elective	**Contact hours**	**Self-study**	**Planned group size**	**LP**
5.1	S	Practical Internship in Landscape Ecology	3423141	Compulsory	1 SWS 15 hours	45 hours	30	2
5.2	P	Practical Internship in Landscape Ecology	3423142	Compulsory	3 SWS 45 hours	75 hours	30	4

2 **Learning outcomes / competences**

3423141 - Practical Internship in Landscape Ecology (S)

The students

- gain in-depth knowledge of the interactions within landscape ecosystems
- are able to plan and design a geo-ecological site investigation
- evaluate ecosystems in their interaction with different spheres (e.g. the pedosphere, hydrosphere, atmosphere, biosphere and lithosphere)

3423142 - Practical Placement in Landscape Ecology (P)

The students

- are able to carry out an independent geo-ecological site investigation
- can select and evaluate the methods required for a geo-ecological site investigation
- can compile the results of an independently conducted site investigation and present them in a scientific paper

3 **Course content**

3423141 - Practical Placement in Landscape Ecology (S)

- soils and substrates of different ecosystems
- spatial and temporal variations in geo-ecological processes
- Ecosystem interactions between different spheres (in the context of the pedosphere and hydrosphere)

3423142 - Practical Internship in Landscape Ecology (P)

- Causes and effects of geo-ecological processes
- Water and material balance and its dynamics
- Ways to protect soils and water
- Resource conservation and sustainability

4 **Frequency of the course**

offered only in the summer term

3423141 - Practical Internship in Landscape Ecology (S)
offered in the summer term only

3423142 – Practical Internship in Landscape Ecology (P)
offered in the summer semester only

5 **Language of instruction**

	3423141 - Practical Internship in Landscape Ecology (S) English **3423142 - Practical Internship in Landscape Ecology (P)** English
6	**Entry requirements** None
7	**Assessment methods** Module examination in Landscape Ecology as a term paper (written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Dr Julian Zemke
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423141 - Practical Internship in Landscape Ecology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423142 - Practical Internship in Landscape Ecology (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** To be announced in the relevant courses.
13	**Use in degree programme** M.Sc. BioGeo Sciences (20125) M.Sc. BioGeo Sciences (20125) M.Sc. BioGeo Sciences (20187) M.Sc. BioGeo Sciences (20177) M.Sc. BioGeo Sciences (20177)
14	**Other information**

Module 06 **Physical Geography** 6 credit points
03GE2331 Compulsory module

Workload	**Semester**	**Duration**
180 hours	2nd semester (recommended)	1 semester

1

Courses				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
6.1	S	Field Studies: Soil, Water and Climate	3423311	Compulsory	1 SWS 15 hours	45 hours	30	2
6.2	P	Field Studies: Soil, Water and Climate	3423312	Compulsory	3 contact hours per week 45 hours	75 hours	30	4

2 **Learning outcomes / competences**

3423311 - Field Studies: Soil, Water and Climate (S)

The students

- gain a deeper understanding of runoff processes in a low-mountain drainage basin
- are able to apply the concept of water body structure quality mapping
- gain in-depth knowledge of the processes that influence soil, water and climate properties
- are able to analyse climate change processes

3423312 - Field Studies: Soil, Water and Climate (P)

The students

- can independently carry out and evaluate experiments on current scientific topics in soil, water and climate science (in the field and in the laboratory)
- acquire the ability to design, conduct, discuss and present a scientific paper on topics in soil, water and climate science
- are able to plan and carry out research work in the field
- acquire the ability to design, conduct, discuss and present a scientific study on hydrological, soil and climate topics

3 **Contents**

3423311 - Field Studies in Soil, Water and Climate (S)

- Chemical, physical and biological processes in soils, water and climate
- Field and laboratory tests
- Planning and design of soil sampling and laboratory tests
- runoff processes
- runoff-relevant parameters
- Water body structure and quality / mapping
- decentralised flood protection measures
- climate change parameters

3423312 - Field Studies: Soil, Water and Climate (P)

- Planning, design and implementation of an independent research project
- Conducting and evaluating soil, water and climate science experiments
- Statistical analysis of the results
- Data interpretation and presentation
- Synthesis and final presentation of an independent research project

4	**Frequency of the course** offered only in the winter semester **3423311 - Field Studies: Soil, Water and Climate (S)** offered only in the winter semester **3423312 - Field Studies: Soil, Water and Climate (P)** Only in the winter semester
5	**Language of instruction** **3423311 - Field Studies: Soil, Water and Climate (S)** English **3423312 - Field Studies: Soil, Water and Climate (P)** English
6	**Entry requirements** None
7	**Assessment methods** Module examination in Physical Geography as a term paper (written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Dr Julian Zemke
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences -> Institute for Integrated Natural Sciences -> Department of Geography **3423311 - Field Studies: Soil, Water and Climate (S)** Faculty 3: Mathematics/Natural Sciences -> Institute for Integrated Natural Sciences -> Department of Geography **3423312 - Field Studies: Soil, Water and Climate (P)** Faculty 3: Mathematics/Natural Sciences -> Institute for Integrated Natural Sciences -> Department of Geography
12	**Reading list** To be announced in the relevant courses.
13	**Use in degree programmes** M.Sc. BioGeoSciences (20187) M.Sc. Applied Natural Sciences (20193)
14	**Other information**

Module 07 **Research Practical** 12 credit points
03XX2302 Compulsory module

Two of the following courses must be chosen: either 3223021 and 3223022 or 3423021 and 3423022

Workload	**Semester**	**Duration**
360 hours	3rd semester (recommended)	1 semester

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	7.1	S	Research Practical with a focus on Biology	3223021	Compulsory elective	1 SWS 15 hours	45 hours	30	2
	7.2	Per	Research Practical with a focus on Biology	3223022	Compulsory elective	0 SWS 0 hours	300 hours	1	10
	7.3	S	Research Practical with a focus on Geography	3423021	Compulsory elective	1 SWS 15 hours	45 hours	30	2
	7.4	Per	Research Practical with a focus on Geography	3423022	Compulsory elective	0 SWS 0 hours	300 hours	1	10

2 **Learning outcomes / competences**

3223021 - Research Practical with a focus on Biology (S)

The students

- are able to read, understand and critically analyse primary scientific articles relevant to selected topics within the field of biology;
- are able to extract the key findings from scientific articles and present them in a scientific presentation.

3223022 - Research Practical with a focus on Biology (Pro)

The students

- acquire comprehensive knowledge of literature searches and are able to compile the relevant literature on a specific research topic,
- gain in-depth theoretical and practical knowledge of selected topics within the field of biology relevant to the research practical,
- gain extended knowledge of experimental design, hypothesis testing, data collection and analysis, as well as scientific writing.

3423021 - Research Practical with a focus on Geography (S)

The students

- are able to read, understand and critically analyse primary scientific articles relevant to selected topics within the field of geography,
- are able to extract the key findings of scientific articles and present them in a scientific presentation.

3423022 - Research Practical with a focus on Geography (Pro)

The students

- gain comprehensive knowledge of literature searches and are able to compile the relevant literature on a specific research topic,

	• gain in-depth theoretical and practical knowledge of selected topics within the field of geography relevant to the research practical, • gain advanced knowledge of experimental design, hypothesis testing, data collection and analysis, as well as scientific writing.
3	**Contents** **3223021 – Research Practical with a focus on Biology (S)** Reading and discussing primary scientific articles relevant to selected topics within the field of biology. Presenting the key findings of selected scientific articles in a scientific presentation. **3223022 - Research Practical with a focus on Biology (Pro)** • Literature search • Developing an experimental design to test a specific hypothesis • Collecting and analysing data within a defined research project • Presenting the data collected in the form of a journal-style paper **3423021 - Research Practical with a focus on Geography (S)** Reading and discussing primary scientific articles relevant to selected topics within the field of geography. Presenting the key findings of selected scientific articles in a scientific presentation. **3423022 - Research Practical with a focus on Geography (Pro)** • Literature search • Developing an experimental design to test a specific hypothesis • Collecting and analysing data within a defined research project • Presenting the data collected in the form of a journal-style paper
4	**Frequency of the course** Every semester **3223021 - Research Practical with a focus on Biology (S)** Every semester **3223022 - Research Practical with a focus on Biology (Pro)** Every semester **3423021 - Research Practical with a focus on Geography (S)** every semester **3423022 - Research Practical with a focus on Geography (Pro)** Every semester
5	**Language of instruction** **3223021 - Research Practical with a focus on Biology (S)** English **3223022 - Research Practical with a focus on Biology (Pro)** English **3423021 - Research Practical with a focus on Geography (S)** English **3423022 - Research Practical with a focus on Geography (Pro)**

	English
6	**Entry requirements** None
7	**Assessment methods** Module examination: Research Practical as a term paper (written – 4 weeks) **3223021 – Research Practical with a focus on Biology (S)** Coursework: Seminar presentation (oral – 20 mins) **3423021 – Research Practical with a focus on Geography (S)** Coursework: Seminar presentation (oral – 20 mins)
8	**Requirements for the award of credit points** Passing the module examination **3223021 – Research Practical with a focus on Biology (S)** Passing the course **3423021 – Research Practical with a focus on Geography (S)** Passing the coursework
9	**Weighting of the final mark** 12/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3223021 - Research Practical with a focus on Biology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223022 - Research Practical with a focus on Biology (Pro)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3423021 - Research Practical with a focus on Geography (S)**

	Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423022 - Research Practical with a focus on Geography (Pro)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Bibliography** Specific, depending on the topic. Based on your own literature search.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Other information**

Compulsory elective area

To successfully complete the Master's programme, students must earn at least 120 credit points, of which 42 credit points must be from modules in the compulsory elective area.

In the Master's programme, a maximum of 4 case studies may be taken (i.e. a maximum of 4 of the following modules: 03BI2333, 03BI2334, 03BI2335, 03BI2336, 03GE2337, 03GE2338, 03GE2339) and only one of the modules

03BI2332 and 03GE2332.

Module 08 **03BI2346**	**Biology 1**							6 credit points Compulsory module
Workload 180 hours		**Semester** 1st semester (recommended)			**Duration** 1 semester			
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	8.1	V	Compulsory elective module with topics changing each semester	3221231	Elective-compulsory	2 SWS 30 hours	60 hours	90	3
	8.2	V	Elective lectures on topics that vary from semester to semester	3223381	Elective-compulsory	2 SWS 30 hours	60 hours	90	3
	8.3	S	Compulsory elective module with topics changing each semester	3221232	Elective-compulsory	2 SWS 30 hours	60 hours	25	3
	8.4	S	Elective lectures on topics that vary from semester to semester	3223382	Elective-compulsory	2 SWS 30 hours	60 hours	25	3
	8.5	LÜ	Compulsory elective module with topics changing each semester	3221233	Elective-compulsory	2 SWS 30 hours	60 hours	20	3
	8.6	LÜ	Elective lectures on topics that vary from semester to semester	3223383	Elective-compulsory	2 SWS 30 hours	60 hours	20	3
	8.8	FÜ	Compulsory elective module with topics changing each semester	3213331	Elective-compulsory	2 SWS 30 hours	60 hours	15	3
2	**Learning outcomes / competences**								

3221231 – Compulsory elective module with topics changing each semester (V)

Students

- will have in-depth knowledge of biological topics, e.g. within the fields of botany, zoology and microbiology.

3223381 – Elective lectures with topics that change each semester (V)

The students

- have in-depth knowledge of biological topics.

3221232 - Compulsory elective course with topics that change each semester (S)

	The students • have in-depth knowledge of biological topics, e.g. within the fields of botany, zoology and microbiology. • are able to familiarise themselves with the scientific principles underlying experiments with the aid of specialist literature and to deliver a scientific presentation on a biological topic in any area of specialisation. **3223382 - Elective lectures with topics changing each semester (S)** The students • have in-depth knowledge of biological topics. **3221233 - Compulsory elective course with topics changing each semester (LÜ)** The students • have in-depth knowledge of biological topics, e.g. within the fields of botany, zoology and microbiology. • are able to plan and carry out scientific experiments under supervision, and to present and interpret the results **3223383 - Elective lectures with topics that change each semester (LÜ)** The students • have in-depth knowledge of biological topics. **3213331 - Compulsory elective course with topics changing each semester (FÜ)** The students • acquire in-depth specialist knowledge on selected topics in field ecology.
3	**Contents** **3221231 – Compulsory elective module with topics changing each semester (V)** In-depth subject-specific knowledge in biology: botany, for example: • Biology and ecology of mosses • Bioindication • Biology and ecology of algae • Biology and ecology of fungi • Biology and ecology of native ferns and flowering plants Zoology, for example: • Population ecology • Behavioural physiology • Limnoecology • Ecology and functional morphology • Faunistic and ecological studies Microbiology, for example:

- Biotechnology
- Ecotoxicology
- Physiology
- Environmental microbiology

3223381 - Elective lectures with topics that change each semester (V)

- Specialised English terminology in biology
- Advanced subject-specific knowledge in biology:

Advanced subject-specific knowledge in biology; examples:

Botany, for example:

- Biology and ecology of mosses
- bioindication
- Biology and ecology of algae
- Biology and ecology of mushrooms
- Biology and ecology of native ferns and flowering plants Zoology, for example:

- Population ecology
- Behavioural physiology
- Aquatic ecology
- Ecology and functional morphology
- Faunistic-ecological investigations Microbiology, for

example:

- Biotechnology
- Ecotoxicology
- Physiology
- Environmental Microbiology

3221232 – Compulsory elective module with topics changing each semester (S)

In-depth subject-specific knowledge in biology: botany, for example:

- Biology and ecology of mosses
- Bioindication
- Biology and ecology of algae
- Biology and ecology of fungi
- Biology and ecology of native ferns and flowering plants Zoology, for example:

- Population ecology
- Behavioural physiology
- Limnoecology
- Ecology and functional morphology
- Faunistic and ecological studies

Microbiology, for example:

- Biotechnology
- Ecotoxicology
- Physiology
- Environmental microbiology

3223382 - Elective lectures with topics that change each semester (S)

- Specialised English terminology in biology
- Advanced subject-specific knowledge in biology:

Advanced subject-specific knowledge in biology; examples:

Botany, for example:

- Biology and ecology of mosses
- bioindication
- Biology and ecology of algae
- Biology and ecology of mushrooms
- Biology and ecology of native ferns and flowering plants Zoology, for example:
- Population ecology
- Behavioural physiology
- Aquatic ecology
- Ecology and functional morphology
- Faunistic-ecological investigations Microbiology, for

example:

- Biotechnology
- Ecotoxicology
- Physiology
- Environmental Microbiology

3221233 – Compulsory elective module with topics changing each semester (LÜ)

In-depth subject-specific knowledge in biology: botany, for example:

- Biology and ecology of mosses
- Bioindication
- Biology and ecology of algae
- Biology and ecology of fungi
- Biology and ecology of native ferns and flowering plants Zoology, for example:
- Population ecology
- Behavioural physiology
- Limnoecology
- Ecology and functional morphology
- Faunistic and ecological studies

Microbiology, for example:

- Methods of microbiology.

3223383 - Elective lectures with topics that change each semester (LÜ)

- Specialised English terminology in biology
- Advanced subject-specific knowledge in biology:

Advanced subject-specific knowledge in biology; examples:

Botany, for example:

- Biology and ecology of mosses
- bioindication
- Biology and ecology of algae
- Biology and ecology of mushrooms
- Biology and ecology of native ferns and flowering plants Zoology, for example:

- Population ecology
- Behavioural physiology
- Aquatic ecology
- Ecology and functional morphology
- Faunistic-ecological investigations Microbiology, for

example:

- Methods in microbiology.

3213331 – Compulsory elective module with topics changing each semester (FÜ)

- Selected biological field exercises on various topics in field ecology.

4	**Frequency of offering** Every semester **3221231 – Compulsory elective module with topics changing each semester (V)** Every semester **3223381 – Elective lectures with topics that change each semester (V)** Summer term only **3221232 – Compulsory elective module with topics that change each semester (S)** Every semester **3223382 - Elective lectures with topics that change each semester (S)** only in the summer term **3221233 – Compulsory elective module with topics that change each semester (LÜ)** Every semester **3223383 - Elective lectures with topics that change each semester (LÜ)** only in the summer term **3213331 – Compulsory elective module with topics changing each semester (FÜ)**

	Every semester
5	**Language of instruction** **3221231 – Compulsory elective module with topics changing each semester (V)** German **3223381 – Elective lectures with topics that change each semester (V)** English **3221232 – Compulsory elective module with topics that change each semester (S)** German **3223382 - Elective lectures with topics that change each semester (S)** English **3221233 – Compulsory elective course with topics that change each semester (LÜ)** German **3223383 - Elective lectures with topics that change each semester (LÜ)** English **3213331 - Compulsory elective course with topics changing each semester (FÜ)** German
6	**Entry requirements**
7	**Assessment methods** 1. Module component examination: not specified (written – 2 weeks) 2. Module component examination: not specified (written – 2 weeks)
8	**Requirements for the award of credit points**
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Check entry
11	**Responsible department** **3221231 – Compulsory elective course with topics changing each semester (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute of Integrated Natural Sciences **->** Department of Biology **3223381 – Elective lectures with topics that change each semester (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3221232 – Compulsory elective module with topics changing each semester (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223382 - Elective lectures with topics that change each semester (S)**

	Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3221233 - Compulsory elective course with topics changing each semester (LÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223383 - Elective lectures with topics that change each semester (LÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3213331 – Compulsory elective course with topics changing each semester (FÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Reading list** To be announced in the relevant courses
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Other information**

Module 09 **03BI2347**	**Biology 2**	6 credit points Compulsory module

Workload 180 hours	**Semester** 1st semester (recommended)	**Duration** 1 semester

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	9.1	V	Compulsory elective module with topics changing each semester	3221231	Compulsory elective	2 SWS 30 hours	60 hours	90	3
	9.2	V	Elective lectures on topics that vary from semester to semester	3223381	Compulsory elective	2 SWS 30 hours	60 hours	90	3
	9.3	S	Compulsory elective module with topics changing each semester	3221232	Compulsory elective	2 SWS 30 hours	60 hours	25	3
	9.4	S	Elective lectures on topics that vary from semester to semester	3223382	Compulsory elective	2 SWS 30 hours	60 hours	25	3
	9.5	LÜ	Compulsory elective module with topics changing each semester	3221233	Compulsory elective	2 SWS 30 hours	60 hours	20	3
	9.6	LÜ	Elective lectures on topics that vary from semester to semester	3223383	Compulsory elective	2 SWS 30 hours	60 hours	20	3
	9.8	FÜ	Compulsory elective module with topics changing each semester	3213331	Compulsory elective	2 SWS 30 hours	60 hours	15	3

2 **Learning outcomes / competences**

3221231 – Compulsory elective module with topics changing each semester (V)

Students

- will have in-depth knowledge of biological topics, e.g. within the fields of botany, zoology and microbiology.

3223381 – Elective lectures with topics that change each semester (V)

The students

- have in-depth knowledge of biological topics.

3221232 - Compulsory elective course with topics that change each semester (S)

The students

- have in-depth knowledge of biological topics, e.g. within the fields of botany, zoology and microbiology.
- are able to familiarise themselves with the scientific principles underlying experiments with the aid of specialist literature and to deliver a scientific presentation on a biological topic in any area of specialisation.

3223382 - Elective lectures with topics changing each semester (S)

	The students • have in-depth knowledge of biological topics. **3221233 - Compulsory elective course with topics changing each semester (LÜ)** The students • have in-depth knowledge of biological topics, e.g. within the fields of botany, zoology and microbiology. • are able to plan and carry out scientific experiments under supervision, and to present and interpret the results **3223383 - Elective lectures with topics that change each semester (LÜ)** The students • have in-depth knowledge of biological topics. **3213331 - Compulsory elective course with topics changing each semester (FÜ)** The students • acquire in-depth specialist knowledge on selected topics in field ecology.
3	**Contents** **3221231 – Compulsory elective module with topics changing each semester (V)** In-depth subject-specific knowledge in biology: botany, for example: • Biology and ecology of mosses • Bioindication • Biology and ecology of algae • Biology and ecology of fungi • Biology and ecology of native ferns and flowering plants Zoology, for example: • Population ecology • Behavioural physiology • Limnoecology • Ecology and functional morphology • Faunistic and ecological studies Microbiology, for example: • Biotechnology • Ecotoxicology • Physiology • Environmental microbiology **3223381 - Elective lectures with topics that change each semester (V)** • Specialised English terminology in biology • Advanced subject-specific knowledge in biology:

Advanced subject-specific knowledge in biology; examples:

Botany, for example:

- Biology and ecology of mosses
- bioindication
- Biology and ecology of algae
- Biology and ecology of fungi
- Biology and ecology of native ferns and flowering plants Zoology, for example:

- Population ecology
- Behavioural physiology
- Aquatic ecology
- Ecology and functional morphology
- Faunistic-ecological investigations Microbiology, for

example:

- Biotechnology
- Ecotoxicology
- Physiology
- Environmental Microbiology

3221232 – Compulsory elective module with topics changing each semester (S)

In-depth subject-specific knowledge in biology: botany, for example:

- Biology and ecology of mosses
- Bioindication
- Biology and ecology of algae
- Biology and ecology of fungi
- Biology and ecology of native ferns and flowering plants Zoology, for example:

- Population ecology
- Behavioural physiology
- Limnoecology
- Ecology and functional morphology
- Faunistic and ecological studies Microbiology, for example:

- Biotechnology
- Ecotoxicology
- Physiology
- Environmental microbiology

3223382 - Elective lectures with topics that change each semester (S)

- Specialised English terminology in biology
- Advanced subject-specific knowledge in biology:

Advanced subject-specific knowledge in biology; examples:

Botany, for example:

- Biology and ecology of mosses
- bioindication
- Biology and ecology of algae
- Biology and ecology of mushrooms
- Biology and ecology of native ferns and flowering plants Zoology, for example:

- Population ecology
- Behavioural physiology
- Aquatic ecology
- Ecology and functional morphology
- Faunistic-ecological investigations Microbiology, for

example:

- Biotechnology
- Ecotoxicology
- Physiology
- Environmental Microbiology

3221233 – Compulsory elective module with topics changing each semester (LÜ)

In-depth subject-specific knowledge in biology: botany, for example:

- Biology and ecology of mosses
- Bioindication
- Biology and ecology of algae
- Biology and ecology of fungi
- Biology and ecology of native ferns and flowering plants Zoology, for example:

- Population ecology
- Behavioural physiology
- Limnoecology
- Ecology and functional morphology
- Faunistic and ecological studies Microbiology, for example:

- Methods of microbiology.

3223383 - Elective lectures with topics that change each semester (LÜ)

- Specialised English terminology in biology
- Advanced subject-specific knowledge in biology:

Advanced subject-specific knowledge in biology; examples:

	Botany, for example: • Biology and ecology of mosses • bioindication • Biology and ecology of algae • Biology and ecology of mushrooms • Biology and ecology of native ferns and flowering plants Zoology, for example: • Population ecology • Behavioural physiology • Aquatic ecology • Ecology and functional morphology • Faunistic-ecological investigations Microbiology, for example: • Methods in microbiology. **3213331 – Compulsory elective module with topics changing each semester (FÜ)** • Selected biological field exercises on various topics in field ecology.
4	**Frequency of offering** Every semester **3221231 – Compulsory elective module with topics changing each semester (V)** Every semester **3223381 – Elective lectures with topics that change each semester (V)** Summer term only **3221232 – Compulsory elective module with topics changing each semester (S)** Every semester **3223382 - Elective lectures with topics that change each semester (S)** only in the summer term **3221233 – Compulsory elective module with topics changing each semester (LÜ)** Every semester **3223383 - Elective lectures with topics that change each semester (LÜ)** Summer term only **3213331 – Compulsory elective module with topics changing each semester (FÜ)** Every semester
5	**Language of instruction** **3221231 – Compulsory elective module with topics changing each semester (V)** German **3223381 – Elective lectures with topics that change each semester (V)** English **3221232 – Compulsory elective module with topics that change each semester (S)**

	German **3223382 - Elective lectures with topics that change each semester (S)** English **3221233 – Compulsory elective course with topics that change each semester (LÜ)** German **3223383 - Elective lectures with topics that change each semester (LÜ)** English **3213331 - Compulsory elective course with topics changing each semester (FÜ)** German
6	**Entry requirements**
7	**Assessment methods** 1. Partial module examination: not specified (written – 2 weeks) 2. Module partial examination: not specified (written – 2 weeks)
8	**Requirements for the award of credit points**
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Check entry
11	**Responsible department** **3221231 – Compulsory elective course with topics changing each semester (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223381 – Elective lectures with topics that change each semester (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3221232 – Compulsory elective course with topics changing each semester (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223382 - Elective lectures with topics that change each semester (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3221233 - Compulsory elective course with topics changing each semester (LÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223383 - Elective lectures with topics that change each semester (LÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3213331 – Compulsory elective course with topics changing each semester (FÜ)**

	Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Reading list** To be announced in the relevant courses
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Other information**

Module 10 **03BI2313** module		**Animal Physiology**					7 credit points Compulsory elective	
Workload 210 hours			**Semester** N/A			**Duration** 1 semester		
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	10.1	V	Animal Physiology	3211081	Compulsory	2 contact hours per week 30 hours	60 hours	80	3
	10.2	LÜ	Animal Physiology Practical Course	3211082	Compulsory	3 contact hours per week 45 hours	75 hours	20	4

2 **Learning outcomes / competences**

3211081 – Animal Physiology (Lecture)

Students

- acquire a sound and structured understanding of the key concepts of animal physiology
- have a command of the relevant technical terminology and are able to apply it correctly
- understand physiological processes and adaptations at the cellular and organismic levels
- gain an overview of the structure, functions and interactions of animal and human organs, in particular the nervous system and the brain (neurobiology)
- are able to apply the principles of physiological mechanisms taught through illustrative examples

3211082 – Animal Physiology Practical (LÜ)

Students

- are able to carry out simple animal physiology experiments, and to evaluate, present and interpret the results
- possess structured specialist knowledge of the fundamental – particularly those relevant to school education – sub-fields of physiology
- are familiar with the methods of inquiry used in the discipline (induction, deduction, hypothesis formation, reduction, experimental verification) and have experience in the practical application of these methods
- are familiar with the working methods (standard scientific procedures) of biology (observing, comparing, classifying, working with a magnifying glass and microscope, experimenting, recording data, drawing)
- possess knowledge and skills in conducting experiments and handling biological equipment whilst observing safety regulations
- have experience in collegial cooperation and teamwork, and possess strategies for working efficiently and in a way that conserves resources

3 **Content**

3211081 – Animal Physiology (Lecture)

- Function and interaction of organs
- Function and mode of action of hormones
- Cellular excitability, excitation processes, neural processing mechanisms
- Sensory physiology (e.g. vision, hearing, sense of balance, taste, smell)
- Neurophysiology; learning and memory
- Processes involved in muscle contraction; digestion, respiration, circulation and exercise physiology
- Homeostasis: thermoregulation, osmoregulation, excretion

	3211082 - Animal Physiology Practical Course (LÜ) • Conducting animal physiology experiments
4	**Frequency of the course** offered only in the summer term **3211081 - Animal Physiology (Lecture)** offered only in the summer term **3211082 – Animal Physiology Practical (LÜ)** offered only in the summer semester
5	**Language of instruction** **3211081 - Animal Physiology (Lecture)** German **3211082 – Animal Physiology Practical (LÜ)** German
6	**Entry requirements** **3211082 - Animal Physiology Practical Course (LÜ)** Passed the written examination for course 3211081
7	**Examination formats** Partial module examination in Animal Physiology as a written examination (90 mins) Module component examination: Animal Physiology Practical Course as a portfolio report (written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module component examinations **3211081 –** **Animal Physiology (Lecture)** Passing the module component examination **3211082 – Animal Physiology Practical (LÜ)** Passing the module component examination
9	**Weighting of the final mark** 7/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible department** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3211081 - Animal Physiology (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3211082 – Animal Physiology Practical Course (LÜ)**

	Faculty 3: Mathematics/Natural Sciences -> Institute for Integrated Natural Sciences -> Department of Biology
12	**References** • Hildebrandt, J.P., Bleckmann, H., Homberg, U. (2015): Penzlin – Textbook of Animal Physiology. Springer Spektrum. • Heldmaier, Neuweiler, Rössler (2012): Comparative Animal Physiology. Springer Spektrum.
13	**Use in degree programme** M.Sc. BioGeoSciences (20125) M.Sc. BioGeo Sciences (20187) M.Sc. BioGeoSciences (20177)
14	**Further information** **3211082 – Animal Physiology Practical (LÜ)** Block course after the end of the semester.

Module 11 **03BI2314** module			**Plant Physiology**						7 credit points Compulsory elective
Workload 210 hours				**Semester**			**Duration** 2 semesters		
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	11.1	V	Plant Physiology	3211071	Compulsory	2 contact hours per week 30 hours	60 hours	80	3
	11.2	LÜ	Plant Physiology Practical Course	3211072	Compulsory	3 contact hours per week 45 hours	75 hours	20	4

2 **Learning outcomes / competences**

3211071 – Plant Physiology (Lecture)

Students

- have a sound and structured understanding of the key concepts of plant physiology
- have a command of the relevant technical terminology and can apply it correctly
- gain an insight into physiological processes and their coordination in plants at the molecular, cellular and organismic levels
- have a structured understanding of the fundamental – particularly those relevant to school education – sub-fields of biology (botany, zoology, human biology and anthropology, cell biology, physiology, genetics and developmental biology, neurobiology and ethology (behavioural biology), ecology, diversity and evolution)
- have a broad understanding of current and fundamental issues in biology
- possess a reflective understanding of the subject of biology drawn from the meta-disciplines and are able to contextualise biological phenomena in terms of their social and historical significance
- are familiar with the methods of inquiry used in the discipline (induction, deduction, hypothesis formation, reduction, modelling, idealisation, mathematisation, experimental verification) and have experience in the exemplary application of these methods in key areas of biology
- have experience in sourcing subject-specific information and in working independently with specialist literature
- make use of a wide range of opportunities to further develop their subject-specific and pedagogical knowledge

3211072 – Plant Physiology Practical (LÜ)

Students

- are able to apply the principles of physiological mechanisms, as illustrated in the course, to other mechanisms
- are able to carry out simple plant physiology experiments and to present and interpret the results appropriately
- possess structured specialist knowledge of the fundamental – particularly those relevant to school education – sub-fields of biology (botany, zoology, human biology and anthropology, cell biology, physiology, genetics and developmental biology, neurobiology and ethology (behavioural biology), ecology, diversity and evolution)

	• are familiar with the methods of inquiry used in the subject (induction, deduction, hypothesis formation, reduction, modelling, idealisation, mathematisation, experimental verification) and have experience in the exemplary application of these methods in key areas of biology • are familiar with the working methods (standard scientific practices) of biology (observing, comparing, classifying, working with a magnifying glass and microscope, conducting experiments, recording data, drawing, working with models, collecting and displaying specimens, culture techniques, and caring for plants and animals) and have experience in the exemplary application of these methods in key areas of the subject • possess knowledge and skills in conducting experiments and in handling biological equipment whilst observing safety regulations • have experience in collegial cooperation and teamwork, and possess strategies for working efficiently and in a resource-conserving manner • draw up experimental reports.
3	**Contents** **3211071 – Plant Physiology (Lecture)** • Functions of the compartments in plant cells • Primary and secondary reactions of photosynthesis; C4 and CAM plants; • photosynthetic energy metabolism • Formation, transport, storage and mobilisation of assimilates • Lipid, protein and carbohydrate metabolism • Uptake and transport of minerals • Mycorrhizal and root nodule symbioses • Regulation of plant development; hormones • Light receptors, photomorphogenesis, circadian rhythms • Plant adaptations to abiotic stress factors and pathogens • Water balance and water transport • Genetically modified plants and model plants • *Optional:* Plant ecology **3211072 - Plant Physiology Practical (LÜ)** • Conducting plant physiology experiments
4	**Frequency of offering** Every semester **3211071 - Plant Physiology (Lecture)** Winter semester only **3211072 – Plant Physiology Practical (LÜ)** only in the summer term
5	**Language of instruction** **3211071 - Plant Physiology (Lecture)** German **3211072 – Plant Physiology Practical (LÜ)** German
6	**Entry requirements**

	None
7	**Examination formats** Module examination in Plant Physiology: written examination (90 mins)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 7/120 of the degree programme
10	**Module coordinator** Prof. Dr Eberhard Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3211071 – Plant Physiology (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3211072 – Plant Physiology Practical (LÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Reading list** To be announced in the relevant courses.
13	**Use in degree programme** M.Sc. BioGeoSciences (20125) M.Sc. BioGeo Sciences (20187) M.Sc. BioGeoSciences (20177)
14	**Further information**

Module 12 **03BI2337** module	**Biodiversity and Assessment Methods for Insects**							6 credit points Compulsory elective
Workload 180 hours			**Semester**			**Duration** 1 semester		

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	12.1	V	Insect Diversity Assessment	3223371	Compulsory	2 contact hours per week 30 hours	60 hours	25	3
	12.2	LÜ	Insect Diversity Assessment	3223372	Compulsory	2 contact hours per week 30 hours	60 hours	25	3

2 **Learning outcomes / competences**

3223371 - Insect Diversity Assessment (V)

The students

- gain an overview of the diversity and phylogeny of insects

3223372 - Insect Diversity Assessment (LÜ)

The students

- learn about the morphology and phylogeny of insects
- can classify insects into taxa
- can identify insects using identification keys
- are familiar with and can apply insect assessment methods

3 **Course content**

3223371 - Insect Diversity Assessment (V)

- Introduction to insect diversity with an overview of the major taxa
- Morphology and phylogeny of insects
- Introduction to methods of insect assessment

3223372 - Insect Diversity Assessment (LÜ)

- Practical course in insect morphology
- Training in insect identification
- Field assessment of insects

4 **Frequency of the course**

offered only in the summer term

3223371 - Insect Diversity Assessment (V)
offered only in the summer term

3223372 – Insect Diversity Assessment (LÜ)
offered only in the summer term

5 **Language of instruction**

3223371 - Insect Diversity Assessment (Lecture)
English

	3223372 - Insect Diversity Assessment (LÜ) English
6	**Entry requirements** None
7	**Assessment methods** Module examination ‘Biodiversity and Assessment Methods for Insects’ as a written assignment (2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Mr Thomas Wagner, Associate Professor
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223371 - Insect Diversity Assessment (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223372 - Insect Diversity Assessment (LÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography** **3223371 - Insect Diversity Assessment (V)** • McGavin, G. C. 2001. Essential Entomology. Pp. 323. Oxford University Press. • Schoonhoven, L. M., v. Loon, J. J. A. & Dicke, M. 2008. Insect-Plant Biology, 2nd ed. pp. 421. Oxford University Press. • Daly, H. V., Doyen, J. T. & Purcell, A. H. 2014. Introduction to Insect Biology and Diversity. Oxford University Press. **3223372 - Insect Diversity Assessment (LÜ)** • McGavin, G. C. 2001. Essential Entomology. 323 pp. Oxford University Press. • Schoonhoven, L. M., v. Loon, J. J. A. & Dicke, M. 2008. Insect-Plant Biology, 2nd ed. pp. 421. Oxford University Press. • Daly, H. V., Doyen, J. T. & Purcell, A. H. 2014. Introduction to Insect Biology and Diversity. Oxford University Press.
13	**Use in degree programmes** M.Sc. BioGeoSciences (20187) M.Sc. Applied Natural Sciences (20193)
14	**Further information** This module is offered on an irregular basis. Please consult the module representative before assigning the module.

	3223371 - Insect Diversity Assessment (V) This course can be included and credited towards Module 13 of the Master of Education in Biology for Upper Secondary School Teachers.

Module 13 03BI2332 module	Biological field exercise							6 credit points Compulsory elective
Workload 180 hours			**Semester**				**Duration** 1 semester	

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	13.1	S	Seminar on biological fieldwork	3223321	Compulsory	2 contact hours per week 30 hours	60 hours	18	3
	13.2	FÜ	Organic fieldwork	3221122	Compulsory	3 contact hours per week 45 hours	45 hours	25	3

2 **Learning outcomes / competences**

3223321 – Seminar on Biological Fieldwork (S)

Students

- gain in-depth knowledge of a specific natural environment, its particular biotic community and the origins of that community
- are able to critically analyse scientific articles and present the content in the form of a lecture.

3221122 – Biological Field Exercise (FÜ)

Students

- gain in-depth knowledge of the biodiversity of various habitats through observation and demonstration using real-world examples in the field;
- are able to apply skills in scientific research.

3 **Contents**

3223321 – Seminar on Biological Fieldwork (S)

- Critical reflection on selected scientific articles relating to the chosen natural area. Independent research into and presentation of selected topics on biotic communities, as well as their origins and conservation in the target area.

3221122 – Biological Fieldwork (FÜ)

- In-depth knowledge of the biodiversity of various habitats
- scientific methodology.

4 **Frequency of the course**

offered only in the summer term

3223321 – Seminar on Biological Fieldwork (S)

offered only in the summer semester

3221122 – Biological Field Work (FÜ)

	Every semester
5	**Language of instruction** **3223321 – Seminar on Biological Field Work (S)** German **3221122 – Biological Field Work (FÜ)** German
6	**Entry requirements** None
7	**Assessment methods** Module examination: Biological fieldwork as a term paper (written – 2 weeks) **3223321 – Seminar on Biological Fieldwork (S)** Coursework: Seminar presentation (oral – 20 mins)
8	**Requirements for the award of credit points** Passing the module examination **3223321 – Seminar on Biological Fieldwork (S)** Passing the course
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223321 – Seminar on Biological Fieldwork (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3221122 - Biological Field Work (FÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Reading list** To be announced separately depending on the natural environment.
13	**Use in degree programme** M.Sc. BioGeosciences (20187)
14	**Further information**

	The seminar takes place as a block course during the lecture-free period. Within the compulsory-elective section of the Master's programme, a maximum of one module from either 03BI2332 or 03GE2332 may be taken.

Module 14 **03BI2333** module			**Case Study: Biodiversity**						6 credit points Compulsory elective
Workload 180 hours				**Semester**			**Duration** 1 semester		
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	14.1	S	Biodiversity	3223331	Compulsory	1 contact hour 15 hours	45 hours	10	2
	14.2	P	Biodiversity	3223332	Compulsory	3 contact hours per week 45 hours	75 hours	10	4

2 **Learning outcomes / competences**

3223331 - Biodiversity (S)

The students

- gain in-depth knowledge of literature review and evaluation with regard to current scientific topics in biodiversity,
- demonstrate advanced knowledge of processing and presenting scientific results.

3223332 - Biodiversity (P)

The students

- acquire advanced knowledge of hypothesis testing, experimental design and the execution of a scientific project within the context of biodiversity research,
- acquire advanced knowledge of data management and analysis, and the presentation of scientific data,
- acquire advanced knowledge of scientific writing.

3 **Course content**

3223331 – Biodiversity (S)

- Discussing and critically reflecting on scientific topics in biodiversity research,
- analysing and presenting scientific findings (presentation).

3223332 - Biodiversity (P)

- Planning and carrying out a scientific project in the context of biodiversity research,
- analysing one's own data,
- writing a report in the style of a scientific publication.

4 **Frequency of the course**

every semester

3223331 – Biodiversity (S)

Every semester

3223332 - Biodiversity (P)

Every semester

5 **Language of instruction**

3223331 - Biodiversity (S)

English

	3223332 - Biodiversity (P) English
6	**Entry requirements** None
7	**Assessment methods** Module examination: Case Study on Biodiversity as a term paper (written – 4 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223331 - Biodiversity (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223332 - Biodiversity (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography** To be announced separately.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information** The module is taught by various lecturers authorised to set examinations for the degree programme. Please refer to separate announcements.

Module 15 **03BI2334** module	**Case Study in Terrestrial Ecology**							6 credit points Compulsory elective	
Workload 180 hours			**Semester**				**Duration** 1 semester		
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	15.1	S	Terrestrial Ecology	3223341	Compulsory	1 SWS 15 hours	45 hours	10	2
	15.2	P	Terrestrial Ecology	3223342	Compulsory	3 contact hours per week 45 hours	75 hours	10	4

2 **Learning outcomes / competences**

3223341 - Terrestrial Ecology (S)

The students

- gain in-depth knowledge of literature review and evaluation with regard to current scientific topics in terrestrial ecology,
- demonstrate advanced knowledge of the processing and presentation of scientific results.

3223342 - Terrestrial Ecology (P)

The students

- acquire advanced knowledge of hypothesis testing, experimental design and the execution of a scientific project within the context of terrestrial ecology research,
- acquire advanced knowledge of data management and analysis, and the presentation of scientific data,
- acquire advanced knowledge of scientific writing.

3 **Course content**

3223341 – Terrestrial Ecology (S)

- Discussing and critically reflecting on scientific topics in terrestrial ecology research,
- analysing and presenting scientific findings (talk).

3223342 - Terrestrial Ecology (P)

- Planning and carrying out a scientific project in the field of terrestrial ecology,
- analysing one's own data,
- writing a report in the style of a scientific publication.

4 **Frequency of offering**

every semester

3223341 – Terrestrial Ecology (S)

Every semester

3223342 – Terrestrial Ecology (P)

Every semester

5 **Language of instruction**

3223341 - Terrestrial Ecology (S)

English

	3223342 - Terrestrial Ecology (P) English
6	**Entry requirements** None
7	**Assessment methods** Module examination: Case Study in Terrestrial Ecology as a term paper (written – 4 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223341 - Terrestrial Ecology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223342 - Terrestrial Ecology (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography** To be announced separately.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information** The module is taught by various lecturers authorised to set examinations for the degree programme. Please check separate announcements.

Module 16 **03BI2335** module	**Case Study in Aquatic Ecology**							6 credit points Compulsory elective
Workload 180 hours			**Semester**			**Duration** 1 semester		

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	16.1	S	Aquatic Ecology	3223351	Compulsory	1 SWS 15 hours	45 hours	10	2
	16.2	P	Aquatic Ecology	3223352	Compulsory	3 contact hours per week 45 hours	75 hours	10	4

2 **Learning outcomes / competences**

3223351 - Aquatic Ecology (S)

The students

- gain in-depth knowledge of literature review and evaluation with regard to current scientific topics in aquatic ecology,
- acquire advanced knowledge of processing and presenting scientific results.

3223352 - Aquatic Ecology (P)

The students

- acquire advanced knowledge of hypothesis testing, experimental design and the execution of a scientific project within the context of aquatic ecology,
- acquire advanced knowledge of data management and analysis, and the presentation of scientific data,
- acquire advanced knowledge of scientific writing.

3 **Course content**

3223351 – Aquatic Ecology (S)

- Discussing and critically reflecting on scientific topics in aquatic ecology research,
- analysing and presenting scientific findings (presentation).

3223352 - Aquatic Ecology (P)

- Planning and carrying out a scientific project in the field of aquatic ecology,
- analysing one's own data,
- writing a report in the style of a scientific publication.

4 **Frequency of the course**

every semester

3223351 – Aquatic Ecology (S)
Every semester

3223352 – Aquatic Ecology (P)
Every semester

5 **Language of instruction**

3223351 - Aquatic Ecology (S)

English

	3223352 - Aquatic Ecology (P) English
6	**Entry requirements** None
7	**Assessment methods** Module examination: Case Study in Aquatic Ecology as a term paper (written – 4 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Kenneth Dumack
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223351 - Aquatic Ecology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223352 - Aquatic Ecology (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography** To be announced separately.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information** The module is taught by various lecturers authorised to set examinations for the degree programme. Please check the separate announcements.

Module 17 **03BI2336** module			**Case Study in Tropical Ecology**						6 credit points Compulsory elective
Workload 180 hours				**Semester**				**Duration** 1 semester	
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	17.1	S	Tropical Ecology	3223361	Compulsory	1 contact hour 15 hours	45 hours	10	2
	17.2	P	Tropical Ecology	3223362	Compulsory	3 contact hours per week 45 hours	75 hours	10	4

2 **Learning outcomes / competences**

3223361 - Tropical Ecology (S)

The students

- gain in-depth knowledge of literature review and evaluation with regard to current scientific topics in tropical ecology,
- demonstrate advanced knowledge of processing and presenting scientific results.

3223362 - Tropical Ecology (P)

The students

- acquire advanced knowledge of hypothesis testing, experimental design and the execution of a scientific project within the context of tropical ecology research,
- acquire advanced knowledge of data management and analysis, and the presentation of scientific data,
- gain advanced knowledge of scientific writing.

3 **Course content**

3223361 - Tropical Ecology (S)

- Discussing and critically reflecting on scientific topics in tropical ecology research,
- analysing and presenting scientific findings (presentation).

3223362 - Tropical Ecology (P)

- Planning and carrying out a scientific project in the context of tropical ecology,
- analysing one's own data,
- writing a report in the style of a scientific publication.

4 **Frequency of offering**

every semester

3223361 - Tropical Ecology (S)

Every semester

3223362 - Tropical Ecology (P)

Every semester

5 **Language of instruction**

3223361 - Tropical Ecology (S)

English

	3223362 - Tropical Ecology (P) English
6	**Entry requirements** None
7	**Assessment methods** Module examination: Case Study in Tropical Ecology as a term paper (written – 4 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Eberhard Fischer
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223361 - Tropical Ecology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223362 - Tropical Ecology (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Reading list** To be announced separately.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information** The module is taught by various lecturers authorised to set examinations for the degree programme. Please refer to separate announcements.

Module 18 **03GE2332** module		**Regional Geography**					6 credit points Compulsory elective	
Workload 180 hours			**Semester**			**Duration** 1 semester		
1	**Courses**			**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	18.1	E	Study trip abroad (10 days)	3421094	Compulsory	10 SWS 100 hours	50 hours	18	5
	18.2	S	Regional Geography for the study trip abroad	3423322	Compulsory	0.5 SWS 7.5 hours	22.5 hours	18	1

2 **Learning outcomes / competences**

3421094 – Study trip abroad (10 days) (E)

Students

- are able to scrutinise self-perceptions and perceptions of others in the context of intercultural learning, recognise and respect 'the other', break down prejudices and question their own position
- are able to observe in a hypothesis-driven manner, and to recognise, analyse and interpret structures
- are able to apply geographical theories and specialist knowledge to the local area and systematically explore landscape and society
- are proficient in the independent preparation – in terms of both content and methodology – implementation and reflection on individual stages of a geographical field trip

3423322 – Regional Geography for the Field Trip Abroad (S)

Students

- are able to transfer and apply key human geographical and physical geographical questions and issues to a region outside Germany
- are able to identify sites of regional significance in human geography and physical geography abroad and explore them thematically in a coherent manner

3 **Contents**

3421094 – Field trip abroad (10 days) (E)

- Theoretical, methodological and regional-geographical preparation for the field trip area (examples from European or non-European countries)
- Regional geographical overview of the field trip area
- Classification within global spatial structures (e.g. geozones, landscape belts, economic regions, cultural regions, systems of states)
- Globalisation and its landscape-ecological and socio-spatial impacts
- Specific regional geographical topics and content (e.g. resource use, environmental degradation, social conflicts, migration, urbanisation and urban development)

3423322 – Regional Geography for the Field Trip Abroad (S)

- Characteristics of regional geographical fieldwork
- Selected sub-regions and their human- and physical-geographical interactions
- Survey of objects and sites of regional-geographical significance outside Germany

4 **Frequency of the course**

Every semester

	3421094 – Field trip abroad (10 days) (E) Every semester **3423322 – Regional Geography for the Study Tour Abroad (S)** Every semester
5	**Language of instruction** **3421094 – Field Trip Abroad (10 days) (E)** German **3423322 – Regional Geography for the Study Tour Abroad (S)** German
6	**Entry requirements** None
7	**Examination formats** Module examination in Regional Geography as a single examination (practical – 120 mins)
8	**Requirements for the award of credit points** Passing the module examination **3421094 – Study trip abroad (10 days) (E)** Proof of participation in the field trip abroad in 3421094
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Mr PD Dr Thomas Brühne
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute of Integrated Natural Sciences **->** Department of Geography **3421094 - Study trip abroad (10 days) (E)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423322 - Regional Geography for the Study Trip Abroad (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** To be announced in the relevant courses.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Other information**

	Within the compulsory-elective section of the Master's programme, a maximum of one module from either 03BI2332 or 03GE2332 may be taken.

Module 19 03GE2333 module	Regional Development and Spatial Planning	6 credit points Compulsory elective

Workload 180 hours	Semester	Duration 1 semester

1	Courses				Compulsory/Compulsory elective	Contact hours	Self-study	Planned group size	LP
	19.1	Ü	Regional Planning and Spatial Planning	3421131	Compulsory	2 contact hours per week 30 hours	150 hours	30	6

2 **Learning outcomes / competences**

3421131 – Spatial Planning and Regional Planning (Seminar)

Students

- understand the scope of spatial and landscape planning and are proficient in the relevant technical terminology
- are familiar with the framework conditions and procedures of spatial and landscape planning
- are able to analyse a specific area from a planning perspective, critically evaluate planning proposals and concepts, and identify possible alternatives
- explain geo-ecological, social and economic measures that are appropriate for sustainable development and the protection of areas

3 **Course content**

3421131 – Spatial Organisation and Regional Planning (Lecture)

- Steering spatial planning processes
- Hierarchy of spatial planning
- Regional Development Programmes and Regional Development Plans
- Regional Planning
- Land-use plan and development plan
- Sustainable spatial and landscape planning
- Nature and environmental conservation
- Landscape conservation
- Federal Nature Conservation Act

4 **Frequency of the course**

offered only in the summer term

3421131 – Regional and Spatial Planning (Lecture)

Only in the summer term

5 **Language of instruction**

3421131 - Spatial and Regional Planning (Seminar)

German

6 **Entry requirements**

None

7 **Examination formats**

Module examination in Regional and Spatial Planning in the form of

a written assignment in the form of a presentation

	(written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Mr PD Dr Thomas Brühne
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3421131 – Spatial Planning and Regional Planning (Lecture)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** To be announced in the relevant courses.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information**

Module 20 03GE2334 module	**Society-Environment Research**							6 credit points Compulsory elective	
Workload 180 hours			**Semester**				**Duration** 1 semester		
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	20.1	S	Human–Environment Interaction	3421141	Compulsory	2 contact hours per week 30 hours	150 hours	17	6

2 **Learning outcomes / competences**

3421141 – Human–Environment Interaction (S)

Students

- are familiar with integrative research questions in society-environment research and can contextualise these within the current state of research
- identify and analyse the interactions between humans and the environment using examples of their own choosing
- are able to classify the core themes of human-environment interaction across different scales and develop integrative approaches to address them
- are able to create a concept map on a topic of their own choosing relating to human-environment interaction
- are able to present a concept map they have created themselves in an academic presentation

3 **Course content**

3421141 – Human–Environment Interaction (S)

- Integrative issues (Human Geography and Physical Geography)
- Case studies of regional human-environment interactions
- Syndromes of global change
- Globalisation and Regionalisation
- Global Change
- Global and regional environmental problems
- Sustainability
- Climate Change
- Resilience and Vulnerability

4 **Frequency of the course**

offered only in the summer term

3421141 – Human–Environment Interaction (S)

offered only in the summer semester

5 **Language of instruction**

3421141 - Human-Environment Interaction (S)

German

6 **Entry requirements**

None

7 **Examination formats**

	Module examination in Society, Environment and Research as a single examination (oral – 30 mins)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Martin Kehl
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3421141 - Human-Environment Interaction (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** To be announced in the relevant courses.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information**

Module 21 03GE2337 module	Case Study in Geoecology	6 credit points Compulsory elective

Workload 180 hours	Semester	Duration 1 semester

1	Courses				Compulsory/Compulsory elective	Contact hours	Self-study	Planned group size	LP
	21.1	S	Geoecology	3423371	Compulsory	1 SWS 15 hours	45 hours	15	2
	21.2	P	Geoecology	3423372	Compulsory	3 contact hours per week 45 hours	75 hours	15	4

2 **Learning outcomes / competences**

3423371 - Geoecology (S)

The students

- are familiar with the concepts and methodological steps involved in a geoecological case study
- are able to discuss geoecological hypotheses and problems both within a team and between teams
- are able to present (partial) results of a geoecological case study

3423372 - Geoecology (P)

The students

- are able to apply theoretical knowledge to a practice-oriented analysis of a real ecosystem compartment
- are able to independently assess field data and carry out laboratory analyses based on a suitable selection of field and laboratory methods
- are able to identify, determine and analyse connections and relationships between different geoecological issues

3 **Course content**

3423371 - Geoecology (S)

- Conception and planning of a geoecological case study
- Data preparation
- Discussion and scientific reflection on geoecological problems and results

3423372 - Geoecology (P)

- Analysing a given geoecological problem
- Independent assessments and analyses within a spatially defined study area

4 **Frequency of the course**

offered in the summer semester only

3423371 - Geoecology (S)

offered in the summer semester only

3423372 – Geoecology (P)

offered only in the summer semester

5 **Language of instruction**

	3423371 - Geoecology (S) English **3423372 - Geoecology (P)** English
6	**Entry requirements** None
7	**Assessment methods** Module examination: Case Study in Geoecology as a term paper (written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Martin Kehl
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423371 - Geoecology (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423372 - Geoecology (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** Specific, depending on the topic. To be announced during the course.
13	**Use in degree programme** M.Sc. BioGeoSciences (20187)
14	**Other information**

Module 22 **03GE2338** module	**Case Study: Regional Development**	6 credit points Compulsory elective

Workload	**Semester**	**Duration**
180 hours		1 semester

1

Courses				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
22.1	S	Regional Development	3423381	Compulsory	1 contact hour per week 15 hours	45 hours	15	2
22.2	P	Regional Development	3423382	Compulsory	3 contact hours per week 45 hours	75 hours	15	4

2 **Learning outcomes / competences**

3423381 - Regional Development (S)

Students

- identify and develop research topics in Human Geography; independently design and carry out research on regional development; are able to analyse facts in Human Geography and related disciplines, with a particular focus on society and social factors

3423382 - Regional Development (P)

Students

- are able to understand, analyse and interpret maps, aerial photography, data and literature relating to the case study; are able to correctly apply appropriate methods from human geography in data collection and empirical research; and are able to critically assess, interpret, edit and present their own results

3 **Contents**

3423381 - Regional Development (S)

- Regulation and processes in spatial planning; regional planning and regional development; internal and external factors in regional development; concepts for regional development in different regions

3423382 - Regional Development (P)

- Conceptual design, planning and implementation of a case study on regional development with a focus on human geography; analysing multi-layered structures in human geography (e.g. structures of urban and rural settlements, brownfield regeneration, population structures, migration, rural and urban spaces)

4 **Frequency of the course**

offered only in the winter semester

3423381 - Regional Development (S)

offered only in the winter semester

3423382 - Regional Development (P)

Only in the winter semester

5 **Language of instruction**

3423381 - Regional Development (S)

English

	3423382 - Regional Development (P) English
6	**Entry requirements** None
7	**Assessment methods** Module examination: 'Case Study: Regional Development' as a term paper (written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Ms Zahra Arzjani
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423381 - Regional Development (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423382 - Regional Development (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** To be determined, depending on the topic. Will be announced during the course.
13	**Use in degree programme** M.Sc. BioGeoSciences (20187)
14	**Other information**

Module 23 03GE2339 module	Case Study: Human and Environment	6 credit points Compulsory elective

Workload 180 hours	Semester	Duration 1 semester

1

Courses				Compulsory/Compulsory elective	Contact hours	Self-study	Planned group size	LP
23.1	S	Human and Environment	3423391	Compulsory	1 SWS 15 hours	45 hours	15	2
23.2	P	Human and Environment	3423392	Compulsory	3 contact hours per week 45 hours	75 hours	15	4

2 **Learning outcomes / competences**

3423391 - Human and Environment (S)

Students

- are familiar with state-of-the-art research on society-environment interaction and interdependence, and measure and analyse human-environment interdependencies by studying an individually selected example

3423392 - Human and Environment (P)

Students

- are aware of the regional impacts associated with human–environment interactions; are able to identify significant sites of human–environment interaction and carry out on-site analysis; are able to demonstrate and present potential human–environment effects in the field. Content

3 **Contents**

3423391 - Human and Environment (S)

- Integrative perspective (Human Geography and Physical Geography) Global change Sustainability Climate change Vulnerability and resilience

3423392 - Human and Environment (P)

- Case studies of regional human–environment interaction; Industrialisation and structural change; Globalisation and regionalisation; Global and regional environmental problems

4 **Frequency of offering**

offered only in the summer semester

3423391 - Human and Environment (S)

offered in the summer semester only

3423392 - Human and Environment (P)

Summer term only

5 **Language of instruction**

3423391 - Human and Environment (S)

English

3423392 - Human and Environment (P)

	English
6	**Entry requirements** None
7	**Assessment methods** Module examination: ‘Case Study: Human and Environment’ as a term paper (written – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Ms Zahra Arzjani
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423391 - Human and Environment (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **3423392 - Human and Environment (P)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Reading list** Specific, depending on the topic. To be announced during the course.
13	**Use in degree programme** M.Sc. BioGeoSciences (20187)
14	**Other information**

Module 24 **Freshwater Ecology** 6 credit points
03BI2348 Compulsory module

Workload	**Semester**	**Duration**
180 hours	N/A	1 semester

1

Courses				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
24.1	V	Concepts of stream ecology	3223431	Compulsory	2 contact hours per week 30 hours	60 hours	30	3
24.2	S	Literature seminar	3223433	Compulsory	2 SWS 30 hours	60 hours	30	3

2 **Learning outcomes / competences**

3223431 - Concepts of stream ecology (V)

The students

- understand the structure and function of freshwater ecosystems
- possess in-depth biological and ecological knowledge
- are able to apply biological and ecological knowledge to stream ecosystems
- understand the interaction between environmental factors and organisms in stream ecosystems
- understand nutrient cycles in stream ecosystems
- are able to identify and assess the impact of anthropogenic changes to environmental factors on aquatic ecosystems

3223433 – Literature seminar (S)

The students

- are able to search for and select relevant scientific literature on specific topics
- have the ability to understand and critically evaluate the findings in scientific papers
- are able to present complex scientific content clearly, logically and comprehensibly in a lecture delivered in English
- are able to critically discuss the content presented, drawing on their own lectures and those of their peers

3 **Contents**

3223431 – Concepts of stream ecology (V)

- Structure and function of stream ecosystems
- concepts of ecological processes and interactions
- Specific methods in stream ecology
- anthropogenic impacts and their remediation

3223433 - Literature seminar (S)

- structure and function of stream ecosystems
- concepts of ecological processes and interactions
- Specific methods in stream ecology
- Anthropogenic impacts and their remediation

4 **Frequency of the course**

offered only in the summer term

3223431 - Concepts of stream ecology (V)

offered in the summer semester only

	3223433 - Literature seminar (S) offered only in the summer term
5	**Language of instruction** **3223431 - Concepts of stream ecology (V)** English **3223433 - Literature seminar (S)** English
6	**Entry requirements**
7	**Examination formats** Module examination in Freshwater Ecology: not specified (written – 2) **3223431 – Concepts of stream ecology (V)** Coursework: not specified (written – 45)
8	**Requirements for the award of credit points**
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Kenneth Dumack
11	**Responsible institution** **3223431 - Concepts of Stream Ecology (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223433 - Literature seminar (S)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography** **3223431 - Concepts of stream ecology (V)** • Lampert & Sommer 2007 Limnoecology: The Ecology of Lakes and Streams, 2nd edition, Oxford University Press • Moss (2010) Ecology of Fresh Waters: A View for the Twenty-First Century, 4th edition, Wiley-Blackwell
13	**Use in degree programme** M.Sc. BioGeosciences (20187) M.Sc. Hydrology and Water Management (20233)
14	**Other information**

Module 25 **03BI2344** module	**Ecophysiology and ecosystem services of aquatic microorganisms**	6 credit points Compulsory elective

Workload	**Semester**	**Duration**
180 hours	N/A	1 semester

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	25.1	V	Ecophysiology and ecosystem services of aquatic microorganisms	3223441	Compulsory	2 contact hours per week 30 hours	60 hours	30	3
	25.2	Ü	Ecophysiology and ecosystem services of aquatic microorganisms	3223442	Compulsory	2 contact hours per week 30 hours	60 hours	30	3

2 **Learning outcomes / competences**

3223441 – Ecophysiology and ecosystem services of aquatic microorganisms (V)

The students

- have in-depth knowledge of the ecophysiological traits of aquatic microorganisms
- are able to explain the role microorganisms play in ecosystem functioning and the provision of ecosystem services in aquatic systems
- are able to consider the ecophysiological potential and metabolic capacity of microorganisms in the context of applied problem-solving
- are able to understand the significance of microbial activity in the context of government policies and the definition of guideline values and quality targets

3223442 – Ecophysiology and ecosystem services of aquatic microorganisms (Lecture)

The students

- have the ability to present the results of scientific studies (including analyses and forecasts) both orally and in writing
- are able to engage in factual and professional discussion and to offer constructive criticism
- are able to evaluate and revise their own work through discussion and by taking into account comments and recommendations made by peers and lecturers

3 **Contents**

3223441 – Ecophysiology and ecosystem services of aquatic microorganisms (V)

The ecophysiological traits of microorganisms and the ecosystem services they provide result from their adaptation to specific environmental conditions. This course imparts extensive and in-depth knowledge regarding these phenomena. The relationship between ecophysiology and metabolic performance, and its impact on the environment and ecosystem services, is demonstrated using selected examples such as:

- microorganisms involved in the nitrogen cycle and the transformation of nitrogen compounds in aquatic ecosystems and wastewater treatment plants
- the role of bacteria in the production and treatment of drinking water
- microbial degradation of natural biopolymers and organic (micro)pollutants
- extracellular electron transport and its importance for metabolic turnover and element cycling
- horizontal gene transfer and the spread of (resistance) genes

	3223442 - Ecophysiology and ecosystem services of aquatic microorganisms (Lecture) Students are instructed to work on a specific problem within the field of ecophysiology and ecosystem services in a scientifically sound and valid manner, to prepare a presentation and to revise it through a process similar to the peer review of scientific publications. The course includes: • the independent exploration of a specific topic based on a scientific publication (in small groups) • the preparation of a presentation and the acquisition of knowledge relevant to the discussion of the selected topic (in small groups) • presentation and discussion of the work within the whole group • a revision based on comments made during the discussions, followed by a final presentation
4	**Frequency of the course** offered only in the summer term **3223441 – Ecophysiology and ecosystem services of aquatic microorganisms (V)** offered only in the summer term **3223442 - Ecophysiology and ecosystem services of aquatic microorganisms (Seminar)** offered in the summer semester only
5	**Language of instruction** **3223441 - Ecophysiology and ecosystem services of aquatic microorganisms (L)** English **3223442 - Ecophysiology and ecosystem services of aquatic microorganisms (seminar)** English
6	**Entry requirements**
7	**Examination formats** Module component examination: Ecophysiology and ecosystem services of aquatic microorganisms (Lecture) – not specified (written – 2 weeks) Module component examination: Ecophysiology and ecosystem services of aquatic microorganisms (Ü) as 'not specified' (written – 2 weeks)
8	**Requirements for the award of credit points**
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Werner Manz
11	**Responsible institution** **3223441 - Ecophysiology and ecosystem services of aquatic microorganisms (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223442 - Ecophysiology and ecosystem services of aquatic microorganisms (Ü)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Bibliography**

	3223441 - Ecophysiology and ecosystem services of aquatic microorganisms (Lecture) • Allan, Castillo (2007) Stream Ecology. Springer, Dordrecht • Fuchs (ed.) (2017) General Microbiology. Thieme, Stuttgart • Madigan, Martinko, Stahl, Clark (2013) Brock Microbiology. Pearson Studium, Munich • Maier, Pepper, Gerba (2009) Environmental Microbiology. Academic Press Elsevier, London Further reading will be provided at the start of each course. **3223442 – Ecophysiology and ecosystem services of aquatic microorganisms (seminar)** • Allan, Castillo (2007) Stream Ecology. Springer, Dordrecht • Fuchs (ed.) (2017) General Microbiology. Thieme, Stuttgart • Madigan, Martinko, Stahl, Clark (2013) Brock Microbiology. Pearson Studium, Munich • Maier, Pepper, Gerba (2009) Environmental Microbiology. Academic Press Elsevier, London Further reading will be provided at the start of each course.
13	**Use in the degree programme** M.Sc. BioGeoSciences (20187) M.Sc. Hydrology and Water Management (20233)
14	**Further information**

Module 26 **03BI2341** module	**Ecological Water Body Assessment**							6 credit points Compulsory elective	
Workload 180 hours			**Semester** 2nd semester (recommended)				**Duration** 2 semesters		
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	26.1	Ü	Identification exercises	3223411	Compulsory	2 contact hours per week 30 hours	60 hours	20	3
	26.2	FÜ	Water Quality Assessment	3223412	Compulsory	2 contact hours per week 30 hours	60 hours	20	3

2 **Learning outcomes / competences**

3223411 – Identification exercises (Ü)

Students

- acquire in-depth taxonomic and ecological knowledge of aquatic animal groups, as well as practical skills in the field of identification

3223412 – Water Body Assessment (FÜ)

Students

- are able to assess the ecological quality of watercourses in accordance with the requirements of the Water Framework Directive and to interpret the results

3 **Contents**

3223411 - Identification Exercises (Practical)

- Identification of invertebrate aquatic organisms (macrozoobenthos), Autoecological characterisation of the animal groups studied

3223412 – Water body assessment (FÜ)

- Carrying out structural quality mapping, evaluation of the mapping results
- Carrying out water body assessment for the 'macrozoobenthos' quality component; evaluation and interpretation of the results

4 **Frequency of the course**

from the winter semester onwards

3223411 – Identification exercises (Ü)

Winter semester only

3223412 – Water Quality Assessment (FÜ)

only in the summer semester

5 **Language of instruction**

3223411 - Identification Exercises (Practical)

German

3223412 – Water Quality Assessment (FÜ)

	German
6	**Entry requirements** None
7	**Examination formats** Module examination in Ecological Water Body Assessment as a group examination (practical – 90 mins) **3223412 – Water Body Assessment (FÜ)** Coursework relevant to the examination: Coursework relevant to the examination: preparation, conduct and evaluation of all experiments (theory and practical – 2 weeks)
8	**Requirements for the award of credit points** Passing the module examination **3223412 – Water Body Assessment (FÜ)** Passing the examination-related coursework
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Dr Carola Winkelmann, PD
11	**Responsible institution** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **3223411 – Identification Exercises (Ü)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **3223412 - Water Quality Assessment (FÜ)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences
12	**Reading list** To be announced during the course.
13	**Use in degree programme** M.Sc. in BioGeoSciences (20187)
14	**Further information** **3223412 – Water Body Assessment (FÜ)** Block course in the summer term

Module 27 **03BI2342** module	**Experimental Design and Data Analysis** Please note: This module is not currently being offered.	6 credit points Compulsory elective

Workload	**Semester**	**Duration**
180 hours	3rd semester (recommended)	1 semester

1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
	27.1	V	Experimental design and data analysis	3223421	Compulsory	2 contact hours per week 30 hours	60 hours	10	3
	27.2	Ü	Experimental design and data analysis	3223422	Compulsory	2 contact hours per week 30 hours	60 hours	10	3

2 **Learning outcomes / competences**

3223421 – Experimental Design and Data Analysis (V)

Students

- gain in-depth knowledge of experimental design and statistical experimental design
- gain in-depth knowledge of data processing, analysis and visualisation
- gain knowledge of simple ecological models and multivariate statistical methods

3223422 - Experimental Design and Data Analysis (Practical)

Students

- are able to plan experiments independently, taking into account the requirements of statistical analysis methods
- can import, process and analyse collected data in statistical software
- can independently distinguish between simple and multivariate statistical tests and carry them out on a computer in a practical context

3 **Contents**

3223421 – Experimental Design and Data Analysis (V)

- Experimental design and statistical experimental planning
- Data processing and analysis, exploratory data analysis
- Simple statistical and ecological models
- Multivariate statistical methods

3223422 - Experimental Design and Data Analysis (Practical)

- Planning simple experiments
- Practical use of computer programmes (Excel, R)
- Software-supported data processing, analysis and visualisation
- Documentation in data processing and the creation of metadata

4 **Frequency of the course**

offered only in the summer term

3223421 – Experimental Design and Data Analysis (V)

offered in the summer term only

3223422 – Experimental Design and Data Analysis (Practical)

offered only in the summer term

5	**Language of instruction** **3223421 - Experimental Design and Data Analysis (L)** German **3223422 – Experimental Design and Data Analysis (Practical)** German
6	**Entry requirements** None
7	**Examination formats** Module examination in experimental design and data analysis: written examination (90 mins)
8	**Requirements for the award of credit points** Passing the module examination
9	**Weighting of the final mark** 6/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible institution** **3223421 – Experimental Design and Data Analysis (V)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology **3223422 - Experimental Design and Data Analysis (Ü)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology
12	**Reading list** To be announced separately.
13	**Use in degree programme** M.Sc. in BioGeosciences (20187)
14	**Further information** Two-week block course during the lecture-free period. Please check for separate announcements.

Final dissertation

BiG-KA		**Master's thesis**							30 credit points Compulsory module
Workload 900 hours			**Semester** 4th semester (recommended)			**Duration** 1 semester			
1	**Courses**				**Compulsory/Compulsory elective**	**Contact hours**	**Self-study**	**Planned group size**	**LP**
		A	Master's thesis in BioGeosciences	03XX2390	N/A	0 SWS 0 hours	810 hours	0	27
		A	Final oral examination	03XX2399	N/A	0 SWS 0 hours	90 hours	0	3
2	**Learning outcomes / competences** **03XX2390 – Master's Thesis in BioGeosciences (A)** Students • are able to apply theoretical knowledge in practice within a supervised biogeoscientific case study • have the ability to detect and analysing of complex (landscape) ecological relationships • have the ability to assess current conditions and predict changes in limnic-terrestrial ecosystems • are able to collect valid scientific data in the field and in the laboratory • are able to work with databases, carry out statistical analysis of data and present it in the form of tables, diagrams, maps and text • have the ability to balance ecological and socio-economic requirements • are capable of conducting research in the field of biogeosciences • have the ability to present the results of scientific analyses and forecasts in writing **03XX2399 – Final oral examination (A)** Students • are able to reflect on the guided biogeoscientific case study • have the the to written and oral presentation of results of scientific analyses and forecasts									
3	**Contents** **03XX2390 – Master's Thesis in BioGeosciences (A)** The Master's thesis is an examination paper designed to demonstrate that candidates are able to familiarise themselves with a biogeoscientific research question, solve it independently with appropriate guidance, and present the results in writing. The topic is selected in consultation between the candidates and their supervisors. **03XX2399 – Final Oral Examination (A)**									

	The Master's examination covers the subject matter of the Master's thesis, i.e. the methods used, the results and a discussion of these results, taking into account the relevant scientific literature.
4	**Frequency of offering** Every semester **03XX2390 – Master's Thesis in BioGeosciences (A)** Every semester **03XX2399 – Final Oral Examination (A)** Every semester
5	**Language of instruction** **03XX2390 - Master's thesis in BioGeosciences (A)** German **03XX2399 - Final oral examination (A)** German
6	**Entry requirements** **03XX2390 – Master's Thesis in BioGeosciences (A)** In accordance with Section 14 of the Regulations for Examinations in the Bachelor's and Master's degree programmes in BioGeosciences, students shall be admitted to the Master's thesis if they 1. have earned at least 75 LP and 2. have agreed a provisional topic for a Master's thesis with a supervisor. **03XX2399 – Final Oral Examination (A)** Competencies from module 03XX2390
7	**Examination formats** Master's thesis in BioGeoSciences as a single examination (written – 1) Final oral examination as a single examination (oral – 1)
8	**Requirements for the award of credit points 03XX2390 – Master's Thesis in** **BioGeosciences (A)** Submission of a Master's thesis of appropriate length in German or English following a period of 6 months. Passing the Master's thesis in accordance with Section 14 of the Regulations for Examinations in the Bachelor's and Master's degree programmes in BioGeosciences. **03XX2399 – Final Oral Examination (A)** Passing the final oral examination in accordance with Section 15 of the Regulations for Examinations in the Bachelor's and Master's degree programmes in BioGeosciences
9	**Weighting of the final mark** 30/120 of the degree programme
10	**Module coordinator** Prof. Dr Klaus Fischer
11	**Responsible institution**

	03XX2390 – Master's Thesis in BioGeosciences (A) Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography **03XX2399 - Final Oral Examination (A)** Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Biology Faculty 3: Mathematics/Natural Sciences **->** Institute for Integrated Natural Sciences **->** Department of Geography
12	**Bibliography** Depending on the topic, based on your own literature search. / Depending on the topic, according to your own literature search.
13	**Use in the degree programme**
14	**Other information** Both the Master's thesis in BioGeoSciences (03XX2390) and the final oral examination (03XX2399) may be completed in German or English in accordance with Section 14(6) and Section 15(3). **03XX2390 – Master's Thesis in BioGeoSciences (A)** Supervision of the Master's thesis is provided by a member of the panel authorised to conduct examinations in accordance with § 4(1) of the Examination Regulations. Within this framework, the supervising lecturer may be chosen freely. **03XX2399 – Final Oral Examination (A)** The 30-minute examination is conducted by the supervisor of the Master's thesis and two further examiners appointed by the Examination Board (examination committee in accordance with § 15(2) of the Examination Regulations).