



Sommersemester 24

Module Guide

for the study of

Ecology

Master of Science

valid in connection with the examination regulations MPO 2022

Module Guide for the Master's Program Ecology

Structure

- Compulsory modules (without master thesis module) 63 CP
- Elective modules (Specialization) 27 CP
- Master Thesis 30 CP

Generated: April 8, 2024

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Module 02-BIO-MA-CommEcol: Community Ecology

Community Ecology

Assignment to areas of study:

- Compulsory modules

Content-related prior knowledge or skills:

none

Learning content:

- The nature of ecological communities
- Interactions between vegetation and abiotic / biotic factors
- Ecological niches and indicator values
- Plant growth forms, life forms and strategies
- Plant species diversity at different spatial scales
- Human impact on vegetation and management
- Sustainable strategies for the preservation of biodiversity, species conservation under globalchange, identification of target species
- Tools of vegetation sampling and analysis of environmental data
- Plant identification
- Basics of multivariate statistical analyses, data transformation
- Ordination: CA, DCA, CCA, PCA, RDA, NMDS
- Classification. cluster analysis, TWINSpan

Learning outcomes / competencies / targeted competencies:

- The students have a basic understanding of the variety of species assemblages, especially of the theoretical concept and real differentiation of plant communities
- They can link the variation of plant communities to the variation of abiotic environmental factors and human impact
- They understand the importance of adaptations and ecological traits for the structure of ecological communities
- Students have an overview of different ecosystem services of communities, species conservation and environmental protection to safeguard a sustainable future
- They are able to sample field data on the species composition and environment of communities and to analyse these statistically by means of multivariate techniques

Calculation of student workload:

86 h Self-study

100 h Exam preparation

84 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Martin Diekmann

Frequency:

summer semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

9 / 270 hours

Module examinations

Module examination: Kombinationsprüfung Community Ecology	
Type of examination: combination exam	
Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 1 / 1 / -	
Language(s) of instruction: Englisch	
Description: PL 1 = Project group report SL 1 = oral presentation	

Module courses

Course: Community Ecology	
Frequency: winter semester, yearly	Are there parallel courses? no
Contact hours: 6	University teacher: Prof. Dr. Martin Diekmann Dr. Marlis Reich
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Tutorial Seminar Field trip	Associated module examination: Kombinationsprüfung Community Ecology
Associated module courses Community Ecology (Lecture)	

Module 02-BIO-MA-ConcEcol: Concepts of Ecology

Concepts of Ecology

Assignment to areas of study:

- Compulsory modules

Content-related prior knowledge or skills:

none

Learning content:

- Important concepts in different sub-disciplines of ecology
- Levels of ecological studies from autecology to ecosystems
- Autecology: life forms, responses of species along resource gradients, range size and local distribution
- Population ecology: population growth and intraspecific competition, interspecific competition, plant-animal interactions
- Community ecology: species assemblages, biodiversity, impacts of habitat and climate change, invasions
- Ecosystems: Energy flow and nutrient cycles, eutrophication

Learning outcomes / competencies / targeted competencies:

- Students have a basic overview of universal, modern concepts of ecology
- They can identify suitable and appropriate, observational and experimental, methods to answer research questions related to both basic and applied ecology
- They understand that ecological problems cannot be solved by a reductionistic approach, neglecting the intricate interactions between organisms and their abiotic and biotic environment
- They can take responsibility in a group work to tackle ecological research questions – from literature search to data extraction – and to translate this work into a joint oral presentation
- They comprehend that the concept of sustainability has its foundation in ecological principles

Calculation of student workload:

70 h Exam preparation

68 h Self-study

42 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Martin Diekmann

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Kombinationsprüfung Concepts of Ecology

Type of examination: combination exam

Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 1 / 1 / -	
Language(s) of instruction: Englisch	
Description: PL 1 = written examination SL 1 = oral presentation	

Module courses

Course: Concepts of Ecology	
Frequency: winter semester, yearly	Are there parallel courses? no
Contact hours: 3	University teacher: Prof. Dr. Martin Diekmann
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Tutorial Seminar	Associated module examination: Kombinationsprüfung Concepts of Ecology

Module 02-BIO-MA-DataAnal: Experimental Design and Data Analysis

Experimental Design and Data Analysis

Assignment to areas of study:

- Compulsory modules

Content-related prior knowledge or skills:

Basic knowledge in statistics is recommended.

Learning content:

- The consequences of experimental design for data analysis
- Null, alternative, and research hypotheses
- Designs for manipulative experiments and correlative studies
- Independence of data points, replication, pseudo-replication and randomization
- Controls, factorial and block designs, crossover and split-pot designs
- Linear models with one or more continuous or factorial variables
- Generalized linear models with one or more continuous or factorial variables
- GLMs with repeated measurements, generalized linear mixed models
- Model selection, MAM, Akaike

Learning outcomes / competencies / targeted competencies:

- Students are able to develop adequate experimental designs for research hypotheses and to critically analyze and improve existing experimental designs.
- They can handle data and prepare them for data analysis using R.
- They can apply linear, generalized linear, repeated measures and mixed models in an adequate fashion to data and interpret them both, statistically and biologically.
- They can report results from statistical analyses in a scientific fashion and can analyze and criticize statistical results towards their adequacy.

Calculation of student workload:

84 h SWS / presence time / working hours

40 h Exam preparation

146 h Self-study

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Thomas Hoffmeister

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

9 / 270 hours

Module examinations

Module examination: Kombinationsprüfung Experimental Design and Data Analysis

Type of examination: combination exam

Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 1 / 1 / -	
Language(s) of instruction: Englisch	
Description: PL 1 = written examination SL 1 = group presentation of an experimental design	

Module courses

Course: Experimental Design and Data Analysis	
Frequency: winter semester, yearly	Are there parallel courses? no
Contact hours: 6	University teacher: Prof. Dr. Thomas Hoffmeister
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Tutorial Seminar	Associated module examination: Kombinationsprüfung Experimental Design and Data Analysis

Module 02-BIO-MA-MolEcol: Molecular Techniques of Ecology**Molecular Techniques of Ecology****Assignment to areas of study:**

- Compulsory modules

Content-related prior knowledge or skills:

Basics of molecular biology are recommended

Learning content:

- Species hypotheses: biological and phylogenetic species concept (BSC, PSC)
- Molecular-based community analysis
- Molecular markers and their use in ecological studies
- DNA barcoding, metabarcoding, DNA-based taxon classification
- DNA fingerprinting techniques
- Sequencing techniques: Sanger, next-generation, third-generation
- Sequence (downstream) analyses, primary and secondary databases
- Sequence similarity based analyses
- Phylogenetic calculation
- How to use molecular techniques in the laboratory
- Workflow with detailed steps: from taking environmental samples to high-throughput sequencing
- Output formats to be ready to use for uni- and multivariate statistics

Learning outcomes / competencies / targeted competencies:

- At the end of the course, students will be able to decide on an appropriate molecular/computational approach and apply it specifically to test ecological hypotheses and concepts.
- In a scientific discussion, students will be able to form their own opinion about the validity of an applied approach and a derived ecological conclusion.
- They are able to defend their opinion based on their acquired knowledge regarding different techniques, their advantages and disadvantages.

Calculation of student workload:

60 h Self-study

140 h SWS / presence time / working hours

70 h Exam preparation

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Dr. Marlis Reich

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

9 / 270 hours

Module examinations

Module examination: Kombinationsprüfung Molecular Techniques of Ecology

Type of examination: combination exam	
Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 1 / 1 / -	
Language(s) of instruction: Englisch	
Description: PL 1 = Presentation and written assignment SL 1 = Assignment	

Module courses

Course: Molecular Techniques of Ecology	
Frequency: winter semester, yearly	Are there parallel courses? no
Contact hours: 10	University teacher: Dr. Marlis Reich Dr. Volkhard Rippe Dr. Rolf Nimzyk
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Tutorial Seminar Laboratory class	Associated module examination: Kombinationsprüfung Molecular Techniques of Ecology

Module 02-BIO-MA-PopEcol: Population Ecology

Population Ecology

Assignment to areas of study:

- Compulsory modules

Content-related prior knowledge or skills:

knowledge about concepts in population ecology at the Bachelor's level is expected

Learning content:

- Factors of demography: life cycles and life tables, survivorship curves
- Distribution and dispersal
- Methods in the estimation of population size
- Population genetics (genetic variation and population genetics, inbreeding, outbreeding and asexual reproduction, evolutionary and ecological genetics)
- Population growth, intraspecific competition, density dependence, self-thinning and population dynamics
- Interspecific competition, species interactions and models of interspecific competition, apparent competition
- Niche differentiation and partitioning, temporal and spatial aggregation and coexistence
- Predator-prey systems, food choice, functional responses, population cycles and models
- Demographic models, regional dynamics, metapopulations
- Invasive species
- Nature conservation and population viability analysis

Learning outcomes / competencies / targeted competencies:

Students have a sound knowledge about important concepts in population ecology, can explain such concepts and can plan and conduct experimental investigations based on these concepts. Based on this, they can formulate research hypotheses, gather appropriate data, analyze and present them.

Calculation of student workload:

84 h SWS / presence time / working hours

144 h Self-study

42 h Exam preparation

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Thomas Hoffmeister

Frequency:

summer semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

9 / 270 hours

Module examinations

Module examination: Kombinationsprüfung Population Ecology

Type of examination: combination exam	
Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 1 / 1 / -	
Language(s) of instruction: Englisch	
Description: PL 1 = written examination SL 1 = oral presentation	

Module courses

Course: Population Ecology	
Frequency: summer semester, yearly	Are there parallel courses? no
Contact hours: 6	University teacher: Prof. Dr. Martin Diekmann Prof. Dr. Marko Rohlfis Prof. Dr. Thomas Hoffmeister
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Seminar Laboratory class	Associated module examination: Kombinationsprüfung Population Ecology
Associated module courses Population Ecology (Lecture)	

Module 02-BIO-MA-ResProj: Research Project

Research Project

Assignment to areas of study:

- Compulsory modules

Content-related prior knowledge or skills:

none

Learning content:

The module research project aims at the training and individual performance of a research project under supervision of a senior scientist in the framework of inquiry-based learning.

Work on all steps of a scientific project by way of example:

1. Identification of research question(s) and hypotheses
2. Practical planning and outline of time schedule with supervisor
3. Initial literature review
4. Sampling of data
5. Analysis and interpretation of data
6. Writing, revision and formatting of project report

This part (steps 1-5) includes compulsory elective choices (Wahlpflicht, WP) of 9-12 weeks duration:

- WP1: Students undertake the practical work integrated in a research group at the University of Bremen, usually at the Institute of Ecology.
- WP2: Students undertake the practical work as internship students integrated in an external national or international research group

Learning outcomes / competencies / targeted competencies:

- Students can plan and execute a scientific project independently in single or group work and can thus implement the entire procedure of a research work from the stage of planning, hypothesis forming, sampling and analysing of data to final writing
- They can carry out ecological research on a level enabling them to proceed with a Master thesis

Calculation of student workload:

14 h SWS / presence time / working hours

100 h Self-study

336 h Exam preparation

Are there optional courses in the modules?

yes

The module includes compulsory elective choices (Wahlpflicht, WP) of 9-12 weeks duration:

- WP1: Students undertake the practical work integrated in a research group at the University of Bremen, usually at the Institute of Ecology.
- WP2: Students undertake the practical work as internship students integrated in an external national or international research group

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Martin Diekmann

Frequency:

each semester

Duration:

1 semester[s]

The module is valid since / The module is valid until: WiSe 22/23 / -	Credit points / Workload: 15 / 450 hours
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Module examinations

Module examination: Modulprüfung Research Project	
Type of examination: module exam	
Form of examination: Announcement at the beginning of the semester	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 1 / - / -	
Language(s) of instruction: Englisch	
Description: PL 1 = Project report	

Module courses

Course: Research Project	
Frequency: each semester	Are there parallel courses? yes
Contact hours: 1	University teacher: Prof. Dr. Martin Diekmann Prof. Dr. Marko Rohlf Prof. Dr. Juliane Filser Prof. Dr. Thomas Hoffmeister Dr. Marlis Reich
Language(s) of instruction: Englisch	
Teaching method(s): Seminar	Associated module examination: Modulprüfung Research Project

Module 02-BIO-MA-SciWri: Scientific Writing

Scientific Writing

Assignment to areas of study:

- Compulsory modules

Content-related prior knowledge or skills:

none

Learning content:

Motivation for scientific writing; how to get started; variability, basic structure and contents of the single parts of a scientific publication (Introduction, research questions, hypotheses; materials and methods; tables, graphs and results; discussion, conclusions and outlook; title, abstract and highlights. Use of Scientific English; good research practice; data storage; role of the editor, scope, impact and selection of scientific journals; predatory publishing; writing a mini-paper

Learning outcomes / competencies / targeted competencies:

The students

- have an overview of the various types and techniques of written presentations in basic, applied, and popular ecological science
- can write scientific mini-papers following the basic structure of a scientific publication (taking into account the do`s and don`ts of the associated writing style, as well as typical mistakes and pitfall traps in scientific writing, in particular concerning quality and quantity of the data).
- can select a high-quality journal matching both the contents and the targeted audience
- are able to address editors and suggest appropriate reviewers

Calculation of student workload:

82 h Exam preparation

70 h Self-study

28 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Juliane Filser

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Modulprüfung Scientific Writing

Type of examination: module exam

Form of examination:

See free text

The examination is ungraded?

no

Number of graded components / ungraded components / prerequisites of the examination:

1 / - / -

Language(s) of instruction:

Englisch

Description:

PL 1 = Scientific paper (mini-paper)

Module courses

Course: Scientific Writing

Frequency:

winter semester, yearly

Are there parallel courses?

no

Contact hours:

2

University teacher:

Prof. Dr. Martin Diekmann

Prof. Dr. Marko Rohlf

Prof. Dr. Juliane Filser

Language(s) of instruction:

Englisch

Teaching method(s):

Lecture

Seminar

Associated module examination:

Modulprüfung Scientific Writing

Module 02-BIO-MA-BaT: Be a Tutor**Be a Tutor****Assignment to areas of study:**

- Elective modules

Content-related prior knowledge or skills:

none

Learning content:

- Student assistance in a practical course of the 1st study year
- Help as part of a group with practical course arrangements (including administrative planning, purchase and compilation of course materials, booking of travels and accommodation, organisation of guidings)
- Tutoring of students during laboratory and field work as well as computational exercises

Learning outcomes / competencies / targeted competencies:

- Students understand the complexity of university teaching
- They can teach scientific contents and skills in different research fields in the framework of modules which they have passed before
- They have in-depth knowledge about specific subjects of ecology, acquired under the guidance of experienced academic teachers

Calculation of student workload:

5 h Exam preparation

71 h Self-study

14 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Martin Diekmann

Frequency:

each semester

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

3 / 90 hours

This module is ungraded!**Module examinations****Module examination:** Modulprüfung Be a Tutor**Type of examination:** module exam**Form of examination:**

See free text

The examination is ungraded?

yes

Number of graded components / ungraded components / prerequisites of the examination:

- / 1 / -

Language(s) of instruction:

Englisch

Description:

SL 1 = Internship report

Module courses

Course: Be a Tutor

Frequency:

each semester

Are there parallel courses?

no

Contact hours:

1

University teacher:

Prof. Dr. Martin Diekmann
 Prof. Dr. Marko Rohlf's
 Prof. Dr. Juliane Filser
 Prof. Dr. Thomas Hoffmeister
 Dr. Marlis Reich

Language(s) of instruction:

Englisch

Teaching method(s):

Seminar

Associated module examination:

Modulprüfung Be a Tutor

Module 02-BIO-MA-Biodiv: Advances in Biodiversity

Advances in Biodiversity

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

Fundamental knowledge on biodiversity, evolution and ecology is recommended.

Learning content:

- Basic definitions of the concept of biodiversity
- Changes in biodiversity through time, the history of biodiversity research
- Spatial and temporal patterns of biodiversity and their ecological reasons
- Biodiversity and ecosystem functions
- Biodiversity in the face of global change
- Methods of biodiversity research
- Biodiversity and society

Learning outcomes / competencies / targeted competencies:

The students

- have a basic understanding of the main concepts of biodiversity based on current scientific literature
- are able to identify different biodiversity patterns
- understand the high importance of the archiving and documentation of biodiversity information
- are able to reflect on the significance of biodiversity for ecosystem functioning and service provisioning in societal context, with special reference to sustainable development.

Calculation of student workload:

84 h Exam preparation

68 h Self-study

28 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Juliane Filser

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

SoSe 24 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Kombinationsprüfung Advances in Biodiversity

Type of examination: combination exam

Form of examination:

See free text

The examination is ungraded?

no

Number of graded components / ungraded components / prerequisites of the examination:

3 / - / -

Language(s) of instruction:

Englisch

Description:

PL 1: (25%) Presentation, oral

PL 2: (25%) Group examination, oral

PL 3: (50%) Project report

The compensatory principle applies, so that failure in a minor graded component can be compensated by other graded components if the overall performance is sufficient.

Module courses**Course:** Advances in Biodiversity**Frequency:**

winter semester, yearly

Are there parallel courses?

no

Contact hours:

2

University teacher:

Prof. Dr. Martin Diekmann

Prof. Dr. Juliane Filser

Language(s) of instruction:

Englisch

Teaching method(s):

Lecture

Seminar

Associated module examination:

Kombinationsprüfung Advances in Biodiversity

Module 02-BIO-MA-Ecotox: Environmental Risks and Ecotoxicology

Environmental Risks and Ecotoxicology

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

Fundamental knowledge on concepts of ecology and chemistry is recommended.

Learning content:

- Lecture & seminar: Hazardous substances, emission, environmental behaviour, bioavailability, acute and chronic exposition, biomagnification, principles of ecotoxicological test systems (from molecules to model ecosystems), modes of action and test endpoints, toxicodynamics, biomarkers, thinking in terms of structure-activity relations (T-SAR), persistency, bioaccumulation, biodegradation, data availability and uncertainty, environmental monitoring, chemicals regulation, legal aspects.
- Laboratories with two toxic model substances: literature study, occupational safety, analytics, aquatic and terrestrial tests with different organism groups; data evaluation and presentation

Learning outcomes / competencies / targeted competencies:

The students

- have an overview about the most relevant environmental hazards
- are able to assess modes of action and potential risks (a priori) under varying environmental conditions
- know selected analytical methods in chemistry and are aware of their importance in risk assessment
- have a basic understanding of risk assessment and regulation and can critically evaluate the associated potentials and limitations
- know the key aspects of occupational safety
- are familiar with a selection of standardised test methods, dose response curves and threshold values in environmental hazard assessment and can interpret examples of these
- are aware of data variability, accuracy and reproducibility and the resulting need for independent test runs

Calculation of student workload:

77 h SWS / presence time / working hours

25 h Exam preparation

78 h Self-study

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Juliane Filser

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Kombinationsprüfung Environmental Risks and Ecotoxicology	
Type of examination: combination exam	
Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 3 / - / -	
Language(s) of instruction: Englisch	
Description: PL 1: (25%) Presentation, oral (as individual seminar presentation) PL 2: (50%) Presentation, oral (as seminar group presentation on the practical) PL 3: (25%) Portfolio, consisting of short tests on the lecture The compensatory principle applies, so that failure in a minor graded component can be compensated by other graded components if the overall performance is sufficient.	

Module courses

Course: Environmental Risks and Ecotoxicology	
Frequency: winter semester, yearly	Are there parallel courses? no
Contact hours: 5,5	University teacher: Prof. Dr. Juliane Filser
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Tutorial Seminar	Associated module examination: Kombinationsprüfung Environmental Risks and Ecotoxicology

Module 02-BIO-MA-ExpEcol: Experimental Ecology

Experimental Ecology

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

Prior completion of Experimental Design and Data Analysis and Population Ecology is recommended.

Learning content:

- Experimental Design
- Grant Application Writing
- Experimental Data Collection and Analysis
- Data Presentation
- Chemical Ecology
- Terrestrial and Aquatic Invertebrate Ecology
- Microbial Ecology

Learning outcomes / competencies / targeted competencies:

Students will

- be able to design a proper lab-based ecological experiment and formulate their own research ideas according to the guidelines for a DFG Research Grant proposal
- be able to plan, conduct and present their research with an advanced level of independence

Calculation of student workload:

90 h Self-study

56 h SWS / presence time / working hours

34 h Exam preparation

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Marko Rohlf

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Kombinationsprüfung Experimental Ecology

Type of examination: combination exam

Form of examination:

See free text

The examination is ungraded?

no

Number of graded components / ungraded components / prerequisites of the examination:

2 / - / -

Language(s) of instruction:

Englisch

Description:

PL 1: (30%) Grant proposal

PL 2: (70%) Poster presentation (of research results)

The compensatory principle applies, so that failure in a minor graded component can be compensated by other graded components if the overall performance is sufficient.

Module courses

Course: Experimental Ecology

Frequency:

winter semester, yearly

Are there parallel courses?

no

Contact hours:

4

University teacher:

Prof. Dr. Marko Rohlf

Language(s) of instruction:

Englisch

Teaching method(s):

Seminar

Laboratory class

Associated module examination:

Kombinationsprüfung Experimental Ecology

Module 02-BIO-MA-FunctEcol: Functional Ecology: From Biodiversity Patterns to Ecosystem Functioning

Functional Ecology: From Biodiversity Patterns to Ecosystem Functioning

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

Prior completion of the module Molecular Techniques of Ecology is recommended.

Learning content:

- Evolution and function of (marine) organisms
- Ecological processes driving patterns of functional diversity
- Genetics, variability and the relevance thereof to understand ecological processes
- Principles of „omics“ approaches: genomics, transcriptomics, proteomics
- Environmental genomics: taxa- and community-centered approaches
- Computational biology: resources, pipelines, databases

Learning outcomes / competencies / targeted competencies:

- Students will be able to evaluate which computational sources need to be used to decipher the biogeography of species and their functional traits from different -omic datasets.
- Students will be able to critically evaluate publications based on omic datasets, present them in an understandable way, and use their knowledge to discuss their own opinions with others.

Calculation of student workload:

30 h Self-study

80 h Exam preparation

70 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Dr. Marlis Reich

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Kombinationsprüfung Functional Ecology: From Biodiversity Patterns to Ecosystem Functioning

Type of examination: combination exam

Form of examination:

See free text

The examination is ungraded?

no

Number of graded components / ungraded components / prerequisites of the examination:

1 / 1 / -

Language(s) of instruction:

Englisch

Description:

PL 1 = Oral presentation

SL 1 = Assignment

Module courses

Course: Functional Ecology: From Biodiversity Patterns to Ecosystem Functioning

Frequency:

winter semester, yearly

Are there parallel courses?

no

Contact hours:

5

University teacher:

Dr. Marlis Reich

Dr. Rolf Nimzyk

Language(s) of instruction:

Englisch

Teaching method(s):

Lecture

Tutorial

Seminar

Associated module examination:

Kombinationsprüfung Functional Ecology: From

Biodiversity Patterns to Ecosystem Functioning

Module 02-BIO-MA-GisAppl: GIS Applications in Ecology

GIS Applications in Ecology

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

none

Learning content:

- General introduction to the concept of Geographical Information Systems (GIS)
- Basic overview about the program QGIS and its structure and applications
- Use of various features, among others vector tools (geometry and geoprocessing tools), attribute tables, selection of features and joining
- Introduction to digitalization and import of own research data
- Map editing of the produced data
- Exemplary ecological applications

Learning outcomes / competencies / targeted competencies:

- Students have general knowledge of the use of the program QGIS and its potential applications in ecology
- They can digitalize, import and transform own or external research data for basic spatial and statistical analyses
- They can process the acquired data graphically for presentation and publication

Calculation of student workload:

34 h Exam preparation

28 h SWS / presence time / working hours

28 h Self-study

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Martin Diekmann

Frequency:

winter semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

3 / 90 hours

Module examinations**Module examination:** Modulprüfung GIS Applications in Ecology**Type of examination:** module exam**Form of examination:**

See free text

The examination is ungraded?

no

Number of graded components / ungraded components / prerequisites of the examination:

1 / - / -

Language(s) of instruction:

Englisch

Description:

PL 1 = Project report

Module courses

Course: GIS Applications in Ecology

Frequency:

winter semester, yearly

Are there parallel courses?

no

Contact hours:

2

University teacher:

Prof. Dr. Martin Diekmann

Dr. Cecilia Dupré

Language(s) of instruction:

Englisch

Teaching method(s):

Lecture

Tutorial

Associated module examination:

Modulprüfung GIS Applications in Ecology

Module 02-BIO-MA-InsEco: Insect Ecology and Biodiversity**Insect Ecology and Biodiversity****Assignment to areas of study:**

- Elective modules

Content-related prior knowledge or skills:

Prior completion of Experimental Design and Data Analysis, Population Ecology and Community Ecology is recommended.

Learning content:

- Insect functional trait diversity and ecosystem service
- Insect community composition and species interactions
- Habitat heterogeneity, plant and insect diversity
- Human impact, habitat management, and insect conservation
- Insect sampling and identification

Learning outcomes / competencies / targeted competencies:

Students will be able to

- evaluate the impact of environmental/anthropogenic habitat changes on insect populations, species interactions and associated ecosystem services
- link population, community and landscape ecology concepts to develop insect conservation measures that contribute to a sustainable use of terrestrial ecosystems
- apply appropriate sampling and identification techniques to assess the dynamics of insect functional diversity in response to environmental change and insect management

Calculation of student workload:

40 h Self-study

70 h Exam preparation

70 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Marko Rohlf

Frequency:

summer semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

SoSe 24 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Modulprüfung Insect Ecology and Biodiversity

Type of examination: module exam

Form of examination:

See free text

The examination is ungraded?

no

Number of graded components / ungraded components / prerequisites of the examination:
1 / - / -

Language(s) of instruction:
Englisch

Description:
PL 1 = oral examination

Module courses

Course: Insect Ecology and Biodiversity

Frequency:
summer semester, yearly

Are there parallel courses?
no

Contact hours:
5

University teacher:
Prof. Dr. Marko Rohlfs

Language(s) of instruction:
Englisch

Teaching method(s):
Lecture
Laboratory class

Associated module examination:
Modulprüfung Insect Ecology and Biodiversity

Associated module courses

Insect Ecology, Biodiversity and Conservation (Lecture)

Module 02-BIO-MA-LongExc: Long Ecological Excursion and Field Course

Long Ecological Excursion and Field Course

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

none

Learning content:

- Excursion with 9 to 14 days duration, to variable destinations, including Wadden Sea islands, Krkonoše Mountains, Southern Scandinavia or Baltic states
- Observation of plant and animal species with their communities in natural and cultural landscapes
- Observational and experimental field projects related to different fields of ecology (autecology, population and community ecology, behavioural ecology)
- Preparatory seminar introducing to the geology, geography, climate, culture, vegetation, flora / fauna and cultural history of the target region

Learning outcomes / competencies / targeted competencies:

- Students understand the variation of plant and animal communities of different habitats and into their underlying abiotic, biotic and anthropogenic factors
- The students can use a broad spectrum of ecological field methods and can conduct research studies under field conditions
- They can apply the basic skills of species identification with a focus on plants, insects and vertebrates

Calculation of student workload:

61 h Exam preparation

105 h SWS / presence time / working hours

14 h Self-study

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Martin Diekmann

Frequency:

summer semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

6 / 180 hours

This module is ungraded!

Module examinations

Module examination: Modulprüfung Long Ecological Excursion and Field Course

Type of examination: module exam

Form of examination:

Announcement at the beginning of the semester

The examination is ungraded?

yes

Number of graded components / ungraded components / prerequisites of the examination:
- / 1 / -

Language(s) of instruction:
Englisch

Description:
SL 1 = oral presentation

Module courses

Course: Long Ecological Excursion and Field Course

Frequency:
summer semester, yearly

Are there parallel courses?
no

Contact hours:
7,5

University teacher:
Prof. Dr. Martin Diekmann
Prof. Dr. Juliane Filser
Dr. Hans-Konrad Nettmann
Dr. Josef Müller
Dr. Cecilia Dupré

Language(s) of instruction:
Englisch

Teaching method(s):
Tutorial
Seminar
Field trip

Associated module examination:
Modulprüfung Long Ecological Excursion and Field Course

Associated module courses

Long ecological excursion and field course (Field trip)

Module 02-BIO-MA-MarEcol: Marine Ecology Excursion

Marine Ecology Excursion

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

none

Learning content:

- identification of key marine invertebrates (e.g. molluscs, arthropods, cnidarians, echinoderms, tunicates etc.)
- understanding biodiversity in the Mediterranean
- ecosystem engineering
- keystone species
- design, implementation and analysis of brief field experiments
- training in-situ marine survey techniques

Learning outcomes / competencies / targeted competencies:

Students are familiar with all major taxa of marine invertebrates and will be able to identify and distinguish them. Students understand ecosystem engineering and keystone species concepts. They link association of organisms to particular ecosystems and the contribution to ecosystem functioning.

Calculation of student workload:

96 h Exam preparation

84 h SWS / presence time / working hours

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Christian Wild

Frequency:

summer semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until:

WiSe 22/23 / -

Credit points / Workload:

6 / 180 hours

Module examinations

Module examination: Modulprüfung Marine Ecology Excursion

Type of examination: module exam

Form of examination:

See free text

The examination is ungraded?

no

Number of graded components / ungraded components / prerequisites of the examination:

1 / - / -

Language(s) of instruction:

Englisch

Description:
 PL 1 = Project report

Module courses

Course: Marine Ecology Excursion	
Frequency: winter semester, yearly	Are there parallel courses? no
Contact hours: 3	University teacher: Prof. Dr. Christian Wild
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Tutorial Field trip	Associated module examination: Modulprüfung Marine Ecology Excursion

Module 02-BIO-MA-SoilEco: Soil and Ecosystem Ecology

Soil and Ecosystem Ecology

Assignment to areas of study:

- Elective modules

Content-related prior knowledge or skills:

Fundamental knowledge on concepts of ecology and invertebrate identification is recommended

Learning content:

- Basic soil properties and their variability
- Fundamentals of soil formation
- Soil as a habitat
- Soil biomass and biodiversity
- Characteristics and functions of soil microorganisms, micro-, meso- and macrofauna
- Adaptations to life in soil
- Field excursions and sampling
- Methods in soil ecology
- Morphotype identification of soil invertebrates

Learning outcomes / competencies / targeted competencies:

The students

- have a basic understanding of the most important soil properties
- are able to roughly describe the horizons of selected soil types in the field and to interpret their most conspicuous characteristics
- understand the special characteristics of soil as a habitat and are aware of various adaptations of the organisms living there
- have a good overview on the biomass and diversity of soil organisms and the functions performed by them
understand the interactions of the different compartments and organisms in the pedosphere, with special respect to carbon cycling
- are able to apply a range of methods in the field (soil sampling and description, pitfall and emergence traps, earthworm extraction) and to analyse soils in the lab (pH, aggregate size, water holding capacity, rough identification of meso- and macrofauna)
- can evaluate the potentials and limitations of these and various additional methods in soil ecology

Calculation of student workload:

77 h SWS / presence time / working hours

25 h Exam preparation

78 h Self-study

Are there optional courses in the modules?

no

Language(s) of instruction:

English

Responsible for the module:

Prof. Dr. Juliane Filser

Frequency:

summer semester, yearly

Duration:

1 semester[s]

The module is valid since / The module is valid until: WiSe 22/23 / -	Credit points / Workload: 6 / 180 hours
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Module examinations

Module examination: Kombinationsprüfung Soil and Ecosystem Ecology	
Type of examination: combination exam	
Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 1 / 2 / -	
Language(s) of instruction: Englisch	
Description: PL 1 = Presentation and written assignment (of project) SL 1 = oral presentation SL 2 = Portfolio (consisting of short tests) The portfolio forms a unit and is graded as such.	

Module courses

Course: Soil and Ecosystem Ecology	
Frequency: summer semester, yearly	Are there parallel courses? no
Contact hours: 5,5	University teacher: Prof. Dr. Juliane Filser
Language(s) of instruction: Englisch	
Teaching method(s): Lecture Tutorial Seminar Field trip	Associated module examination: Kombinationsprüfung Soil and Ecosystem Ecology
Associated module courses Soil and Ecosystem Ecology (Laboratory class)	

Module 02-BIO-MA-MasThes: Module Master Thesis (and Colloquium)

Module Master Thesis (and Colloquium)

Assignment to areas of study:

- Master thesis

Content-related prior knowledge or skills:

none

Learning content:

The module Master Thesis aims at the training and individual independent performance of a research project under supervision of a senior scientist in the framework of inquiry-based learning. The master thesis project is supervised and conducted under the conditions of the respective department at the University of Bremen and the examination regulations of the respective study programme.

The Module Master Thesis includes:

- Definition of an independent ecological research theme
- Planning and discussion of the contents and the time frame of the research work in lab meetings
- Realization of the research project: practical preparation, sampling of data, statistical analysis, structuring and writing of the thesis under the guidance of supervisor(s)

The module includes compulsory elective choices (Wahlpflicht WP) of 24 weeks (or upon request 28 weeks) duration:

- WP1: The practical work is conducted in a research group at the University of Bremen, usually at the Institute of Ecology.
- WP2: The practical work is conducted as an internship student integrated in an external national or international research group.

Learning outcomes / competencies / targeted competencies:

- Students can implement their scientific knowledge and methodological competences in the field of ecology to independently carry out a research project
- They can sample and analyse ecological data and report and interpret them in a written thesis
- They have the competences necessary to apply for and conduct a PhD project and to enter into a future scientific career:
 - They can independently identify, address and investigate scientific problems using a research-based approach.
 - They are able to present and discuss the results of a scientific investigation professionally.

Calculation of student workload:

86 h Self-study

814 h Exam preparation

Are there optional courses in the modules?

yes

The module includes compulsory elective choices (Wahlpflicht WP) of 24 weeks (or upon request 28 weeks) duration:

- WP1: The practical work is conducted in a research group at the University of Bremen, usually at the Institute of Ecology.
- WP2: The practical work is conducted as an internship student integrated in an external national or international research group.

Language(s) of instruction: English	Responsible for the module: Prof. Dr. Martin Diekmann
Frequency: each semester	Duration: 1 semester[s]
The module is valid since / The module is valid until: WiSe 22/23 / -	Credit points / Workload: 30 / 900 hours

Module examinations

Module examination: Thesis and Colloquium	
Type of examination: module exam	
Form of examination: See free text	The examination is ungraded? no
Number of graded components / ungraded components / prerequisites of the examination: 2 / - / -	
Language(s) of instruction: Englisch	
Description: PL 1: Master Thesis (75 %) PL 2: Colloquium (25 %)	

Module courses

Course: Master Thesis	
Frequency: each semester	Are there parallel courses? yes
Contact hours:	University teacher: Prof. Dr. Martin Diekmann Prof. Dr. Marko Rohlf Prof. Dr. Juliane Filser Prof. Dr. Thomas Hoffmeister Dr. Marlis Reich
Language(s) of instruction: Englisch	
Teaching method(s): Self-study unit	Associated module examination: Thesis and Colloquium

Module 02-BIO-MA-0-MOE: Supplementary Courses in the Master of Ecology

Supplementary Courses in the Master of Ecology

Assignment to areas of study: • Supplementary Courses	Content-related prior knowledge or skills: none
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Learning content:

Learning outcomes / competencies / targeted competencies:

Calculation of student workload:

Are there optional courses in the modules?

no

Language(s) of instruction: English	Responsible for the module: N.N.
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Frequency: (depending on capacity) winter or summer semester	Duration: 1 semester[s]
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The module is valid since / The module is valid until: SoSe 24 / -	Credit points / Workload: 0 / 0 hours
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This module is ungraded!

Module examinations

Module examination: With examination or without examination

Type of examination: module exam

Form of examination: See free text	The examination is ungraded? yes
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Number of graded components / ungraded components / prerequisites of the examination:
- / 1 / -

Language(s) of instruction:
Englisch

Module courses

Course: Lab Safety and Fire Prevention Workshop (in English)

Frequency: (depending on capacity) winter or summer semester	Are there parallel courses? no
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Contact hours:	University teacher: N. N.
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Language(s) of instruction:
Englisch

Teaching method(s): Lecture Tutorial	Associated module examination: With examination or without examination
Associated module courses	
Lab Safety and Fire Prevention Workshop (in English) (Lecture)	
Course: Supplementary Courses in the Master of Ecology	
Frequency: (depending on capacity) winter or summer semester	Are there parallel courses? no
Contact hours:	University teacher: N. N.
Language(s) of instruction: Englisch	
Teaching method(s): Tutorial Seminar Field trip	Associated module examination: With examination or without examination