Modulhandbuch für den Masterstudiengang/ Compendium of modules in the Master Study Program

Ecology and Microbial Biodiversity (EcoDiv)

am Fachbereich Biologie der TU Kaiserslautern/
at the Faculty of Biology of the University of Kaiserslautern

(*verabschiedet vom Fachbereichsrat Biologie am 27.6.2012*)

Für Rückfragen stehen die Koordinatoren des Studiengangs zur Verfügung/
For more information, please contact the coordinators of the program:

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Prof. Dr. Thorsten Stoeck (0631-2052502; stoeck@rhrk.uni-kl.de)

Code	Lehrveranstaltungen/ Courses	Prüfung/ Examination	CP	Coordi-nator(s)
T1	Theorie/ Theory 1	schriftlich; benotet/ written, graded	6	TS, BB
T2	Theorie/ Theory 2	schriftlich; benotet/ written, graded	6	BB
T3	Theorie/ Theory 3	schriftlich; benotet/ written, graded	6	TS
T4	Theorie/ Theory 4	mündlich o. schriftlich; unbenotet/ oral or written, non-graded	6	BB
CC	Lehrveranstaltungen nach Wahl/ Courses of choice	mündlich o. schriftlich; unbenotet/ oral or written, non-graded	15	RW
VP1	Vertiefungspraktikum/ Advanced Practical 1	schriftlich; benotet/ written, graded	12	TS
VP2	Vertiefungspraktikum/ Advanced Practical 2	schriftlich; benotet/ written, graded	12	RW
VP3	Vertiefungspraktikum/ Advanced Practical 3	mündlich o. schriftlich; unbenotet/ oral or written, non-graded	12	TS, BB
RP	Forschungspraktikum/ Research Practical	mündlich; benotet/ oral, graded	15	PI
MT	Masterarbeit/ Master Thesis	schriftlich, benotet/ written, graded	30	PI

BB: Burkhard Büdel, TS: Thorsten Stoeck, RW: Rainer Wirth, JK: Jürgen Kusch, MD: Micah Dunthorn; PI: Principal investigator (supervisor), EXT: External teacher

Die Masterstudiengänge werden abgekürzt wie folgt/ The Master study programs are abbreviated as follows:
Ecology and Microbial Biodiversity: EcoDiv
Microbial and Plant Biotechnology: MPBiotec
Molecular Cell and Neurobiology: CellNeuro

Theorie 1 / Theory 1

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
T1	180 h/ 6 CP	4	1.	WS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Lecture „Diversity and Evolution“	20 h	70 h	
Lecture „Systematics and Ecology of Cryptogams“	20 h	70 h	12-20

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students acquire a deepened knowledge of theoretical contents and research topics of the diversity and evolution in the three domains of life as well as in the systematics and ecology of cryptogams. The reconstruction of phylogenetical and evolutionary traits of different taxonomic groups using the methodology of bioinformatics (at the protein, gene, and genome level) will be told. Students will work with English literature (textbooks, monographs, review articles, original research articles) to increase their knowledge about these subjects. They will increase their ability for scientific discussions and presentations.

Topics: In the lecture „Diversity and Evolution“, students will learn about the biodiversity in the universal tree of life (domains archaea, bacteria and eukaryotes) and understand mechanisms that generate this diversity. The lecture will focus on aquatic and terrestrial organisms and students will increase their knowledge about the ecological meaning of biodiversity. Different species concepts in the light of biodiversity research will be introduced. The lecture includes a theoretical unit about basic methods in biodiversity research.

In the lecture „Systematics and Ecology of Cryptogams“ the understanding of cyanobacteria, algae, fungi, lichens and bryophytes will be introduced theoretically with their most recent phylogeny, morphology and life cycles as well as basic ecological features. Their systematics and phylogeny is treated in detail and specific methods of phylogenetic research in the different groups will be discussed. The ecology of the different groups will be demonstrated on selected taxa.

Literature will be provided before start of the lectures

Pflichtveranstaltungen/ Compulsary courses

Lehrformen/ Teaching methods

Lecture

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

Optional for MPBiotec

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to EcoDiv or MPBiotec

Prüfungsformen/ Types of examination

90 min written examination

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

6/87 (6,9%)

Modulbeauftragte und hauptamtlich Lehrende/ Organizers of module and full-time teacher(s)

Prof. B. Büdel, Prof. T. Stoeck, Dr. M. Dunthorn

Sonstige Informationen/ Further information

none

Theorie 2 / Theory 2

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
T2	180 h/ 6 CP	4	2.	SS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Lecture with seminar „Ecology of Plants“	42 h	138 h	20-30

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students acquire a deepened knowledge of theoretical contents and research topics of general plant ecology and detailed information on vegetation ecology and to evaluate them critically. They are able to work with English literature (textbooks, monographs, review articles, original research articles) to increase their knowledge about general plant ecology and vegetation ecology. They increase their ability for scientific discussions and presentations.

Topics: General topics of plant ecology like plant and habitat, phytogeography, vegetation ecology, and more specifically the eco-physiology of plant types and the ecology of the nine major plant related biomes of the earth.

Literature will be provided before start of the lectures

Pflichtveranstaltungen/ Compulsary courses

Lehrformen/ Teaching methods

Lecture

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

Optional for MPBiotec

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to EcoDiv or MPBiotec

Prüfungsformen/ Types of examination

90 min written examination

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance of seminars; passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

6/87 (6,9%)

Modulbeauftragter und hauptamtlich Lehrender/ Organizer of module and full-time teacher(s)

Prof. B. Büdel

Sonstige Informationen/ Further informations

Theorie 3 / Theory 3

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
T3	180 h/ 6 CP	3	2.	SS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Lecture with seminar “Marine Ecology”	34 h	146 h	12-20

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students acquire a deepened knowledge of theoretical contents and research topics of general marine ecology. During a seminar as part of this module (1 SWS), students will read scientific papers about current topics in marine ecology. Each student attending this module will develop presentation skills through the presentation of one scientific paper. During the lecture (2 SWS) students will acquire the background knowledge to read, understand and critically evaluate these scientific papers.

Topics: Basic knowledge of oceanography, environmental conditions, ecosystem components, biotic structure of selected ecosystems (e.g. coastal seas, intertidal seas, deep-sea, coral seas), marine community ecology, plankton ecology, adaptive strategies, and human impacts on the sea (e.g. fisheries, mariculture, pollution, global warming, ocean acidification).

Literature will be provided before start of the lectures

Pflichtveranstaltungen/ Compulsary courses

Lehrformen/ Teaching methods

Lecture and seminar

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

Optional for MPBiotec

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to EcoDiv or MPBiotec

Prüfungsformen/ Types of examination

90 min written examination

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance; passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

6/87 (6,9%)

Modulbeauftragter und hauptamtlich Lehrender/ Organizer of module and full-time teacher(s)

Prof. T. Stoeck

Sonstige Informationen/ Further information

Theorie 4 / Theory 4

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
T4	180 h/ 6 CP	4	3	WS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Lecture and/or seminar “Subsidiary Topics”	45 h	135 h	variable

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students acquire knowledge of theoretical contents and research topics relevant to the deeper education of the individual student. Possible choices will include for example: statistics, stochastics, mathematical modeling, bioinformatics (cluster analyses, alignments, nucleotide sequences, MCMC), phylogenetics (phylogenetic models, likelihood, distance, Mr. Bayes), environmental law, water management.

Topics: Topics of this module are variable and are designed to prepare each individual student for specific field of work, which is the intended professional career of the student.

Literature will be provided before start of the lectures

Wahlpflichtveranstaltung/Compulsory optional module

Lehrformen/ Teaching methods

Lecture or seminar

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

MPBiotec and CellNeuro, provided the agreement of the individual teachers

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to this Master study program

Prüfungsformen/ Types of examination

Lecture: Non-graded written examination; Seminar: oral presentation (non-graded)

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance of courses and fulfilment of study achievements such as oral presentations, contribution to discussions or protocols; if applicable passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

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Modulbeauftragte und hauptamtlich Lehrende/ Organizers of module and full-time teacher(s)

Prof. B. Büdel, Prof. T. Stoeck; teachers engaged in this study program

Sonstige Informationen/ Further information

Choices of appropriate courses will be discussed between each individual student and the organizers

Lehrveranstaltungen nach Wahl / Courses of Choice

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
CC	450 h/ 15 CP	ca.12	1. - 2.	WS + SS	3 semesters

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Diverse courses of choice	ca. 125 h	ca. 325 h	variable

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: Depending on the courses chosen, the students acquire a deepened and widened practical and theoretical knowledge in various biological and non-biological directions. They are able to increase their knowledge in diverse fields of science and expertise. They enhance their capabilities for scientific discussions and presentations, and improve their methodical and laboratory skills. They acquire interdisciplinary and multidisciplinary knowledge and competences, including competences in general skills that are required for professional work (soft skills).

Topics: The module 'Courses of Choice' comprises courses that are not necessarily thematically connected to each other. It includes theoretical topics and methods in biology and non-biological fields of expertise, as well as interdisciplinary courses, including those that convey general professional competences (soft skills) and language courses. For foreign students, German courses above A2 level, and for all students, English courses above B2 level can be credited.

For a comprehensive list of choices, see http://www.kis.uni-kl.de

Soft skill courses:

Seminar: Practical ethics in biological research (Cullum) 2 SWS, 2CP (SS)

Lecture: Entrepreneurial Marketing (in German) (Fassott) 4 SWS, 6 CP (SS)

Lecture: Schlüsselqualifikation - Unternehmerkompetenz für Naturwissenschaftler (Key qualification - entrepreneurial competence for natural scientists) (in German) (Grünhagen) 2 SWS, 3 CP (WS)

Lecture: Gründungsmanagement (in German) (Fassott) 2 SWS, 3 CP (WS)

Practical: Gründungsplanspiel (in German) (Roth, Sohn) 2 SWS, 3 CP (WS)

Lecture: Philosophiegeschichte: Antike (in German) (Neuser) 2 SWS, X CP (WS)

Seminar: Wissenschaftstheorie I (in German) (Roterberg) 2 SWS, X CP (WS)

Wahlpflichtveranstaltung/ Compulsory optional course

Lehrformen/ Teaching methods

Diverse

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

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Teilnahmevoraussetzungen/ Requirements for attendance

Admission to this and other study programs

Prüfungsformen/ Types of examination

Diverse: Oral presentations, contribution to discussions, written or oral examinations (non-graded)

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance of seminars or practical courses; passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

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Modulbeauftragte/r und hauptamtlich Lehrende/ Organizer(s) of module and full-time teacher(s)

Dr. Rainer Wirth; teachers of the Faculty of Biology and of other Faculties

Sonstige Informationen/ Further informations

3 - 6 CP have to be achieved by courses in which soft skills are conveyed; a maximum of 8 CP can be achieved by practical courses.

Vertiefungspraktikum 1 / Advanced Practical 1

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
VP1	360 h/ 12 CP	8	1.	WS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Advanced Practical „Plankton Ecology“ with field work, lecture and seminar	112 h	248 h	max. 15

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students will learn basic techniques for the analyses of freshwater microbial plankton communities. This includes field-work and lab experiments. Theoretical knowledge will be acquired through an accompanying lecture as part of the practical course and seminars (each student will present a scientific paper relevant to the subject of the course). As a result of this course, students will be able to identify and characterize the basic biotic components of a plankton community and environmental factors shaping these communities. Statistical methods for field data evaluation as well as phylogenetic tools in molecular diversity research will belong to the student's repertoire after completing this course. The students will be able to present, interpret and discuss their experimental data in a written and oral form.

Topics: Field-work: sampling techniques, recording of environmental parameters, sample preparation for subsequent lab work including the application of bioinformatics for phylogenetic analyses.

Lab-work: live microscopy, staining and identification of microbial plankton organisms, fluorescence in situ hybridization for protistan- and bacterioplankton cell counts, nucleic acid extraction and amplification of taxonomic marker genes for sequencing; nucleotide sequencing, alignments.

Data analyses: statistical tools in diversity and community analyses, phylogenetic analyses (likelihood, distance, Mr. Bayes, MCMC).

Documentation and presentation: In the seminar, students present their own results and a scientific research paper. They will learn to draft a scientific paper based on the data obtained during the practical course. Scientific papers discussed during the seminar will serve as templates for student's papers.

Literature will be provided before and during the courses.

Pflichtveranstaltung/ Compulsary course

Lehrformen/ Teaching methods

Practical with lecture and seminar

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

MPBiotec, if places are available

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to EcoDiv and MPBiotec

Prüfungsformen/ Types of examination

Written examination

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance of the practical and the seminar, passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

12/87 (13,8 %)

Modulbeauftragter und hauptamtlich Lehrende/ Organizer of module and full-time teacher(s)

Prof. T. Stoeck, Dr. Alexandra Stock

Sonstige Informationen/ Further information

Due to a three-day field trip, this course is liable to costs

Vertiefungspraktikum 2 / Advanced Practical 2

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
VP2	360 h/ 12 CP	8	1. - 3.	SS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Advanced Practical „Plant Ecology“ with field work, lecture and seminar	112 h	248 h	6-12

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students acquire a deepened knowledge in experimental methods and selected research topics within the field of plant ecology. They have learned to perform, under supervision, the planning and execution of scientific field assessments and experiments. They have learned to understand the theoretical basis and to devise methodical details of experiments using English technical literature. They are able to present, interpret and discuss their experimental data in a written and oral form.

Topics: Working in groups of three students during a period of 5 weeks, the students are performing vegetation analyses in the field and eco-physiological experiments under research-like conditions. In addition to the main program of the practical, the students will develop own research projects on the basis of field observations, present them to a review panel that selects the best project, and will be performed in the field the following day. They will document their results in oral presentations and written protocols. In the seminar, the students present their evaluations of original articles, in the lecture their experimental results in presentations. Literature will be provided before and during the courses.

One of the Practicals listed below can be chosen:

VP Plant Ecology 1 (B. Büdel, R. Wirth; 12 places)
Research in vegetation ecology and eco-physiology mainly focused on lower plant communities and individuals.

VP Plant Ecology 2 (B. Büdel, R. Wirth; 12 places)
Research in vegetation ecology and eco-physiology focused on vascular plant communities and individuals.

Wahlpflichtveranstaltung/ Compulsory optional course

Lehrformen/ Teaching methods

Practical with lecture and seminar

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

MPBiotec, if places are available

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to EcoDiv or MPBiotec, examination in module T2

Prüfungsformen/ Types of examination

Written examination

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance of the practical and the seminar, passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

12/87 (13,8 %)

Modulbeauftragter und hauptamtlich Lehrende/ Organizer of module and full-time teacher(s)

Prof. B. Büdel, Dr. R. Wirth

Sonstige Informationen/ Further informations

Vertiefungspraktikum 3a / Advanced Practical 3a

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
VP3-1	360 h/ 12 CP	8	3.	SS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Advanced Practical „Marine Ecology“ with excursion and seminar	112 h	248 h	max. 15

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students acquire a deep knowledge in marine, predominantly coastal, ecology through field-work, experiments and lab work. Students will learn to develop, design and conduct experiments in the field in order to study specific question in marine ecology. Presentation skills will be trained in the seminar through the presentation of a scientific paper relevant to the topics of this course.

Topics: Field work: Intertidal ecosystems (rocky shores, sediment shores); habitat zonation – causes and effects; sampling techniques (intertidal, benthic, pelagic, offshore); indicator organisms; ecosystem engineers; biochemistry of sediments; food webs and energy flow; interstitial microorganisms, phyto-, zoo-, protistan- and bacterioplankton; habitat diversity (salt marshes, mussel beds, sea grass, substrates, offshore, intertidal); adaptation strategies; environmental factors structuring benthic communities; sea birds; marine mammals, Natural World Heritage. Guest scientists will give lectures about current topics in marine ecology. Literature will be provided before and during the courses.
Data analyses: statistical tools in ecology and marine science; molecular tools in biodiversity research; distribution mapping; evaluation of experiments to adaptation strategies and functional roles of indicator organisms
Documentation and presentation: In the seminar, students present their own results. Presentations are subjected to group discussions for quality evaluation.
This course (VP3a) is mandatory (required) for all students planning their Master Thesis in the Department of Ecology (Prof. Stoeck). It can be chosen as a course of choice for other EcoEvoDiv students. For students conducting their Master Thesis in a different department course VP3b (winter term, 3rd semester) can be chosen as an alternative. Alternative choices, such as practicals in other departments or research institutions in Germany of other countries, are also possible.

Wahlpflichtveranstaltung/ Compulsory optional course (option a)

Lehrformen/ Teaching methods

Practical with seminar

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

MPBiotec, if places are available

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to EcoDiv or MPBiotec

Prüfungsformen/ Types of examination

Non-graded written or oral examination

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance of courses and completion of study achievements such as oral presentations or protocols; if applicable passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

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Modulbeauftragter und hauptamtlich Lehrende/ Organizer of module and full-time teacher(s)

Prof. T. Stoeck, Dr. Alexandra Stock, Prof. B. Büdel

Sonstige Informationen/ Further information

Due to a field trip (Sylt or Roscoff) this course is liable to costs

Vertiefungspraktikum 3b / Advanced Practical 3b

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
VP3-2	360 h/ 12 CP	8	3.	WS	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Advanced practical „Species and Functional Diversity“ with seminar	112 h	248 h	6-12

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: The students acquire a deepened knowledge in species diversity and identification methods. They have learned to perform, under supervision, the usage of specific determination keys and literature as well as different methods to identify (classical and molecular). They have learned to understand the theoretical basis and to devise methodical details of finding, isolating and cultivating organisms from the field. They are able to present, interprete and discuss their data in a written and oral form.

Topics: Working in groups and individually during a period of 5 weeks, the students are performing determinations of a large variety of cryptogamic organisms and document their results in written protocols. In the seminar, they present their results in lectures, with posters or similar. Literature will be provided before and during the courses.

Advanced Practicals (VP), or ‚Aufbaupraktika‘ (AP) also offered for the Bachelor program ‚Biowissenschaften‘, that are listed below can be can be chosen from the catalogue below. Alternative choices, such as practicals in other departments or research institutions in Germany of other countries, are also possible.

VP/AP Embryo Plants (NN; 12 places)
A set of different groups of vascular plants are given to each student. They will learn determination and gather a detailed knowledge of their morphology and development.

VP Fungi and Lichens (NN; 12 places)
A set of different groups of fungi and lichens are given to each student. They will learn determination and gather a detailed knowledge of their morphology and development.

VP Algae (NN)
A set of different groups of cyanobacteria/algae are given to each student. They will learn determination and gather a detailed knowledge of their morphology and development.

VP Molecular Methods in Microbial Diversity Research (Stoeck; NN)
Isolation of DNA from different groups or microorganisms, PCR and sequencing of different genes for a phylogenetic analysis, and methods to generate and evaluate phylogenetic trees.

Wahlpflichtveranstaltung/ Compulsory optional course (option b)

Lehrformen/ Teaching methods

Practical with seminar

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

MPBiotec, and Bachelor program ‚Biowissenschaften’, if places are available

Teilnahmevoraussetzungen/ Requirements for attendance

Admission to MPBiotec, CellNeuro or EcoDiv, possibly to Bachelor program ‚Biowissenschaften’, passed examination in Theory module 1

Prüfungsformen/ Types of examination

Non-graded written or oral examination

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Regular attendance of courses and completion of study achievements such as oral presentations or protocols; if applicable passed examination

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

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Modulbeauftragter und hauptamtlich Lehrende/ Organizer of module and full-time teacher(s) Prof. T. Stoeck; teachers engaged in this study program
Sonstige Informationen/ Further information **none**

Forschungspraktikum / Research Practical

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
RP	450 h/ 15 CP	---	3.	Nach Absprache/ by agreement	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Research Practical	360	80	1
accompanying Seminar	2	8	variable

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: Performing scientific work on a small research project using current methods, and data analysis. The students will be able to do the planning and execution of experiments with an increasing degree of independence. They are able to present and to interpret their own experimental results in a written research report, and increase their ability of scientifically founded presentation and discussion. They acquire practical and theoretical expert knowledge.

Topics: In an 8-10 weeks practical, the students learn methods and are introduced into scientific research topics that are investigated in the groups that are involved in the study program. The research practical is usually performed in the same group in which the Master thesis is performed. It can serve as a practical and theoretical preparation for the Master Thesis. The practical is finished by a written report and an oral presentation of the experimental results.

Wahlpflichtveranstaltung/ Compulsory optional course

Lehrformen/ Teaching methods

Individual practical with final seminar

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

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Teilnahmevoraussetzungen/ Requirements for attendance

Successful completion of at least two Advanced Practicals and two Theory modules

Prüfungsformen/ Types of examination

Oral examination (lecture with discussion)

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Completion of the practical; final lecture; protocol

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

15/87 (17,2 %)

Modulbeauftragte/r und hauptamtlich Lehrende/ Organizer(s) of module and full-time teacher(s)

Teachers engaged in this study program

Sonstige Informationen/ Further information

Masterarbeit / Master Thesis

Kennnummer/ ID-number	Work load/ Credits	SWS	Semester	Angebotsturnus/ Frequency	Dauer/ Duration
MT	900 h/ 30 CP	---	4.	Nach Absprache/ by agreement	1 semester

Lehrveranstaltungen/ Courses	Kontaktzeit/ Contact time	Selbststudium/ Self study time	Gruppengröße/ Group size
Thesis work and lecture	720 h	180 h	1

Qualifikationsziele, Kompetenzen und Inhalte/ Goals of qualification, competences, topics

Goals of qualification, competences: After successful completion of the Master Thesis, students have acquired profound practical skills in state-of-the-art methods and concepts in microbial ecology, evolution and biodiversity. They are acquainted with current research and recent publications in this field. They are trained in compiling and analyzing data for a scientific paper and in writing a scientific report. In addition to scientific expertise, students will acquire soft skills, such as time and project management, working in interdisciplinary teams, English communication and writing skills, and rules of responsible conduct of research. Overall, with successful completion of their thesis, students proove their scientific competence and demonstrate that they are ready to tackle a demanding doctoral project.

Topics: Performing research on a scientific project in a group of the Faculty of Biology that is engaged in this Master study program.

Lehrformen/ Teaching methods

Within six months, the student has to solve a problem individually, thereby employing scientific approaches and methods. She/he has to present her/his results both in a seminar lecture and in a written scientific report

Verwendbarkeit des Moduls in anderen Studiengängen/ Usability of the module in other study programs

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Teilnahmevoraussetzungen/ Requirements for attendance

Successful completion of at least 78 CP, including the credits for VP1-VP3 and RP

Prüfungsformen/ Types of examination

Thesis evaluation

Voraussetzungen für die Vergabe von Leistungspunkten/ Achievements required for obtaining credit points

Successful completion of the Master Thesis, seminar lecture with discussion

Stellenwert der Note in der Endnote/ Relative weight of grade for final grade

30/87 (34,5 %)

Modulbeauftragte und hauptamtlich Lehrende/ Organizers of module and full-time teacher(s)

Prof. B. Büdel, Prof. T. Stoeck