



UNIVERSITÄT
BAYREUTH

Modulhandbuch

M5 979 Global Change Ecology M.Sc.
Global Change Ecology M.Sc.
Universität Bayreuth

Allgemeine Informationen und Lesehinweise

Ein zentraler Baustein des Bologna-Prozesses ist die Modularisierung der Studiengänge, das heißt die Umstellung des vormaligen Lehrveranstaltungssystems auf ein Modulsystem, in dem die Lehrveranstaltungen zu thematisch zusammenhängenden Veranstaltungsblocken – also Modulen – gebündelt sind.

Dieses Modulhandbuch enthält die Beschreibungen aller Module, die im Studiengang angeboten werden. Das Modulhandbuch dient der Transparenz und versorgt Studierende, Studieninteressierte und andere interne und externe Adressatinnen und Adressaten mit Informationen über die Inhalte der einzelnen Module, ihre Qualifikationsziele sowie qualitative und quantitative Anforderungen.

Inhaltsverzeichnis und Index

Das Inhaltsverzeichnis gibt einen Überblick über die Modulbereiche und Module des Studiengangs. Die Klammerangabe nach dem Titel eines Moduls enthält den Zeitpunkt, zu dem dessen Beschreibung zuletzt aktualisiert wurde. Beispiel zur Notation: 24W steht für das Wintersemester 2024/25, 25S für das darauffolgende Sommersemester 2025.

Der Index am Ende des Modulhandbuchs listet alle Module des Studiengangs in alphabetischer Reihenfolge auf.

Modulbeschreibung

Die Beschreibung eines Moduls enthält dessen Lernziele, Lerninhalte und Leistungsnachweise. Sieht ein Modul mehrere Teilprüfungen vor, ist deren Anteil an der Modulgesamtnote als Gewichtung angegeben. Umfang und Dauer der jeweiligen Prüfungsformen sind in der *(Fach-)Prüfungs- und Studienordnung* des Studiengangs geregelt.

Über den QR-Code in der Beschreibung gelangt man zur Seite des Moduls in CAMPUSonline. Hierüber lassen sich die zum Modul gehörigen Lehrveranstaltungen einsehen und es wird angegeben, in welchen weiteren Studiengängen das Modul vorkommt.

Rechtsverbindlichkeit

Modulbeschreibungen dienen der Erhöhung der Transparenz und der besseren Orientierung über die Module eines Studiengangs. Rechtsverbindlich ist ausschließlich die einschlägige *(Fach-)Prüfungs- und Studienordnung*.

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Biodiversity and Ecosystem Functions
Global Policies, Economies, Civil Society and the Environment

Major (15LP)

Global Climate Change and Ecosystems
Biodiversity and Ecosystem Functions
Global Policies, Economies, Civil Society and the Environment

Minor (10LP)

Global Climate Change and Ecosystems
Biodiversity and Ecosystem Functions
Global Policies, Economies, Civil Society and the Environment

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Fak229798: Orientation in Global Change Ecology

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben zu Excursions	0	1
Beitrag	0	1
semesterbegleitende Aufgaben zu Global Change Ecology	0	3

Lernziele

This module covers the conception approach of the Master Programme. Participating disciplines and instructors are introduced. Logistical and organisational details are discussed. Students are also able to share and exchange their individual experience and knowledge.

Lerninhalte

First, an overview of the information about current and expected global development is given. Not only climate change but also land-use changes and the loss of biodiversity is included. In the advanced seminar, current research results are presented and analysed.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Global Change Ecology (2 SWS)

Seminar: Regularly Scheduled Meetings (1 SWS)

Two Excursions (1 SWS)

This module lasts for one semester and must be taken in the first semester as it sets the basis for the entire programme. The course "Global Change Ecology" consists of lectures and an tutorial. Additionally, a regularly scheduled weekly meeting is offered to discuss current study issues and for group mentoring. Two daylong excursions about landscape ecology supplement the module.

Anmerkungen

Biogeography and Sport Ecology, UBT

Ecological Services, UBT

Soil Physics, UBT

[zum Inhaltsverzeichnis](#)



Fak229802: Climate Change

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise		
Titel:	Gewichtung:	LP:
mündliche Prüfung	1	2
semesterbegleitende Aufgaben	0	3

Lernziele
The aim of this module is to teach fundamental knowledge about current climate development.

Lerninhalte
Basic principles of the climate system; naturally occurring climate variability, climate change in the past; reconstruction of past climate; natural forcing-factors, circulation dynamics; human impact on the climate system; global warming; greenhouse effect; land use change; aerosols; ozone depletion; global circulation models; forecasts; scenarios; fundamentals of energy and mass balance; modelling; sensitive parameters of global change

Art und Umfang der Lehrveranstaltungen
Lecture: Natural Climate and Human Impacts on Climate (2 SWS)
Seminar: Climate Variability and Change: Natural and Man-Made (2 SWS)

Anmerkungen
Physical Geography, University of Augsburg

[zum Inhaltsverzeichnis](#)



Fak211046: Ecological Climatology

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Samimi, Cyrus; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Hausarbeit	1	3
Beitrag	0	2

Voraussetzungen

Knowledge in programming language R

Lernziele

Climate Ecology is the interface between Ecology, Micrometeorology and Climatology as an interdisciplinary formation to understand the function of terrestrial ecosystems within the climate system. This course integrates the disciplinary areas of Meteorology, Hydrology, Soil Science, Plant Physiology, etc. to understand the physical, chemical and biological processes relevant to climate with which landscape and atmosphere are connected, and which can mutually influence both systems. In this module, students should develop a problem and process-oriented understanding with a variety of scale levels about the interaction between Pedosphere, Biosphere and Atmosphere. Furthermore, students learn to collect and analyse terrain data.

Lerninhalte

The seminar deals with climate-relevant material and energy flows in the soil-vegetation-atmosphere system on different scale levels. In particular, the interrelation between single compartments of ecosystems and their ecological relevance on climate will be dealt with.

The course looks at examples of the parameters of climate data collection for terrain and analysis and modelling with particular attention given to scale transitions.

Art und Umfang der Lehrveranstaltungen

Seminar: Ecological Climatology (2 SWS)

Tutorial: Ecological Climatology: Measurements and Analyses (2 SWS).

Anmerkungen

Climatology, UBT

[zum Inhaltsverzeichnis](#)



Fak229814: Extreme Events and Natural Hazards

Gültig ab: 01.10.2026

Lehrsprache	Dauer Zweisemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Jentsch-Beierkuhnlein, Anke; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation	1	3
semesterbegleitende Aufgaben	0	2

Lernziele

The aim of this module is to teach about occurrence and impact of natural risks and extreme events in ecology. Reoccurring events are included as well as single disasters; those with stabilizing effects and those with catastrophic consequences and regime shift. The impact of climatic, biotic and geomorphological events on biodiversity, ecology, provision of services, and cultural landscapes is covered. The learning objective is the ability to deal with in-depth theories and methods of Disturbance Ecology and to research extreme events. Fundamentals for a scientific study of interdisciplinary disaster research and risk management will be developed.

Lerninhalte

Climate and land-use change are leading to global changes in disturbance regimes and to an increase in the frequency and magnitude of extreme events. In this module, we deal with geomorphological hazards, abrupt climate change and extreme weather events like heat waves, drought, intense rainfall, tropical cyclones and extra-tropical severe storms. Furthermore, avalanches, mass movement, large fires, insect calamities, pandemics, volcano eruptions and floods will be covered. The ecological consequences of possible future extreme events such as a lack of cold winter and occurrence of late frosts in the northern hemisphere will be addressed. Developing and presenting a scientific expert presentation trains students in analyzing and understanding the progress in current scientific literature on extreme events.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Natural Risks and Hazards (2 SWS)

Seminar: Extreme Events (2 SWS)

Anmerkungen

Disturbance Ecology, UBT

Physical Geography, University of Augsburg

[zum Inhaltsverzeichnis](#)



Fak285764: Changes in Agroecosystems

Gültig ab: 01.10.2026

Lehrsprache	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Diamantopoulos, Efstathios; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur Soil Structure and Soil Functions	1	2
semesterbegleitende Aufgaben zu Global Change and Agroecosystems	0	3

Voraussetzungen

Basic knowledge in soil science is recommended.

Lernziele

The module goal is to understand and evaluate how soil management and various (a)biotic drivers affect the structure of soils and herewith multiple soil functions at different temporal scales. The seminar aims to apply the acquired knowledge to the transfer and discussion of specific global challenges in agroecosystems.

Lerninhalte

Agroecosystem management alters soil structure and thus various soil functions. In addition, bioturbation and climatic conditions induce seasonal dynamics in the pore network and thus in the architecture of the soil. Quantifying these changes provides critical information about soil as a habitat and water as a key resource for plant production. In addition, soil structure plays a crucial role for water and matter fluxes in agroecosystems. In this module, we learn about soil structure as a dynamic soil state, methods to quantify structural indicators and how these structural changes modify soil functions. We will further discuss how management systems can be adapted in prospect of future scenarios.

The course provides a general overview of soil structure, how it is changing by various drivers (tillage, freezing/thawing, wetting/drying, bioturbation), as well as the feedback mechanisms for soil functions and implications for resource management in agroecosystems.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Soil Structure and Soil Functions (2 SWS)

Seminar: Global Change and Agroecosystems (2 SWS)

Anmerkungen

Soil Physics, UBT

Agroecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229977: Land Use Change and Microclimate

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 45	Selbststudium (in Stunden) 105
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Thomas, Christoph; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	3
schriftliche Ausarbeitung	1	2

Lernziele

The learning outcome of this class is to comprehend the fundamental interactions between anthropogenic land use and land cover changes and the cycling of heat, water, carbon and reactive gas species at the land surface, to collect and analyse field observations, and to apply this knowledge across contrasting land uses and covers.

Lerninhalte

Land use and land cover (LULC) change from local to global scales is an important aspect of global change and acts as both a responder to socio-economic demands and as a driver of societal development. At the heart of these feedback processes is the biogeochemical cycling of heat, water, carbon, and reactive species creating specific microclimates between the land surface and the near-surface air, both of which comprise the 'critical zone' containing almost all terrestrial life including human activities. The microclimate and thus the state of the critical zone is important for identifying sustainable solutions in a rapidly changing world impacted by urbanization, agricultural expansion, afforestation, and desertification. Students will first develop a conceptual problem and process-oriented understanding of how LULC changes impact the microclimatic cycling of heat, water, carbon, and other trace gases in a classroom setting. Next, they will apply their skills by designing, conducting, analysing, and interpreting field measurements of heat, water, and radiative fluxes across the soil-air-plant continuum across contrasting land use types (grassland, urban land cover) to understand the urban heat island and vegetative cool islands. Methods include commonly applied micrometeorological experimental techniques and models.

Art und Umfang der Lehrveranstaltungen

Lecture: Land Use Change and Microclimate (2 SWS)

Tutorial: Microclimatic field experiment across land uses (1 SWS)

Anmerkungen

Micrometeorology, UBT

Atmospheric Chemistry, UBT

[zum Inhaltsverzeichnis](#)



Fak229799: Soils and Climate Change

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 45	Selbststudium (in Stunden) 105
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Lehndorff, Eva; Prof. Dr.	
Leistungsnachweise			
Titel:		Gewichtung:	LP:
Klausur		1	3
Beitrag		1	2
Lernziele Knowledge about soil formation and soil functions with focus on the storage and turnover of carbon in and from soil is crucial to mitigate climate warming. This module offers insights into soil formation processes and mechanisms that lead to carbon sequestration in soil. We look at soils from different climate regions and learn about soil carbon accumulation and greenhouse gas emissions and how this is affected by climate change and land-use.			
Lerninhalte Lecture: Soil formation, soil functions and carbon stabilisation in soil as influenced by climate and land-use change; Characteristics of soil organic matter and stabilization processes and their implementation to soil models. Tutorial: One day field trip on carbon storage in soil. Two weeks modelling of carbon turnover and GHG emissions across different agricultural systems and soil textures.			
Art und Umfang der Lehrveranstaltungen Lecture: Soils and Climate Change (2 SWS) Tutorial: Soil Carbon and Modeling (1 SWS, as 1 week block course 1 week after lecture exam)			
Anmerkungen Soil Ecology, UBT Soil Physics, UBT			

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Fak229815: Changes in Hydrological Systems

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Zweimestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Knapp, Julia; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur	1	3
Präsentation	0	2

Lernziele

The objective of this module is to gain a thorough understanding of natural processes of water flow and storage in and between the various compartments of the environment and to learn about various impacts on global water resources.

Lerninhalte

The module is divided into a lecture about fundamental hydrological processes and a seminar with interactive content. The focus of the lecture are the hydrological cycle and the water balance equation. Processes of water movement through the compartments of the atmosphere, biosphere and geosphere and their interactions are discussed in detail. Furthermore, aspects of chemical and ecological water quality and strategies for protecting surface- and groundwater are presented. In the seminar, we discuss current risks for and impacts on water resources in a global context. Students select a topic and present the results of their literature review to their fellow students, with the aim to stimulate a critical discussion also of potential mitigation strategies. The student presentations may be complemented by presentations of external experts.

Art und Umfang der Lehrveranstaltungen

Lecture: Hydrological Concepts (2 SWS)

Seminar: Water resources in a quickly changing world – impacts and challenges (2 SWS)

Anmerkungen

Hydrology, UBT

[zum Inhaltsverzeichnis](#)



Fak229980: Biogeography and Global Ecology

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur oder mündliche Prüfung	1	3
Präsentation	0	2

Voraussetzungen

Undergraduate knowledge in Biogeography

Lernziele

Students understand the processes that create and maintain the diversity of life on Earth and can critically evaluate biogeographical theories in the context of anthropogenic global change. They understand how human activities modify core biogeographical processes, including dispersal, speciation, extinction, and community assembly, and how these changes interact with ecosystem functioning and Earth system processes across spatial and temporal scales. Students are able to assess the explanatory power, limitations, and potential further development of biogeographical theories under rapid environmental change. They are familiar with key analytical approaches used in contemporary Biogeography and Sport Ecology and can critically reflect on their theoretical assumptions and data limitations. Furthermore, they are able to critically synthesize primary scientific literature and communicate complex biogeographical concepts and arguments in oral and written scientific formats.

Lerninhalte

The module examines how biodiversity patterns and processes are shaped by both natural mechanisms and human-driven environmental change, including climate change and land-use transformation. It combines a lecture and exercise component, in which key processes, patterns, and interconnections are presented and explored, with a seminar in which current research is reflected upon and critically discussed. Core topics include the role of spatial and temporal scale, historical contingency, and the processes shaping species distributions and biodiversity patterns. The module explores how anthropogenic change alters biogeographical processes and feedbacks between biodiversity and Earth system dynamics. Methodological approaches used in Biogeography and Sport Ecology are introduced to illustrate how concepts are tested and developed.

Art und Umfang der Lehrveranstaltungen

Tutorial: Biogeography and Global Ecology (2 SWS)

Seminar: Progress in Biogeography (2 SWS)

Anmerkungen

Biogeography and Sport Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229655: Disturbance Ecology and Resilience

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Jentsch-Beierkuhnlein, Anke; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur	1	2
Präsentation	0	3

Lernziele

At the conclusion of this module, students will comprehend how ecosystems in all biomes are affected by natural and anthropogenic disturbance regimes, which create their own dynamics and spatio-temporal phenomena. This knowledge will enable participants to understand the effects of disturbances and extreme events on biodiversity and ecosystem functions, regeneration dynamics, and mechanisms of stability such as functional resilience. The learning outcome of the seminar is to reach an overview of recent scientific literature covering disturbance ecology and pulse dynamics increasingly interacting with climate change and land-use change. This understanding will enable students to evaluate system behavior, contribute to developing adaptation strategies, and tackle current research frontiers in disturbance ecology. At the conclusion of this module, students will comprehend how ecosystems in all biomes are affected by natural and anthropogenic disturbance regimes, which create their own dynamics and spatio-temporal phenomena. This knowledge will enable participants to understand effects of disturbances and extreme events on biodiversity and ecosystem functions, regeneration dynamics, and mechanisms of stability such as functional resilience.

Lerninhalte

Theory, methodology and application of disturbance ecology and pulse dynamics as well as the relationship between disturbance, vegetation dynamics and ecosystem functions are taught in the lecture "Disturbance Ecology". Current research frontiers in disturbance ecology, resilience and sustainability science are presented and discussed in the seminar "Resilience". The significance of understanding disturbance ecology for ecosystem restoration and sustainable land-use planning is also addressed. Temporal variability of ecosystems, their rhythms and recurrent events are discussed with respect to future global changes to assess the dynamics of ecological systems.

Art und Umfang der Lehrveranstaltungen

Lecture: Disturbance Ecology (2 SWS)

Seminar: Stability, Resilience and Inertia (2 SWS)

Anmerkungen

Disturbance Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229331: Ecosystem Services

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur	1	2
Semesterbegleitende Aufgaben	0	3

Lernziele

Global change in climate, land use, markets and policies has a major impact on the performance of ecosystems. The aim of this module is to examine the ecosystem services relevant to societies in greater depth (food production, erosion regulation, drinking water purification, risk protection, etc) and their relationship to biodiversity.

Lerninhalte

The lecture „Ecosystem Services“ gives an overview of ecosystem services in regional and global human-environmental systems. Contents include the definition and classification of ecosystem services, their relationship to biodiversity and the role of global change. Furthermore, the physical quantification and socio-economic evaluation, the supply and demand by social actors as well as the management of the performance of the ecosystem by market-related policy instruments are dealt with. The seminar deepens lecture topics with current examples from research.

Art und Umfang der Lehrveranstaltungen

Lecture: Ecosystem Services (2 SWS)

Seminar: Current Research in Ecosystem Services (2 SWS)

Anmerkungen

Ecological Services, UBT

[zum Inhaltsverzeichnis](#)



Fak220684: Rhizosphere Biogeochemistry

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Pausch, Johanna; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
mündliche Prüfung	1	2
Präsentation	0	3

Lernziele

The module goal is to understand fundamental biological, chemical and physical processes taking place at the root-soil interface and their larger scale implications.

Lerninhalte

The rhizosphere is one of the most dynamic interfaces in terrestrial ecosystems and certainly the most important zone in terms of defining the quality and quantity of our crops.

Interactions in the rhizosphere between living organisms (roots and microorganisms), solids (minerals and organic matter), liquids (water with dissolved nutrients) and gaseous phases are pivotal in controlling ecosystem dynamics, functions and the services they provide.

Art und Umfang der Lehrveranstaltungen

Lecture: Rhizosphere Biogeochemistry (2 SWS)

Seminar: Emerging Topics in Rhizosphere Research (2 SWS)

Anmerkungen

Agroecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229952: Population Ecology in Forest Ecosystems

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Hülsmann, Lisa; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation oder Beitrag	1	2
semesterbegleitende Aufgaben	0	3

Voraussetzungen

A basic ecological understanding as well as skills in statistical modelling and in the application of the programming language R are expected.

Lernziele

In this course, participants will learn and apply key concepts and quantitative methods in population and community ecology, with a focus on forest ecosystems. Participants will be enabled to understand fundamental principles of population ecology and species interactions in forest environments, identify drivers of species diversity, coexistence and forest structure, select and apply appropriate ecological models to analyse population dynamics and spatial patterns and develop strategies for population monitoring. Participants will also be equipped to critically assess population-level responses to global change drivers such as climate change, habitat fragmentation, and land-use intensification and to develop strategies for maintaining forest functioning and ecosystem resilience.

Lerninhalte

Topics covered in the course include: fundamentals of population and community ecology in forest ecosystems; life history strategies and tree demography; density dependence, competition, predation and mutualism; dispersal, habitat connectivity and metapopulations; forest dynamics monitoring, trait data and demographic datasets; demographic analyses, population and community models, spatial point patterns, population viability analysis and extinction risk assessment.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Forest population ecology (2 SWS)

Tutorial: Forest population analysis and modelling (2 SWS)

Anmerkungen

Ecosystem Analysis and Simulation, UBT

[zum Inhaltsverzeichnis](#)



Fak227536: Dynamic Vegetation Ecology

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Higgins, Steven; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	1	2
Präsentation	0	3

Lernziele

The module's aim is to teach students about the drivers that influence the earth's vegetation distribution as well as to communicate the role of terrestrial vegetation in Earth's ecosystems. Students who successfully participate in this course will be able to critically assess and interpret dynamic vegetation models (DGVMs).

Lerninhalte

The lecture focuses on the most important ecological processes regarding terrestrial vegetation. The lecture stresses that understanding vegetation dynamics and distribution requires knowledge of biophysical laws and knowledge of the evolutionary history of individual ecosystems. Major topics include photosynthesis, respiration, allocation, birth, death, fire, herbivory and ecosystem assembly.

In the seminar we review and discuss seminal contributions to vegetation ecology and use this knowledge to articulate research priorities for plant ecology in the context of global change.

Art und Umfang der Lehrveranstaltungen

Lecture: Dynamic Vegetation Ecology (2 SWS)

Seminar: Foundations of Dynamic Vegetation Ecology (2 SWS)

Anmerkungen

Plant Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229986: Biodiversity in the Tropics

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Engelbrecht, Bettina; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation	1	2,5
Präsentation	1	2,5

Voraussetzungen

Foundations of animal ecology, plant ecology and evolution. Basic statistical knowledge is required

Lernziele

Module's aim is to gain a sound overview of tropical ecology and in particular of research on biodiversity in the tropics. Students learn on the basis of examples of different approaches to advance and test an ecological hypothesis. Critically reading and assessing scientific literature, as well as scientific presentations, are also practiced.

Lerninhalte

First, the module provides an introductory overview of tropical ecology. On the basis of tropical forests, which represent one of the most diverse ecosystems on Earth, we deal with theories and today's state of knowledge on mechanisms of the origin and maintenance of diversity, processes determining the spatial and temporal distribution of diversity, the functions of diversity, impacts of climate change and land use and strategies for protection. In doing so we include genetic, chemical, functional and species diversity as well as different taxonomic groups.

Art und Umfang der Lehrveranstaltungen

Lecture/Seminar (4 SWS)

Anmerkungen

Functional and Tropical Plant Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak325499: Globalization of Economies and the Environment

Gültig ab: 01.10.2026

Lehrsprache	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Semesterbegleitende Aufgaben zur Vorlesung	0	2
Semesterbegleitende Aufgaben zum Seminar	1	3

Lernziele

The increasing demand for goods and services as well as the globalization of markets has far-reaching economic, ecological and social effects. On the one hand, developing countries could benefit economically from increased export of raw materials (e.g. biofuels) or through direct investment from industrial nations (e.g. in the agricultural sector), on the other hand, ecosystems could be sustainably damaged due to low environmental standards in developing countries.

The aim of this module is to understand the flows of goods and services in global financial and raw materials markets and their economic and ecological effects, and to critically examine environmental policy instruments.

Lerninhalte

The lecture teaches the basics of the functions of, actors, and environmental innovations in the global financial sector. The lecture also introduces environmental economic theories and policies in an international context. This knowledge enables students to critically examine the influence of globalization in the area of goods and finance on the environment and ecosystems.

The seminar discusses what effects global trade, particularly of raw materials, induces due to the use of terrestrial and marine ecosystems. In order to reduce negative effects, environmental policy measures such as environmental standards play a special role. However, national environmental policies and different environmental policy standards between trading partners can also distort competition. Global market changes, environmental impacts and policy measures are critically reflected.

Art und Umfang der Lehrveranstaltungen

Lecture: Globalization of Economies and the Environment (2 SWS)

Seminar: Globalization of Economies and the Environment (2 SWS)

Anmerkungen

Ecological Services, UBT

VWL VI: Empirical Economics, UBT

[zum Inhaltsverzeichnis](#)



Fak215125: Socio-Economic and Political Dimensions of Global Change

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 120
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Rothfuß, Eberhard; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	1	5

Lernziele

The Anthropocene refers to a new geo-chronological era on Earth in which humans make significant impacts on geology, biological processes and ecosystems, not least anthropogenic climate change. The module aims to address foundations and concepts to understand possible causes and impacts of global change, as well as the quality of adaptation measures in various social contexts. Global and environmental change demands a variety of transformation, avoidance, and adaptive strategies that are at the centre of debates in the social sciences; in this connection, system-immanent reflections on neo-liberal economies that can be considered the drivers of global environmental change are also encouraged. The students are exposed to a cross-section of politico-economic and politico-ecological approaches based on relevant studies on global environmental change from the social sciences; they also learn social approaches and approaches from social theory to examine social transition and adaptation.

Lerninhalte

The seminar "Socio-Economic and Political Dimensions of Global Change" analyses society-environment interrelationships from the perspective of political ecology. Areas of tension include access to natural resources, the distribution of environmental risks, or defining environmental rights and duties. Environmental conflicts often include various spatial and social scale levels, from the local neighbourhood to international relations. In addition, fundamental processes of transformation in the Global South that are not only related to climate and environmental change are also addressed. Moreover, an analysis requires interacting with various dimensions of global change in the context of geographical development research, considering specific social, economic, political, and cultural contexts, and their inherent power structures. Comparing current case studies from the Global South and the Global North helps illustrate the unjust socialization of global change.

Art und Umfang der Lehrveranstaltungen

Seminar: Socio-Economic and Political Dimensions of Global Change (2 SWS)

Anmerkungen

Social and Population Geography, UBT

[zum Inhaltsverzeichnis](#)



Fak229800: Biodiversity Policies, Governance and Economics

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2
Präsentation	1	3

Lernziele

The aim of the module is to provide students with insights into the economic and policy dimensions of global change, and outline options for addressing the economic challenges.

Global environmental change confronts societies and the economy with increasing costs (e.g. loss of biodiversity, desertification, climate change and soil erosion undermine human wellbeing, cause risks to global supply chains and drive inflation). This creates not only considerable societal costs but also systemic risks to the economy and the financial system. As climate change and biodiversity loss are interlinked, policies have to work in synergy while dealing also with conflicting interests between stakeholder groups.

Environmental governance encompasses a variety of approaches including international treaties, economic incentives promoting more sustainable behaviour and business practices, corporate reporting requirements, voluntary frameworks, informal networks and market-based approaches (e.g. for carbon and nature credits). Ideally, policies create synergies in addressing multiple environmental challenges and support a more sustainable and resilient economic system.

Lerninhalte

The seminar "Economics of Global Environmental Change" focuses on the economic dimension of climate change (e.g. the Stern Review), biodiversity loss (e.g. The Economics of Ecosystems and Biodiversity TEEB), and land degradation (e.g. The Economics of Land Degradation ELD) and provides an overview of the role of biodiversity (nature) in the current financial system (e.g. UNEP State of Finance for Nature). Course participants will gain insights on 1) major risks global environmental changes pose to the economy and the financial system, 2) how assessing ecosystem services can inform policies and strategic decision making (e.g. investments in nature-based solutions and innovative instruments such as nature credits) and 2) the relevance of such information for national and corporate transition planning (e.g. as part of corporate reporting and sustainable finance). The seminar "Global Change Policy, Contracts and Administrative Strategies" provides an introduction to international political processes in Multilateral Environmental Agreements, using the Convention on Biological Diversity (CBD) and the Intergovernmental Platform on Biodiversity & Ecosystem Services (IPBES) as prominent examples. Strategies of national implementation of global agreements are illustrated.

Art und Umfang der Lehrveranstaltungen

Seminar: Economics of Global Environmental Change (2 SWS)

Seminar: Global Change Policy, Contracts and Administrative Strategies (CBD and IPBES) (2 SWS)

Anmerkungen

Teaching assignments: Umweltforschungszentrum (UFZ); Institut für Biodiversität (ibn), Regensburg

[zum Inhaltsverzeichnis](#)



Fak230051: Climate Policies and Economics

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2
Beitrag	1	3

Lernziele

After attending the lecture (i), students are familiar with various instruments for achieving climate policy goals, (ii) can analyse them in terms of efficiency, distribution effect and uncertainties, and (iii) are able to critically discuss the advantages and disadvantages of real-world political instruments along economic criteria.

The course will introduce key concepts such as the “tragedy of the commons” and “collective action problems” and discuss key academic developments in the understanding of the management of global commons. The course will ensure that the students develop a firm grasp of the fundamental dynamic of climate change negotiations while introducing the main legal instruments that form the backbone of the climate regime. Students will be able to critically assess how the Paris Agreement can mobilize action.

Lerninhalte

In the first part of the lecture, economic criteria for determining efficient and fair climate policy goals are developed. Then climate policy instruments are dealt with (e.g. regulatory policy; CO₂ tax; emissions trading) and instrument selection is discussed with imperfect information. In interactive phases, economic concepts are deepened along with current case studies, such as the German coal phase-out, national CO₂ pricing (climate package) or European emissions trading (EU ETS).

In the second part of the module, an introduction into the climate regime (United Nations Framework Convention on Climate Change, Kyoto Protocol, Paris Agreement) in the context of international environmental governance will be given. This will be discussed against the backdrop of geopolitical developments.

Global environmental commons, Introduction into the International Climate Regime, Roles of state and non-state actors, Case Studies, Critical Assessment and Concluding Discussion.

Art und Umfang der Lehrveranstaltungen

Seminar: Climate Policy and Instruments (2 SWS)

Seminar: Climate Diplomacy (2 SWS)

Anmerkungen

Teaching assignments: Climate Focus, Berlin; German Centre for Integrative Biodiversity Research (iDiv), Halle-Leipzig-Jena

[zum Inhaltsverzeichnis](#)



Fak212093: Land Use Policies, Markets and Ecosystems

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag (benotet)	1	3
Beitrag (unbenotet)	0	2

Lernziele

As an outcome of this module, students are able to:

- Evaluate different policies and market options in terms of their effect on land use and ecosystem services
- Interpret land use model results and put them in the context of real-world policies and markets
- Identify feedback mechanisms and trade-offs in human environment systems

Lerninhalte

Politics, as well as national and international markets, generally have a major impact on regional land use decisions and thus on the provision of ecosystem services. Individual land users (e.g., farmers, foresters, conservationists) are key actors in human environment systems, since they are the ones reacting to policies and market changes with their land use decisions.

The lecture "Land Use Policies, Markets, and Ecosystems" addresses causes of changes in land use, in particular by using regional case studies to focus on the influence of markets and politics. In addition, various methods for quantifying land use change and its influence on ecosystem services are introduced and discussed.

In the tutorial, based on the current development of agricultural and environmental policies as well as markets, possible future land use scenarios are developed and analysed for case study regions. Existing models, such as agent-based models, will be adapted and parameterized. Changes in ecosystem services through land use decisions are integrated into the model using simple estimates.

Art und Umfang der Lehrveranstaltungen

Lecture: Land Use Policies, Markets and Ecosystems (2 SWS)

Tutorial: Modelling Land Use, Markets and Ecosystems (2 SWS)

Anmerkungen

Ecological Services, UBT

[zum Inhaltsverzeichnis](#)



Fak229803: Biodiversity, Climate Change and Health

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2
Präsentation	1	3

Lernziele

At the end of this course, the students will have acquired a good understanding of how certain drivers, such as loss of biodiversity, land use change or climate change, can impact on human and animal health.

Lerninhalte

The lecture synthesizes information on the most important interlinkages between biodiversity, climate change and health. The current global situation of food and nutrition, water scarcity, pollution, migration and urbanization are synthesized and linked with human health. The lecture covers the concepts of One Health and Planetary Health and includes an overview of reports from e.g. WHO, WOA, FAO, UNEP, IPBES.

In the seminar we review and discuss current contributions which cover impacts of global change on animal and human health, especially for vector-borne, and zoonotic infectious diseases, and use this knowledge to articulate future research priorities.

Art und Umfang der Lehrveranstaltungen

Lecture: Health implications of Global Change (2 SWS)

Seminar: Current Research in Health implications of Global Change (2 SWS)

Anmerkungen

Biogeography and Sport Ecology, UBT

Planetary and Public Health, UBT

[zum Inhaltsverzeichnis](#)



Fak529998: Sport Ecology

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation	1	3
Klausur oder Essay oder semesterbegleitende Aufgaben	1	2

Lernziele

Upon completion of the module Sport Ecology, students understand the interactions between sports and ecological systems and are able to illustrate them with practical examples. They can identify quantitative relationships regarding the effect of outdoor sports on ecological systems from scientific publications and reflect them critically.

Lerninhalte

Students learn the complex and dynamic relationship between sport and the environment. The courses impart the importance of nature sports, their potential for conflict with goals in nature and environmental protection and the potential of sports in conveying ecological understanding and derived action strategies. Students collaboratively develop conceptual, functional, and methodological foundations to an economic view on ecology and nature protection and to an analysis of the interactions between human behaviour and ecological systems in the context of sports.

Art und Umfang der Lehrveranstaltungen

Tutorial: Interactions of Sport and Ecology (2 SWS)
Seminar: Impact Analysis of Outdoor Sports (2 SWS)

Anmerkungen

Biogeography and Sport Ecology, UBT

zum Inhaltsverzeichnis



Fak230000: Introduction to R – Basics and Data Handling

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus Wintersemester	Modulverantwortliche(r) Hülsmann, Lisa; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2

Lernziele

Students will learn to independently import, structure, analyse, visualize, and document environmental data using R. They will develop reproducible data workflows and apply modern data manipulation techniques.

Lerninhalte

The first part of the course introduces R syntax and workflows, objects and data structures, functions, data import and filtering, iteration using loops, data visualization with base R and ggplot2, and reproducible reporting. The second part builds on this foundation and covers more advanced data management steps, including filtering, aggregation, reshaping (wide/long), gap filling, and lagged calculations, using the tidyverse package. These steps are practiced using an applied example of time series data.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Introduction to R (2 SWS)

Anmerkungen

Micrometeorology, UBT

Ecosystem Analysis and Simulation, UBT

[zum Inhaltsverzeichnis](#)



Fak230001: Statistical Data Analysis with R

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Hülsmann, Lisa; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	1	3

Voraussetzungen

Having basic knowledge of R is helpful. If participants do not have this knowledge, they will be able to complete a self-learning unit prior to the course to acquire the necessary skills.

Lernziele

In this course, the participants will learn and practice different methods of data analysis using the programming language R, which is the de facto standard for statistical data analysis. They will be enabled to understand basic concepts of statistics, to choose appropriate statistical methods to answer common ecological questions, to apply these methods in R and to interpret the results correctly.

Lerninhalte

Topics covered in the course include using R and RStudio, descriptive statistics and visualization, hypothesis testing, linear models, generalized linear models, mixed models, confounders, causality and Directed Acyclic Graphs (DAGs), data management and experimental design.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Statistical data analysis with R (2 SWS)

Anmerkungen

Ecosystem Analysis and Simulation, UBT

[zum Inhaltsverzeichnis](#)



Fak230031: Spatial Statistics and Visualization with R

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	3

Voraussetzungen

Experience in the use of the software R as well as basic statistical knowledge (e.g. from module Statistical Data Analysis with R)

Lernziele

Spatial data often requires specific methods of analysis. The aim of this tutorial is the development of skills in dealing with different types of spatial datasets. The focus is on learning statistical methods for the analysis of spatial patterns.

Lerninhalte

Different methodological approaches will be presented and implemented with the statistical software R. An exemplary selection of covered topics is: visualization of spatial data, spatial point pattern analysis, variograms, and the modelling of areal data using SAR and CAR models.

Art und Umfang der Lehrveranstaltungen

Tutorial: Spatial Statistics and Visualization with R (2 SWS)

Anmerkungen

Ecological Services, UBT

[zum Inhaltsverzeichnis](#)



Fak213382: Time Series Analysis

Gültig ab: 01.10.2026

Lehrsprache	Dauer Einsemestrig	Präsenzstudium (in Stunden)	Selbststudium (in Stunden)
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Hülsmann, Lisa; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Semesterbegleitende Aufgaben	0	2
Präsentation	0	3

Voraussetzungen

Introductory course in statistics, basic knowledge in R

Lernziele

In this module, students acquire the ability to independently evaluate, analyse, and critically assess environmental time series, with a particular focus on climatic and ecological data. They develop the competence to select, apply, and interpret appropriate linear and non-linear time series analysis methods and to implement these analyses using the programming language R.

Lerninhalte

The module introduces and applies linear and non-linear methods of time series analysis using data from environmental and ecological monitoring. Covered methods include classical approaches such as autocorrelation and cross-correlation analysis, trend analysis, Fourier analysis, and ARIMA models, as well as non-linear techniques such as recurrence analysis, singular system analysis, wavelet analysis, and methods for dimension reduction. In addition, selected machine learning tools for time series analysis will be introduced and applied. The selection of analytical procedures may vary and is adapted to student interests and ongoing research projects.

In the lectures, individual methods are introduced conceptually and discussed in terms of their applicability and limitations. These methods are then practiced in tutorials using short time series examples. In the block practical, students independently select suitable analysis methods for predefined environmental datasets, apply them in R, and critically interpret and compare the results obtained from different approaches.

Art und Umfang der Lehrveranstaltungen

Lecture: Time Series Analysis (2 SWS)

Practical Course: Time Series Analysis (3 SWS)

Anmerkungen

Ecosystem Analysis and Simulation, UBT

[zum Inhaltsverzeichnis](#)



Fak229956: AI in Environmental and Ecological Research

Gültig ab: 01.10.2025

Lehrsprache	Dauer	Präsenzstudium (in Stunden)	Selbststudium (in Stunden)
Leistungspunkte (LP) 3	Turnus	Modulverantwortliche(r)	
Leistungsnachweise			
Titel:		Gewichtung:	LP:
Klausur od. mündl. Prüfung od. Präsentation od. Beitrag od. semesterbegleitende Aufgaben		0	3

[zum Inhaltsverzeichnis](#)



Fak229804: Advanced Multivariate Statistical Methods in Climate Research

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden)	Selbststudium (in Stunden)
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	
Leistungsnachweise			
Titel:		Gewichtung:	LP:
semesterbegleitende Aufgaben		0	3
Lernziele The aim of the course is to impart knowledge of the theory and application of multivariate statistical methods, which are frequently used in climatological research.			
Lerninhalte The lecture part of the module introduces fundamental multivariate analysis methods. The focus is particularly on: Principal Component Analysis; Multiple Regression Analysis; Canonical Correlation Analysis; Cluster Analysis; Discriminant Analysis, Random Forests. In the practical part, selected analytical methods are applied to datasets and research questions in climate science using R.			
Art und Umfang der Lehrveranstaltungen Lecture: Advanced Multivariate Statistical Methods in Climate Research (1 SWS) Tutorial: Advanced Multivariate Statistical Methods in Climate Research (1 SWS) Basic knowledge of statistics and statistics software R (e.g. from Module Statistical Data Analysis with R)			
Anmerkungen Physical Geography, University of Augsburg			

zum Inhaltsverzeichnis



Fak229982: Ecoinformatics and Biogeographical Modelling

Gültig ab: 01.10.2026

Lehrsprache	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
mündliche Prüfung oder Präsentation oder semesterbegleitende Aufgaben	0	5

Voraussetzungen

Basic statistical and programming skills

Lernziele

Students develop the methodological expertise needed to acquire, process, and quantitatively analyse biodiversity data across a wide range of biogeographical approaches. They can assess the strengths, limitations, and biases of heterogeneous data sources, including automated field-sampling technologies, remote sensing, citizen-science platforms, and digital traces. Students are able to apply and interpret quantitative analytical approaches, ranging from spatial and temporal models to species and community-level analyses, while evaluating assumptions, uncertainties, and theoretical foundations. They communicate methodological insights and analytical results effectively in written and oral scientific formats.

Lerninhalte

The module provides in-depth training in advanced analytical approaches and modern data sources used in contemporary biogeographical research. Students work with diverse biodiversity datasets derived from field data, global databases, and remote sensing. Field and computer-based exercises provide hands-on experience with automated sampling technologies, data processing, visualization, and integration into spatial and temporal analyses. Analytical components include species distribution modelling, spatial pattern analysis, community-change workflows. Emphasis is placed on practical implementation, data-quality evaluation, reproducibility, and the potential and limitations of modern ecoinformatics and modelling approaches for addressing biodiversity and global change questions.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial (4 SWS)

Anmerkungen

Biogeography and Sport Ecology, UBT

[zum Inhaltsverzeichnis](#)



ForZ29972: Introduction to GIS

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus Wintersemester	Modulverantwortliche(r) Archner, Oliver	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	2

Lernziele

Students will become familiar with the most important concepts and functions of Geographical Information Systems (GIS). After completing the course, they will be able to conduct a simple spatial analysis independently.

Lerninhalte

Training in GIS software and its functionality: modelling spatial information, spatial reference systems, ways to produce geodata, spatial and factual queries for geodata, selected methods of spatial analysis, formulation of analyses using process models, basic techniques of cartographic presentation.

Art und Umfang der Lehrveranstaltungen

Tutorial: Introduction to GIS (2 SWS)

Anmerkungen

BayCEER (IT and Databases), UBT

[zum Inhaltsverzeichnis](#)



Fak229957: Advanced GIS

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus Sommersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2

Lernziele

The aim of the tutorial is to provide the knowledge, applicable across multiple disciplines, for the use of Geographic Information Systems (GIS) in advanced quantitative geo-spatial analyses and visualizations.

Lerninhalte

Students will be trained in creating, handling, and analyzing spatial data using specialized geoprocessing tools. Emphasis will be placed on the topics of geospatial modelling and analysis, automatization of workflows, geodata management, and the creation of advanced cartographic representations. The tutorial will include a set of hands-on sessions on specific topics, e.g., agriculture, renewable energies, and risk reduction.

Art und Umfang der Lehrveranstaltungen

Tutorial: Advanced GIS (2 SWS)

Basic knowledge in GIS (mandatory), method course Introduction to GIS (recommended)

Anmerkungen

Ecological Services, UBT

[zum Inhaltsverzeichnis](#)



Fak229981: Remote Sensing

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Lu, Meng; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	1	3

Lernziele

Teaches theoretical and practical background of Remote Sensing, adapted to implementation in the context of global change.

Lerninhalte

Theoretical basics of Remote Sensing; Optical, Thermal, and Microwave Sensing; Sensor Systems and Properties of Remote Sensing Data; Image Processing and Classification using Open Source software and coding approaches.

Art und Umfang der Lehrveranstaltungen

Exercise: Remote Sensing (2 SWS)

[zum Inhaltsverzeichnis](#)



Fak230003: Advanced Remote Sensing

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Lu, Meng; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	3

Voraussetzungen

Remote Sensing

Lernziele

The course introduces advanced remote sensing topics, including classification, downscaling, and change detection. The course emphasises on preparing students with an in-depth understanding of the classical and state-of-the-art remote sensing data analysis techniques. By the end of this course, students will be able to:

- Explain and apply advanced remote sensing principles, including spectral behaviour, sensors, and atmospheric correction concepts.
- Select appropriate satellite datasets based on specific research questions.
- Perform applied analysis workflows, including data preprocessing, dimension reduction, feature enhancement, analysis and accuracy assessment.
- Understand classic supervised and unsupervised methods.
- Interpret remote sensing outputs critically within environmental geography contexts, linking observed patterns to underlying physical and socio-environmental processes.
- Develop transferable technical skills in professional remote sensing software environments relevant to research and applied geospatial careers.

Lerninhalte

This course develops advanced competencies in satellite-based remote sensing with a strong focus on the analysis of satellite imagery. Students engage critically with multispectral and multitemporal Earth observation data. Through hands-on computational laboratories using software or programming languages such as ArcGIS Pro, R and Python, students' progress from data discovery and preprocessing to advanced spatiotemporal analysis in various themes such as vegetation dynamics, deforestation, land-use/land-cover classification, and heat mapping. Emphasis is placed on methodology, including both classical and deep learning techniques, as well as uncertainty assessment. Students will be able to independently design and implement remote sensing analyses for environmental monitoring and global change ecology research contexts.

Art und Umfang der Lehrveranstaltungen

Tutorial: Advanced Remote Sensing (2 SWS)

Anmerkungen

Geoinformatics and Spatial Big Data, UBT

[zum Inhaltsverzeichnis](#)

**Fak229958: AI for Spatial Data Analysis**

Gültig ab: 01.10.2025

Lehrsprache	Dauer	Präsenzstudium (in Stunden)	Selbststudium (in Stunden)
Leistungspunkte (LP) 3	Turnus	Modulverantwortliche(r) Lu, Meng; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur od. mündl. Prüfung od. Präsentation od. Beitrag od. semesterbegleitende Aufgaben	0	3

zum Inhaltsverzeichnis



Fak229959: Introduction to Environmental and Ecological Modelling

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus Wintersemester	Modulverantwortliche(r) Hülsmann, Lisa; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2

Lernziele

After completing this module, students have a solid understanding of the role of environmental and ecological dynamic models in research and decision-making. They are able to distinguish between different model types and assess their suitability for specific environmental and ecological research questions. Furthermore, students will gain an understanding of the key components of dynamic models, such as state variables, parameters, forcing, and feedbacks. Students can interpret model outputs and select appropriate model structures and levels of complexity, understand basic principles of model parameterisation and calibration, and apply introductory concepts of sensitivity analysis and uncertainty assessment. They are further able to critically evaluate model assumptions, limitations, and model performance, and to communicate modelling results and their implications in a scientifically sound manner.

Lerninhalte

The module provides an introduction to environmental and ecological modelling as a tool to analyze complex dynamic systems. It introduces the purpose and scope of models in environmental sciences, with a focus on ecosystem processes and human–environment interactions. Core topics cover the full modelling workflow, including problem formulation and conceptualization, selection of appropriate model structures and levels of complexity, mathematical formulation and numerical implementation, model verification, parameterization, calibration, and validation, sensitivity analysis, and the assessment of uncertainty and model performance. Theoretical concepts are complemented by hands-on examples illustrating typical modelling workflows. Students will implement and analyse their own simple environmental or ecological model, primarily using R and Matlab. The module serves as a common foundation for the more specialized modelling courses in “Environmental Models and Simulation”.

Art und Umfang der Lehrveranstaltungen

Tutorial: Introduction to Environmental and Ecological Modelling (2 SWS)

Anmerkungen

Ecosystem Analysis and Simulation, UBT
Soil Physics, UBT

[zum Inhaltsverzeichnis](#)



Fak230004: Climate Data Modelling

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Samimi, Cyrus; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	3

Voraussetzungen

Knowledge of programming language R

Lernziele

Climate models are essential for a better understanding of past and future climate. In this module, students will learn applications of climate models, with a focus on climate change models and scenarios. They will also gain knowledge of climate data sources and how to handle climate data formats such as the netCDF format.

Lerninhalte

The step-by-step process from data acquisition to the analysis of climate change models and scenarios will be taught. This includes: accessing climate data (observation, reanalysis, remotely sensed, and climate change models), gap filling in time series, processing of climate model data in netCDF format, bias correction of climate models, basic statistics to evaluate model performance, trend analysis, and spatial interpolation of climate data. Models from the Representative Concentration Pathways (RCP) and the Shared Socioeconomic Pathways (SSP) scenarios will be used.

Art und Umfang der Lehrveranstaltungen

Tutorial: Climate Data Modelling (2 SWS)

Anmerkungen

Climatology, UBT

[zum Inhaltsverzeichnis](#)



Fak118966: Mathematical Modeling for Climate and Environment

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 90	Selbststudium (in Stunden) 150
Leistungspunkte (LP) 8	Turnus Sommersemester	Modulverantwortliche(r) Bebendorf, Mario; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur oder mdl. Prüfung Mathematical Modeling for Climate and Environment	1	8

Lernziele

Knowledge of important physical principles and their representation in mathematical models for main types of climate and environmental models

Ability to identify the key interactions between different compartments of a climate model and to express them in mathematical form

Lerninhalte

Physical principles, mathematical models, and selected numerical methods in climate and environmental sciences

Earth system: Main components, driving forces, scales, feedbacks

Hierarchy of climate models, regional and global focus

Environmental modeling: Main applications and problem settings

Art und Umfang der Lehrveranstaltungen

Lecture/Exercise: Mathematical Modeling for Climate and Environment (6 SWS)

Anmerkungen

Scientific Computing, UBT

[zum Inhaltsverzeichnis](#)



Fak229949: Modelling Soil-Plant-Atmosphere Systems

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Diamantopoulos, Efstathios; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	1	2,5
Beitrag	1	2,5

Voraussetzungen

The module "Environmental Soil Physics" or an equivalent module is recommended.

Lernziele

By the end of this module, students will be able to:

1. understand and explain how the Daisy model is built, i.e. the function of its major components and how these components interact with each other.
2. find details on how the model works, as well as to prepare input data and to extract output for model applications.
3. apply the Daisy model to traditional agroecological system analysis including the water cycle (e.g. evapotranspiration and runoff), the carbon cycle (e.g. crop production) and the nitrogen cycle (e.g. nitrate leaching).
4. use the model for more specialized analysis, i.e. the leaching of pollutants like pesticides or natural toxins to ground water and surface waters.
5. extract and analyze relevant figures from model simulations with Daisy
6. interpret the results of their analyses, and draw the right conclusions

Lerninhalte

The module covers the following topics and activities:

1. fundamentals of simulating water flow in the soil–plant–atmosphere system, including above- and belowground processes.
2. fundamentals of simulating reactive solute transport in the soil–plant–atmosphere system, including above- and belowground processes, with a focus on nitrogen, pesticides, and emerging pollutants (e.g., PFAS, natural toxins).
3. fundamentals of simulating crop growth and its interactions with the atmosphere, soil water, and nitrogen.
4. fundamentals of modeling heat transport in the soil–plant–atmosphere system.
5. fundamentals of simulating organic matter turnover in agro-ecological systems, including fresh organic inputs, soil microorganisms, and soil organic matter.
6. simulation of human-driven changes in agro-ecological systems (management operations).
7. elements of inverse modeling.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Modelling Soil-Plant-Atmosphere Systems (4 SWS)

Anmerkungen

Soil Physics, UBT

[zum Inhaltsverzeichnis](#)



Fak229996: Ecosystem Services Assessment of Landscapes

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus Sommersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2

Voraussetzungen

Basic knowledge in GIS (obligatory) and module "Ecosystem Services" (recommended)

Lernziele

The aim of the tutorial „Ecosystem Services Assessment of Landscapes“ is to introduce natural science and/or social science assessment methods that can be used by actors in business and politics to balance the environmental consequences of their decisions in landscape systems.

Lerninhalte

In the tutorial ecosystem services will be quantified or optimized in selected regions using spatially explicit models. Following this, scenarios of future land-use change are developed and impacts on different ecosystem services are simulated.

Art und Umfang der Lehrveranstaltungen

Tutorial: Ecosystem Services Assessment of Landscapes (2 SWS)

Anmerkungen

Ecological Services, UBT

[zum Inhaltsverzeichnis](#)



Fak229997: Modeling Ecosystem Services

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden)	Selbststudium (in Stunden)
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise			
Titel:		Gewichtung:	LP:
semesterbegleitende Aufgaben		0	3

Lernziele

The Soil and Water Assessment Tool (SWAT) is a widely used, powerful simulation model used to predict the impacts of climate, land use and management changes on hydrology and matter fluxes in river basins of various sizes. The objective of this module is to teach the major principles and theoretical background of the SWAT model, and its practical application for the investigation, interpretation, and assessment of environmental issues, specifically ecosystem services

Lerninhalte

The theoretical part introduces the different subroutines of the model including climate, hydrology, erosion, nutrient cycles, and plant growth, and explains the major input and output parameters.

In the practical part, students will learn how to perform the model setup, parameterization, and calibration for a case study watershed. We will develop potential climate, land use change and management changes scenarios and evaluate their impacts with respect to ecosystem services.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Modeling Ecosystem Services with the Soil and Water Assessment Tool (2 SWS)

Anmerkungen

Ecological Services, UBT

[zum Inhaltsverzeichnis](#)



Fak227537: Methods in Dynamic Vegetation Ecology

Gültig ab: 01.10.2026

Lehrsprache	Dauer Einsemestrig	Präsenzstudium (in Stunden) 75	Selbststudium (in Stunden) 75
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Higgins, Steven; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	1	5

Voraussetzungen

Basic R knowledge recommended

Lernziele

The module's aim is to teach empirical methods used to estimate the primary production of ecosystems.

Lerninhalte

Students learn how to use non-destructive methods to estimate net primary production (NPP). To achieve this, the leaf area, photosynthesis, transpiration and respiration rates will be measured in field exercises. These data are used to derive estimates of NPP using the statistical script language R.

Students learn how to access and use Earth observation data. The Geographical Information System functionality of R is used to analyze NPP trends observed in the satellite data.

The NPP-estimates derived from the satellite and field measurements are compared and assessed. The findings are summarized in a report written in the style of an R tutorial.

Art und Umfang der Lehrveranstaltungen

Tutorial: Methods in Dynamic Vegetation Ecology (5 SWS)

Anmerkungen

Plant Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak222189: Vegetation Science

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Jentsch-Beierkuhnlein, Anke; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Klausur	1	3

Lernziele

The module's aim is an advanced knowledge of theories and methods in vegetation science, vegetation mapping and vegetation monitoring. Students will be introduced to the full spectrum of historical and modern approaches in vegetation science. The lecture offers fundamentals for and bridging concepts to experimental community ecology, plant functional trait research, disturbance ecology, restoration ecology, ecosystem and landscape ecology, nature conservation, remote sensing and vegetation-based ecosystem service analysis. Theory will be connected with practical experience in plant determination during various floristic field excursions.

Lerninhalte

The contents of the module include current approaches in vegetation science, in vegetation mapping and in monitoring changes in vegetation pattern and dynamics. Students will develop an understanding of the functional characterization of habitats and of scale dependence in vegetation ecology. They will develop the ability to recognize the role of disturbance regimes for vegetation dynamics and develop an understanding of data processing requirements for linking vegetation ground data with remote sensing derived information. Thus, students will become familiar with different theories and methods of collecting and evaluating data in plant ecology.

Art und Umfang der Lehrveranstaltungen

Lecture: Vegetation Science (2 SWS)

Anmerkungen

Disturbance Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229653: Alpine Field Course in Vegetation Science

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Jentsch-Beierkuhnlein, Anke; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation	1	2,5
Schriftliche Ausarbeitung	1	2,5

Voraussetzungen

The knowledge from the module Vegetation Science and knowledge in plant determination.

Lernziele

The module's aim is an advanced practical experience in methods in vegetation science, vegetation mapping, and vegetation monitoring. Students are trained in the field across a variety of ecosystems and will understand the effort and the skills needed for ecological assessments. The field work will be affected at the scale of plant communities and ecosystems ranging from the inner-alpine arid valley slopes to the alpine zone and from bogs and mires to forests and natural grasslands. As all ecosystems require a specific scale of investigation and research questions need to be tackled with appropriate approaches, the methods learned beforehand in theory are applied under field conditions. The recorded data will be analysed and compiled in written protocols. The final product will be an individual textbook of vegetation methods based on own work and experience.

Lerninhalte

Based on theoretical knowledge about different approaches and schools in vegetation science, different ways of data recording are applied in the complex terrain of the Alps, which offers a large diversity of habitats and vegetation structures. Site conditions and ecosystem processes are related to key traits of vegetation including floristic and phytosociological relevés, transects, systematic data recording, biometry, biomass, and spatial assessments (mapping, remote sensing).

Art und Umfang der Lehrveranstaltungen

Tutorial: Field Course Vegetation Science (4 SWS)

Anmerkungen

Disturbance Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229961: Experimental Ecology, Biodiversity and Ecosystem Functioning

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 120
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Jentsch-Beierkuhnlein, Anke; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	1	5

Voraussetzungen

Basic knowledge in R is strongly advised, advanced knowledge very welcome. Skills in plant species determination are welcome.

Lernziele

The learning outcome of the module Experimental Ecology is to reach an overview over recent experimental approaches in community ecology. In particular, globally coordinated, geographically distributed experiments have proven to be very stimulating for understanding design and analysis of standardized experiments and testing ecological theory. The goal of this module is an in-depth look at the relationship between biodiversity and ecological functioning, understanding the scientific approaches and findings on impacts of climate change and land use change on ecosystem services. This course will be composed of several elements including theoretical instruction on experimental design and analysis, participation in ongoing field campaigns as well as collecting and analyzing own data. At the conclusion of this module, students will have a thorough understanding of experimental ecology.

Lerninhalte

General concepts of experimental ecology will be introduced initially using ongoing field experiments as model ecosystems. Here, the focus is on effects of global change drivers on biodiversity and ecosystem functions. Guided by instructors, students will develop their own hypothesis within an ongoing research activity, collect and evaluate their own data. In doing so, students will learn about the potential and limitations of experimental approaches. Thus, students will become familiar with different methods of collecting and evaluating data in experimental ecology.

Art und Umfang der Lehrveranstaltungen

Tutorial: Experimental Ecology (2 SWS)

Anmerkungen

Disturbance Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak229801: Sustainable Finance and Corporate Nature Reporting

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Wintersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation	0	1,5
Beitrag	0	1,5

Lernziele

This module provides a comprehensive overview of global nature-related politics, regulatory frameworks, and reporting standards, focusing on their impact on financial markets and corporate entities. Participants will explore key stakeholders, compliance challenges, and evolving nature- and climate-related risks. The course equips them with practical expertise to assess regulatory requirements, identify risks, and uncover opportunities for corporate sustainability, compliance and risk management.

Lerninhalte

This course provides a theoretical and practical exploration of international nature politics, economics, and regulatory frameworks, emphasizing their impact on financial & corporate stakeholders, and evolving regulatory regimes and standards. The first part introduces key concepts, reporting standards, and major players in nature-related governance, featuring virtual guest contributions from industry experts (e.g., Bundesbank, EU Commission, NGOs, corporations). Participants will gain insights into real-world applications, regulatory processes, and future trends in nature-related policies and corporate due diligence.

In the second part, participants will conduct independent research, analyze information, and present findings through a policy brief and summary presentation. Topics include reviewing key regulations, assessing stakeholder influence, and examining reporting standards shaping corporate strategies. Discussions will focus on scientific, legal, economic, and business implications, highlighting challenges and opportunities for corporate compliance and sustainability.

Art und Umfang der Lehrveranstaltungen

Seminar: Sustainable Finance and Corporate Nature Reporting (2 SWS)

Anmerkungen

Teaching assignment

[zum Inhaltsverzeichnis](#)



Fak229816: Life Cycle Assessment of Products

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus Wintersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2

Lernziele

Aim of the module „Life Cycle Assessment of Products“ is to introduce assessment methods that can be used by business and political actors to assess the environmental consequences of their decision in product systems.

Lerninhalte

The method of Life Cycle Assessment LCA is introduced and students learn to use the LCA software with practical examples (e. g. assessment of energy products with Jatropha or wind energy).

Art und Umfang der Lehrveranstaltungen

Tutorial: Life Cycle Assessment of Products (2 SWS)

Anmerkungen

Ecological Services, UBT

[zum Inhaltsverzeichnis](#)



Fak329818: International Environmental and Sustainable Development Law

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 120
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Kaime, Thokozani; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Heimklausur	1	5

Lernziele

Aim of this module is to teach fundamental knowledge in international environmental law.

Lerninhalte

After a general introduction to structures, functions, sources and implementation of international law, the basic principles of environmental law will be discussed (sustainability, prevention, "producer pays" and liability principles).

In particular, the course deals with international law and agreements between nations on climate protection, biodiversity and other fundamentals for human existence on earth (e.g. the UN Convention UN-FCCC and UN-CBD).

Art und Umfang der Lehrveranstaltungen

Lecture: International Environmental and Sustainable Development Law (2 SWS)

Anmerkungen

African Legal Studies, UBT

[zum Inhaltsverzeichnis](#)



Fak229805: Global Environmental Negotiations: Observing, Engaging, and Reflecting

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus jedes Semester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2

Lernziele

The module enables students to identify and explain the formats of UNFCCC and IPBES negotiations, to observe and critically analyse negotiation processes and stakeholder dynamics, and to communicate effectively with diverse actors in a multilateral environment. Participants carry out role-based tasks within an observer or academic delegation and design and facilitate a post-event seminar drawing on insights from participation, press releases, and UN documents. Throughout the module, students reflect on the interconnections between science, policy, and advocacy in global environmental governance.

Lerninhalte

This module prepares students for meaningful participation as observers in global environmental negotiation processes, such as the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) plenary sessions. Through pre-event briefings, strategy development, and task assignments, students learn to develop an overview of global environmental negotiation bodies such as the UNFCCC COP and the IPBES plenary, understand institutional formats and decision-making procedures, and become familiar with key actors, including NGOs, scientific organizations, and member states. They prepare observationally and analytically for negotiations by examining current focus topics and agenda items, and they practise networking with delegates and observers. Within their observer group, students coordinate roles and responsibilities, participate in official sessions and side events (or online equivalents), and finally design and deliver a structured post-seminar to report on negotiation outcomes and reflect on or disseminate their experience.

Art und Umfang der Lehrveranstaltungen

Seminar: Global Environmental Negotiations: Observing, Engaging, and Reflecting (2 SWS)

Anmerkungen

Biogeography and Sport Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak215954: Methodology of Social Sciences

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Sommersemester	Modulverantwortliche(r) Rothfuß, Eberhard; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	3

Lernziele

Objectives and learning outcomes of the module:

1. Make students familiar with the language(s) of social science methodology and provide both a solid grounding in the key issues and a critical understanding of them.
2. Introduce students to basic epistemological questions, approaches, and debates in the philosophy of social sciences.
3. Introduce students to common methods in social science (both quantitative and qualitative).

Lerninhalte

This module provides a general and broadly understood introduction to problems, approaches, and debates in social science methodologies. The main aim is to make MSc scholars familiar with prominent 'epistemological schools', methodological angles and language(s), to provide a solid grounding in the key issues and a critical understanding of them.

The method course is divided into two parts: (1) Philosophy of social science, epistemology and ontology and (2) Introduction into understanding and applying relevant geographical methodological approaches (with some prominent methods to be addressed).

Art und Umfang der Lehrveranstaltungen

Seminar: Methodology of Social Sciences (2 SWS)

Anmerkungen

Social and Population Geography, UBT

[zum Inhaltsverzeichnis](#)



Fak215157: Science and Communication

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 60
Leistungspunkte (LP) 3	Turnus Wintersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation zu Science and Communication	0	3

Lernziele

The course provides an overview of the challenges associated with scientific communication, especially science outreach typically conducted by scientists to non-expert audiences. At the end of this course, the students will have acquired a good understanding of the multiple factors shaping the success of different communication strategies and tools. Importantly, this course aims to help support the development of critical thinking and decision making among students, while enhancing their communication skills.

Lerninhalte

Science communication skills are needed to get support for scientific research, to inform decision-making, or to engage stakeholders. A major component of this course will be to provide students with the chance to apply knowledge acquired in previous modules to defend their envisaged solution to typical climate change or conservation challenges or discussions.

Art und Umfang der Lehrveranstaltungen

Lecture/Tutorial: Science and Communication (2 SWS)

Anmerkungen

Teaching assignment

[zum Inhaltsverzeichnis](#)



Fak213387: Project Management

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 30	Selbststudium (in Stunden) 30
Leistungspunkte (LP) 2	Turnus Wintersemester	Modulverantwortliche(r) Steinbauer, Alana	

Leistungsnachweise		
Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2

Lernziele

The aim of this module is to provide practical insight into project management, especially in a scientific environment. It seeks to prepare students to carry out tasks relating to coordination in research and the professional world.

Lerninhalte

Depending on the needs and interests of the course participants, practical tasks in science management are addressed (the national and international research funding landscape, requesting funding, setting up research associations and international research networks, communication and quality control, public relations). In addition to such insights, the course also reflects on chances and risks in project management based on personal experience.

Art und Umfang der Lehrveranstaltungen

Tutorial: Project Management and Scientific Coordination (2 SWS)

Anmerkungen

BayCEER, UBT

zum Inhaltsverzeichnis



Fak229817: Research at the Natural and Social Science Interface

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 15	Selbststudium (in Stunden) 15
Leistungspunkte (LP) 1	Turnus Wintersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	
Leistungsnachweise			
Titel:		Gewichtung:	LP:
semesterbegleitende Aufgaben		0	1
Lernziele Environmental problems require not only expert knowledge but also the ability to work together with different disciplines and societal actors. The aim of this module is to impart knowledge about the interface in inter- and transdisciplinary research. The possibilities and limits of these approaches are conveyed using examples.			
Lerninhalte This course teaches theory and practice of inter- and transdisciplinary research.			
Art und Umfang der Lehrveranstaltungen Seminar: Research at the Natural and Social Science Interface (1 SWS)			
Anmerkungen Ecological Services, UBT			
zum Inhaltsverzeichnis			



Fak229806: Internship in Economy (6 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 150	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 5	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	5

Lernziele

- Understand organisational structures and decision-making processes in internationally operating companies.
- Apply interdisciplinary knowledge of global change issues in a business context.
- Develop professional communication, teamwork, and project management skills.
- Gain insight into corporate sustainability, environmental management, and international business relations.
- Reflect on career opportunities in the private sector.

Lerninhalte

- Participation in day-to-day operations and project work within a business enterprise.
- Exposure to international business relations and stakeholder interactions.
- Tasks related to sustainability, environmental management, corporate strategy, consulting, or market analysis.
- Observation of organisational processes, reporting structures, and decision-making procedures.
- Reflection on the role of businesses in addressing global environmental and societal challenges.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229807: Internship in Economy (12 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 300	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 10	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	10

Lernziele

- Understand organisational structures and decision-making processes in internationally operating companies.
- Apply interdisciplinary knowledge of global change issues in a business context.
- Develop professional communication, teamwork, and project management skills.
- Gain insight into corporate sustainability, environmental management, and international business relations.
- Reflect on career opportunities in the private sector.

Lerninhalte

- Participation in day-to-day operations and project work within a business enterprise.
- Exposure to international business relations and stakeholder interactions.
- Tasks related to sustainability, environmental management, corporate strategy, consulting, or market analysis.
- Observation of organisational processes, reporting structures, and decision-making procedures.
- Reflection on the role of businesses in addressing global environmental and societal challenges.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229808: Internship in Science (6 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 150	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 5	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	5

Lernziele

- Gain practical experience in applied research outside the university environment.
- Understand scientific methodologies, data collection, and analysis procedures.
- Strengthen skills in critical thinking, problem solving, and scientific communication.
- Experience interdisciplinary and international research collaboration.
- Evaluate the relevance of scientific findings for global change challenges.

Lerninhalte

- Participation in research activities at internationally recognised research institutes.
- Involvement in data collection, laboratory, field, or modelling work, where applicable.
- Contribution to research projects addressing environmental, ecological, or sustainability-related topics.
- Application of scientific methods, analytical tools, and reporting formats.
- Reflection on the role of research institutions in generating knowledge for evidence-based decision-making.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229809: Internship in Science (12 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 300	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 10	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	10

Lernziele

- Gain practical experience in applied research outside the university environment.
- Understand scientific methodologies, data collection, and analysis procedures.
- Strengthen skills in critical thinking, problem solving, and scientific communication.
- Experience interdisciplinary and international research collaboration.
- Evaluate the relevance of scientific findings for global change challenges.

Lerninhalte

- Participation in research activities at internationally recognised research institutes.
- Involvement in data collection, laboratory, field, or modelling work, where applicable.
- Contribution to research projects addressing environmental, ecological, or sustainability-related topics.
- Application of scientific methods, analytical tools, and reporting formats.
- Reflection on the role of research institutions in generating knowledge for evidence-based decision-making.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229810: Internship in Administration (6 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 150	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 5	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	5

Lernziele

- Understand administrative structures and policy implementation processes.
- Gain insight into environmental governance and public-sector decision-making.
- Develop skills in policy analysis, reporting, and stakeholder communication.
- Understand the interaction between science, policy, and administration.
- Explore career pathways in public institutions and agencies.

Lerninhalte

- Participation in the work of state level, national or international agencies and administrative bodies.
- Exposure to policy development, implementation, monitoring, and evaluation processes.
- Support for environmental management, regulatory, planning, or conservation activities.
- Engagement with administrative procedures, documentation, and public communication.
- Reflection on the role of governmental institutions in addressing global environmental challenges.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229811: Internship in Administration (12 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 150	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 10	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	10

Lernziele

- Understand administrative structures and policy implementation processes.
- Gain insight into environmental governance and public-sector decision-making.
- Develop skills in policy analysis, reporting, and stakeholder communication.
- Understand the interaction between science, policy, and administration.
- Explore career pathways in public institutions and agencies.

Lerninhalte

- Participation in the work of state level, national or international agencies and administrative bodies.
- Exposure to policy development, implementation, monitoring, and evaluation processes.
- Support for environmental management, regulatory, planning, or conservation activities.
- Engagement with administrative procedures, documentation, and public communication.
- Reflection on the role of governmental institutions in addressing global environmental challenges.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229812: Internship in International Organization (6 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 150	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 5	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	5

Lernziele

- Understand the governance structures and operations of international and non-governmental organisations.
- Gain experience in addressing transboundary environmental and sustainability challenges.
- Develop intercultural communication and collaboration skills in international settings.
- Apply academic knowledge to policy, advocacy, programme, or project activities.
- Understand the role of international cooperation in global change governance.

Lerninhalte

- Participation in projects and programmes of international organisations or NGOs.
- Exposure to international environmental agreements, policy processes, and stakeholder engagement.
- Support for e.g. programme management, policy analysis, communication, or advocacy activities.
- Collaboration in multicultural and interdisciplinary working environments.
- Reflection on international cooperation mechanisms for biodiversity, climate, conservation, and sustainable development.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229813: Internship in International Organization (12 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 300	Selbststudium (in Stunden) 0
Leistungspunkte (LP) 10	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	10

Lernziele

- Understand the governance structures and operations of international and non-governmental organisations.
- Gain experience in addressing transboundary environmental and sustainability challenges.
- Develop intercultural communication and collaboration skills in international settings.
- Apply academic knowledge to policy, advocacy, programme, or project activities.
- Understand the role of international cooperation in global change governance.

Lerninhalte

- Participation in projects and programmes of international organisations or NGOs.
- Exposure to international environmental agreements, policy processes, and stakeholder engagement.
- Support for e.g. programme management, policy analysis, communication, or advocacy activities.
- Collaboration in multicultural and interdisciplinary working environments.
- Reflection on international cooperation mechanisms for biodiversity, climate, conservation, and sustainable development.

Art und Umfang der Lehrveranstaltungen

Internship

Anmerkungen

Ecological Services, UBT; GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229983: Science School / Field Camps (1 week)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 40	Selbststudium (in Stunden) 20
Leistungspunkte (LP) 2	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	2

Lernziele

The aim of this module is to provide a platform for advanced discussion, critical reflection, and debate in small groups on contemporary topics related to Global Change. Drawing on learning materials from various scientific providers, participants will explore ecological, environmental, social, or economic dimensions of global change and their interconnected impacts on society and ecosystems.

Lerninhalte

By the end of this module, participants will be able to, e.g.:

- Analyze current issues and challenges associated with Global Change from multiple perspectives.
- Critically evaluate scientific evidence and information from different sources.
- Engage in informed discussions and debates on complex global issues.
- Learn specific methods to measure and analyse global changes.
- Develop interdisciplinary understanding of the interactions between climate, environment, society, and policy.

Art und Umfang der Lehrveranstaltungen

Seminar/Exercise Science School

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229984: Science School / Field Camps (1 week including preparation and/or follow-up)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 40	Selbststudium (in Stunden) 50
Leistungspunkte (LP) 3	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	3

Lernziele

The aim of this module is to provide a platform for advanced discussion, critical reflection, and debate in small groups on contemporary topics related to Global Change. Drawing on learning materials from various scientific providers, participants will explore ecological, environmental, social, or economic dimensions of global change and their interconnected impacts on society and ecosystems.

Lerninhalte

By the end of this module, participants will be able to, e.g.:

- Analyze current issues and challenges associated with Global Change from multiple perspectives.
- Critically evaluate scientific evidence and information from different sources.
- Engage in informed discussions and debates on complex global issues.
- Learn specific methods to measure and analyse global changes.
- Develop interdisciplinary understanding of the interactions between climate, environment, society, and policy.

Art und Umfang der Lehrveranstaltungen

Seminar/Exercise Science School

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229985: Science School / Field Camps (2 weeks)

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 80	Selbststudium (in Stunden) 70
Leistungspunkte (LP) 5	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	0	5

Lernziele

The aim of this module is to provide a platform for advanced discussion, critical reflection, and debate in small groups on contemporary topics related to Global Change. Drawing on learning materials from various scientific providers, participants will explore ecological, environmental, social, or economic dimensions of global change and their interconnected impacts on society and ecosystems.

Lerninhalte

By the end of this module, participants will be able to, e.g.:

- Analyze current issues and challenges associated with Global Change from multiple perspectives.
- Critically evaluate scientific evidence and information from different sources.
- Engage in informed discussions and debates on complex global issues.
- Learn specific methods to measure and analyse global changes.
- Develop interdisciplinary understanding of the interactions between climate, environment, society, and policy.

Art und Umfang der Lehrveranstaltungen

Seminar/Exercise Science School

Anmerkungen

Ecological Services, UBT
GCE Coordination, UBT

[zum Inhaltsverzeichnis](#)



Fak229654: Disturbance Ecology Field Camp

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 75	Selbststudium (in Stunden) 75
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Jentsch-Beierkuhnlein, Anke; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	1	5

Lernziele

Module aim is an advanced practical experience in disturbance ecology and vegetation dynamics while moving through remote landscapes for data collection. Students are trained in the field across a variety of ecosystem types and across altitudinal gradients and will understand the effort and the skills needed for analysing disturbance regimes and their effects on ecosystem dynamics. Field talks and scientific field work will focus on plant communities and biodiversity patterns in various biomes.

Lerninhalte

Concepts and methods taught in disturbance ecology and vegetation science are applied under field conditions across a diversity of ecosystems and disturbance dynamics. Site conditions and ecosystem processes are related to key plant functional traits and vegetation pattern. Methods include floristic relevés, vegetation transects, trait data collection as well as assessment of disturbance dynamics, ecosystem functioning and resilience.

Art und Umfang der Lehrveranstaltungen

Seminar/Exercise: Disturbance Ecology Field Trip (5 SWS)

Anmerkungen

Alternating; European Study Locations

[zum Inhaltsverzeichnis](#)



Fak229639: Science School / Expedition Biodiversity Research

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 180	Selbststudium (in Stunden) 120
Leistungspunkte (LP) 10	Turnus jedes Semester	Modulverantwortliche(r) Jentsch-Beierkuhnlein, Anke; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	1	10

Lernziele

Aim of this module is to provide a setting for advanced fieldwork in small groups on current ecological research topics dealing with biodiversity dynamics. An international team of students will explore wilderness and protected areas prompting ecological topics in climate and biodiversity research, in order to develop and implement research concepts and methods for short studies during a two-week field period. Ahead of the field stay, the students will design their studies, develop sound hypotheses and data sampling designs to answer individual research questions. Following the time in the field, participants will analyse their data and present their results as both, a scientific manuscript draft and a group presentation.

Lerninhalte

Timely research topics will vary in content and method by locations, collaborations and accompanying scientists. Group field work, introduction to target ecosystems, guidance in sampling design, support in data collection, in statistical analysis and in scientific writing, review of manuscripts. Basis for Master thesis.

Art und Umfang der Lehrveranstaltungen

Seminar/Exercise: Science School Biodiversity Research, i.e. La Palma, Himalaya (10 SWS)

Anmerkungen

Alternating; International Study Locations

[zum Inhaltsverzeichnis](#)



Fak529999: Quantitative (Paleo-)Ecology

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Steinbauer, Manuel; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Präsentation	1	2
semesterbegleitende Aufgaben oder Klausur oder mündliche Prüfung	0	3

Voraussetzungen

Programming skills in R are recommended

Lernziele

Upon completion of the module, students understand the potentials and limitations of both recent ecological data and paleoecological proxies. Students are able to prepare, analyse, and interpret ecological and paleontological datasets using modern quantitative methods. They can adapt existing scripts in R to explore patterns in species distributions, community composition, and ecological change. Students are capable of critically evaluating the effect of taphonomic processes, temporal resolution, uncertainty and spatial sampling, when influence ecological systems using data from both the recent and the deep past.

Lerninhalte

The module introduces ecological systems and their dynamics from a quantitative, data-driven perspective. It covers ecological and paleoecological data types, including fossil-based proxies used to reconstruct past ecosystem structure and change. Students collaboratively gain insight into key events in Earth history that have shaped ecosystem dynamics, alongside core concepts such as paleoecological proxies, taphonomy, preservation and sampling biases, and the temporal and spatial resolution of the fossil record. The main focus of the module is the quantitative analysis of ecological and paleontological data. Using datasets on species occurrences, community composition, and environmental proxies (e.g. from the Paleobiology Database and Neotoma), students apply statistical and multivariate methods in R (www.r-project.org) to analyse and interpret ecosystem patterns and dynamics across time.

Art und Umfang der Lehrveranstaltungen

Seminar: Paleobiology and Paleoecology (2 SWS)

Tutorial: Analyses of Paleoecological Data (2 SWS)

Anmerkungen

Biogeography and Sport Ecology, UBT

[zum Inhaltsverzeichnis](#)



Fak230002: Science School for Ecosystem Analysis and Simulation

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 60	Selbststudium (in Stunden) 90
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Hülsmann, Lisa; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
schriftliche Ausarbeitung oder Präsentation oder mündliche Prüfung	0	5

Voraussetzungen

Programming skills in R are recommended

Lernziele

After successful completion of the module, students have strengthened their ability to independently apply and critically reflect on simulation models, data-science approaches, and statistical methods in ecology and environmental sciences. They are able to engage with current modelling-based ecosystem research, evaluate assumptions, limitations, and results of different approaches, and place their own work within ongoing scientific developments. Through active participation in the summer school and the seminar, students further develop their skills in scientific communication, peer-to-peer discussion, and networking, supporting their transition towards emerging quantitative ecosystem researchers.

Lerninhalte

The module is organised as a hands-on and discussion-oriented format that focuses on the application of simulation models, data science, and statistics in ecology and environmental sciences. Students work with existing models, analyse simulation output, and apply statistical methods to ecological data. Students participate in a modelling-focused summer school, such as the annual workshop of the Young Modellers in Ecology (YOMOS, GfÖ), which includes opportunities for scientific exchange and networking supporting interaction with early-career researchers and the wider ecological modelling community. The seminar "Trends in Quantitative Ecosystem Research" complements the summer school, in which students present and discuss current methods, models, and applications in ecosystem modelling, fostering critical reflection and peer-to-peer learning.

Art und Umfang der Lehrveranstaltungen

Seminar: Trends in Quantitative Ecosystem Research (2 SWS)

Seminar/Exercise: Science School (2 SWS)

Participation of the summer school can be organised in a flexible manner

Anmerkungen

Ecosystem Analysis and Simulation, UBT

[zum Inhaltsverzeichnis](#)



Fak220639: Experimental Micrometeorology

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Einsemestrig	Präsenzstudium (in Stunden) 150	Selbststudium (in Stunden)
Leistungspunkte (LP) 5	Turnus Sommersemester	Modulverantwortliche(r) Thomas, Christoph; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
Beitrag	1	5

Voraussetzungen

Successful completion of module "Introduction to Micrometeorology" is recommended.

Lernziele

At the completion of this module, participants will have demonstrated their ability to design and implement a micrometeorological field experiment, as well as analyze field observations to quantify energy and mass fluxes at the air-land surface interface and identify fundamental atmospheric transport mechanisms. The learning outcomes include summarizing the scientific results in form of an oral presentation and a written field report.

Lerninhalte

This module consists of a 2-week field class taught outside of the University of Bayreuth campus. Students will select one or two from a list of micrometeorological techniques and/or scientific questions and form teams of up to four participants. Topics include setup and maintenance of energy and carbon dioxide exchange measurements including classical surface meteorological observations of radiation and soil heat flux, the eddy-covariance technique, and various optional boundary-layer observations. Minimum analyses will include eddy-covariance data processing including post-field corrections and quality assessment, as well as footprint analysis and quantifying surface energy balance components. Advanced topics include characterizing atmospheric turbulence, evaluating the turbulence kinetic energy budget, evapotranspiration, carbon-water coupling, conditional sampling methods (relaxed eddy accumulation, hyperbolic relaxed eddy accumulation, and disjunct eddy covariance), and fiber-optic distributed sensing techniques. In the two weeks, participants will plan and conduct measurements, select data according to their data quality, analyze and interpret the observations, and present their results and write a summary report. During the first weeks, lectures will provide a brief introduction to fundamental micrometeorological concepts and techniques. Participants will be advised individually or in teams.

Art und Umfang der Lehrveranstaltungen

Field lab: Experimental Micrometeorology: Summer School on Fluxes and Turbulence (7 SWS)

[zum Inhaltsverzeichnis](#)



Fak229970: Research Skills

Gültig ab: 01.10.2026

Lehrsprache Englisch	Dauer Zweisemestrig	Präsenzstudium (in Stunden) 45	Selbststudium (in Stunden) 105
Leistungspunkte (LP) 5	Turnus Wintersemester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise

Titel:	Gewichtung:	LP:
semesterbegleitende Aufgaben	0	2
Beitrag	0	2
Präsentation oder Beitrag	0	1

Lernziele

The learning objective is to impart the research skills for the preparation of the master's thesis.

Lerninhalte

The seminar "Scientific Writing and Management of Research Data" deals with writing scientific texts like the master thesis: overall structure, structure and content of individual sections, meaning of the hypotheses, authorship, formalities (tables, figures, legends, verb tenses, citations, etc.) and scientific misconduct. Differences between a thesis and a paper will be explored. Presentation techniques are practiced in short presentations. In addition, students learn the basic principles of research data management: transparency and reproducibility, metadata, data management plan, and long-term archives. This will be offered separately for MSc GCE and MSc Geoecology. Students of MSc Geography of Environmental Transformation can choose between the two courses.

The structure and content of the tutorial "Writing and Presentation of Research Plan" is individually coordinated with the supervisor of the master's thesis or a supervisor of the subject in which the master's thesis is being carried out. It includes a study of literature focused on the master's thesis with a corresponding evaluation, the acquisition of additional professional and work-related skills and, if necessary, the implementation of measurements and model simulations in preparation for the master's thesis. The presentation takes place in the respective working groups.

In the symposium "Environmental System Sciences", the students present their master thesis with a talk or poster to their fellow students and lecturers of the degree program shortly before or after they have submitted it.

Art und Umfang der Lehrveranstaltungen

Seminar: Scientific Writing and Management of Research Data in Global Change Ecology (Ecological Services) (2 SWS) or

Seminar: Scientific Writing and Management of Research Data in Geoecology (Soil Ecology) (2 SWS)

Tutorial: Writing and Presentation of Research Plan (2 SWS)

Seminar: Symposium „Environmental System Sciences“ (1 SWS)

Anmerkungen

The seminar "Scientific writing and research data" will be offered in the winter semester. Writing and presentation of the research plan should happen in the summer semester (3rd semester). The symposium takes place in winter and/or summer semester.

[zum Inhaltsverzeichnis](#)



Fak213394: Masterarbeit – Global Change Ecology

Gültig ab: 01.10.2026

Lehrsprache	Dauer Einsemestrig	Präsenzstudium (in Stunden) 0	Selbststudium (in Stunden) 900
Leistungspunkte (LP) 30	Turnus jedes Semester	Modulverantwortliche(r) Köllner, Thomas; Prof. Dr.	

Leistungsnachweise			
Titel:		Gewichtung:	LP:
Masterarbeit		1	30

Master Thesis (graded)

Lernziele

The Master Thesis provides the opportunity for students to demonstrate their ability to do independent research in their selected field of specialised interest. Using the qualifications they have gained, students should implement this knowledge in a practical manner by working on a topic of their own choice.

The aim is for students to apply the theories and methods they have acquired through their course of studies.

The Master Thesis centres on a specific direction in method and discipline while at the same time showing a clearly recognizable relationship to the programme of study. This can take place through discussion of the issues (e.g., ecological consequences of climate change), of observation of shared criterion (global or at least, large-scale), of the object (ecological zones).

Lerninhalte

Identification of a research question and discussion of a hypothesis, selection and application of a wide range of methods that have been taught, implementation and evaluation of literature research, data collection and evaluation, writing a scientific paper.

Anmerkungen

The Master Thesis is to be completed during the fourth semester, total time: 6 months

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