

Winter Semester 2026/27

As of 18/08/2026

Module Directory

Faculty 09 - Agricultural Sciences, Nutritional Sciences and Environmental
Management

B.Sc. Environmental Sciences

Please consult the timetable or current university calendar for information regarding dates and room numbers of the modules taught in the course:

<https://www.uni-giessen.de/en/faculties/f09/studies/while-studying/study-schedule>

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BK-005 / BK-005-EN	BK-005 / BK-005-EN Mathematics and Statistics		6 CP
	Mathematik und Statistik		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung II		1./3. Sem.
	Offered for the first time: WS 2015/16		
	Intake capacity: nicht limitiert		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Biometrie und Populationsgenetik mit dem Schwerpunkt Bioinformatik			
Applies to the Study Programmes: Agrarwissenschaften, Bachelor (3.); Environmental Sciences, Bachelor (1.); Global Food Systems, Bachelor (1.); Nachwachsende Rohstoffe und Bioressourcen, Bachelor (3.); Ökotrophologie, Bachelor (3.); Umwelt und globaler Wandel, Bachelor (1.); BBB Agrarwirtschaft, Bachelor (1./3.); BBB Ernährung und Hauswirtschaft, Bachelor (1./3.);			
Prerequisites for Participation: None			
Learning Outcomes: The students – know mathematical foundations and basics of statistical methods; – are able to conduct statistical analyses in their fields of study; – know how to use statistical software for data analysis in their field of study; – are able to understand and interpret outputs of statistical software.			
Module Content: – Methods of descriptive statistics – Theory of statistical tests – Experimental design – Analysis of variance and multiple comparisons – Regression analysis – Matrices and vectors, linear equation systems			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	30	60	
Practical training	30	60	
Total:	180		
Prerequisites for Examination: None			
Module Examination: – Form(s) of assessment: Assignment set (4) or written examination – Components of final grade: Assignment set (100 %) or written examination (100 %) – Form of module retake examination: Written examination			
Language: Deutsch und/oder Englisch			

BK-037 / BK-037-EN	BK-037 / BK-037-EN Basics in Landscape Hydrology		6 CP
	Landschaftswasserhaushalt		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		2./4. Sem.
	Offered for the first time: SS 2006		
	Intake capacity: nicht limitiert		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt			
Applies to the Study Programmes: Umwelt und globaler Wandel, Bachelor (2.); Environmental Sciences, Bachelor (4.);			
Prerequisites for Participation: Keine			
Learning Outcomes: Die Studierenden – kennen die Grundlagen des Wasserhaushaltes; – kennen die wesentlichen Steuergrößen des Wasser-, Wärme- Energie- und Stofftransports in Böden, im Gewässer und in der Landschaft; – können die Bedeutung der Landnutzung und des Klimas bezüglich ihres Einflusses auf den Wasserhaushalt und die Gewässerqualität einschätzen.			
Module Content: – Einführung in die Hydrologie – Exemplarische Betrachtung und Methoden zur Erfassung einzelner Größen des Wasserhaushalts und der Gewässergüte – Grundlagen zur Beurteilung der Auswirkung von Nutzungsänderungen auf den Wasser- und Stoffhaushalt – Bewässerung – Konzept des Wasserfußabdrucks			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	56	112	
Excursion	4	8	
Total:	180		
Prerequisites for Examination: Keine			
Module Examination: – Form(s) of assessment: Klausur – Components of final grade: Klausur (100 %) – Form of module retake examination: Klausur			
Language: Deutsch und/oder Englisch			

BK-077 / BK-077-EN	BK-077 / BK-077-EN The Anthropocene		6 CP
	Das Anthropozän		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		1. Sem.
	Offered for the first time: WS 2022/23		
	Intake capacity: 40		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt			
Applies to the Study Programmes: Environmental Sciences, Bachelor (1.); Umwelt und globaler Wandel, Bachelor (1.);			
Prerequisites for Participation: None			
Learning Outcomes: The students – understand the key drivers of global change; – understand the most significant environmental challenges of our time; – explore potential solutions; – learn basic research techniques (literature reviews and structured research; creating and interpreting graphs; presenting academic content).			
Module Content: – The role of humans as a actors in Earth’s development – Drivers of global change – Demographic change – Food production and land-use change – Concept of planetary boundaries – Global environmental changes and their complex interactions (air pollution, climate change, soils and global change, biodiversity crisis, spread of disease, land-use changes, changing oceans, resource availability, new chemicals, waste) – Literature search and research – Methods for determining the ‘state of the art’ – Creating and understanding scientific graphics – Creating a scientific poster – Presentation and discussion at a final conference			
Forms of Instruction:		Contact hours	Preparation and follow-up work
Lecture		60	120
Total:		180	
Prerequisites for Examination: Written assignment (poster)			
Module Examination: – Form(s) of assessment: Assignment set (5-7 pages) – Components of final grade: Assignment set (100 %) – Form of module retake examination: Written assignment (5-7 pages)			
Language: Deutsch und/oder Englisch			

BK-101-EN	BK-101-EN Introduction to Biochemistry	6 CP
	Introduction to Biochemistry	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung I	1. Sem.
	Offered for the first time: WS 2026/27	
	Intake capacity: nicht limitiert	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Genetik der Nutzpflanzendiversität		
Applies to the Study Programmes: Environmental Sciences, Bachelor (1.); Global Food Systems, Bachelor (1.);		
Prerequisites for Participation: None		
Learning Outcomes: The students – have all the necessary chemical foundations to understand essential biochemical processes from a functional perspective (principles of chemical bonding, acid-base equilibrium, redox systems, thermodynamics); – know and understand the structure, biosynthesis, and function of essential biomolecules (carbohydrates, amino acids and proteins, nucleic acids, lipids, and membrane lipids); – are familiar with the basic regulatory principles of living cells; – have a deep understanding of metabolic processes, particularly photosynthesis and dissimilation in general and human metabolism in particular (essential nutrients, regulation, toxicology); – understand the cycles of the most important macronutrients (N, P, C) at the molecular level.		
Module Content: – Fundamentals of Chemistry (principles of chemical bonding, acid-base equilibrium, redox systems, thermodynamics) – Biomolecules (carbohydrates, amino acids and proteins, nucleic acids, lipids and membrane lipids) – Gene expression – Enzymes and enzyme kinetics – Membrane proteins (channels, transporters, pumps) – Receptors and signal transduction – Photosynthesis and dissimilation – Metabolic regulation – Biochemistry of human nutrition – Human toxicology – N, P, and C cycles		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	60	120
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination		
Language: Englisch		

BK-102-EN	BK-102-EN Biology	6 CP
	Biology	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Insektenbiotechnologie	1. Sem.
	Offered for the first time: WS 2026/27	
	Intake capacity: nicht limitiert	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Insektenbiotechnologie im Pflanzenschutz		
Applies to the Study Programmes: Environmental Sciences, Bachelor (1.); Global Food Systems, Bachelor (1.);		
Prerequisites for Participation: None (recommended: upper secondary school level biology – basic course)		
Learning Outcomes: The students – have a solid understanding of the fundamentals of cell biology, botany, zoology, and microbiology, as well as basic chemical and biochemical principles of biology; – are able to classify and understand cell biological, botanical, zoological, microbiological, and biochemical issues that arise in their field.		
Module Content: – Cells as the smallest unit of life (procaryotic and eucaryotic, basics of cellular structures and their functions, cell-cell communication, specialization, cell division) – DNA as genetic material containing the code of life (genetic code, DNA replication, inheritance, mutation, recombination, meiosis) – Evolution as source of organism diversity (molecular and mechanistic basics of evolution, driving forces of evolution, origin of life hypothesis) – Plants (evolution and diversity, reproduction, structure and function, significance for life on earth) – Fungi (evolution and diversity, reproduction, role in ecosystems and influence on plants and animals) – Animals (evolution and diversity, development) – Microorganisms (eukaryotic versus procaryotic microorganisms, bacteria and archaea, significance for ecosystems and humans) – Energy sources of life and nutrition types (photosynthesis, aerobic and anaerobic respiration, fermentation) – Ecosystems (definition ecosystems, role of organisms in ecosystems, biogeochemical cycles and their importance for life, ecosystem services, human influence)		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	60	120
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination		
Language: Englisch		

BK-103	BK-103 Language Acquisition I		6 CP
	Language Acquisition I		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Dekanat		1. Sem.
	Offered for the first time: WS 2026/27		
	Intake capacity: nicht limitiert		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Studiendekanat			
Applies to the Study Programmes: Environmental Sciences, Bachelor (1.); Global Food Systems, Bachelor (1.);			
Prerequisites for Participation: Deutschkenntnisse auf dem Niveau GER A2			
Learning Outcomes: Die Studierenden – erwerben grundlegende Sprachkenntnisse in Deutsch, bzw. bei nachgewiesenen Deutschkenntnissen auf mindestens Niveau C1 GER in einer Fremdsprache, die nicht ihre Erstsprache ist; – verfügen über Sprachkompetenzen, die eine einfache mündliche und schriftliche Kommunikation im Alltag und im universitären Umfeld ermöglichen; – verstehen grundlegende sprachliche Strukturen und kulturelle Kontexte der gewählten Sprache.			
Module Content: – Basisgrammatik und Wortschatz – Hörverstehen und Leseverstehen – Schreiben einfacher Texte – Alltagskommunikation – Studierende, die Deutschkenntnisse auf mindestens Niveau C1 GER nachweisen, wählen im Umfang von 6 CP eine oder mehrere andere Sprachen.			
Forms of Instruction:		Contact hours	Preparation and follow-up work
Lecture		90	90
Total:		180	
Prerequisites for Examination: Keine			
Module Examination: – Form(s) of assessment: Bearbeitung von Aufgaben (12-16 Stück) und mündliche Prüfung oder 2 Klausuren und mündliche Prüfung – Components of final grade: Bearbeitung von Aufgaben (50 %), mündliche Prüfung (50 %) oder Klausur (je 30 %), mündliche Prüfung (40 %) – Form of module retake examination: Klausur (60 %) und mündliche Prüfung (40 %)			
Language: Deutsch			

BK-104	BK-104 Language Acquisition II		6 CP
	Language Acquisition II		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Dekanat		2. Sem.
	Offered for the first time: SS 2027		
	Intake capacity: nicht limitiert		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Studiendekanat			
Applies to the Study Programmes: Environmental Sciences, Bachelor (2.); Global Food Systems, Bachelor (2.);			
Prerequisites for Participation: Language Acquisition I (BK-103)			
Learning Outcomes: Die Studierenden – vertiefen ihre Sprachkenntnisse in Deutsch, bzw. bei nachgewiesenen Deutschkenntnissen auf mindestens Niveau C1 GER in einer Fremdsprache, die nicht ihre Erstsprache ist und erweitern ihren aktiven Wortschatz für akademische und berufsbezogene Situationen; – können sich in vertrauten Themenbereichen zusammenhängend und adressatengerecht mündlich und schriftlich äußern; – reflektieren kulturelle und kommunikative Unterschiede und wenden interkulturelle Kompetenzen sicher an.			
Module Content: – Aufbau der Grammatikkenntnisse – Hör- und Leseverstehen erweitern – Schreiben komplexerer Texte – Kommunikation im Studium – Studierende, die Deutschkenntnisse auf mindestens Niveau C1 GER nachweisen, wählen im Umfang von 6 CP eine oder mehrere andere Sprachen.			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	90	90	
Total:	180		
Prerequisites for Examination: Keine			
Module Examination: – Form(s) of assessment: Bearbeitung von Aufgaben (12-16 Stück) und mündliche Prüfung oder 2 Klausuren und mündliche Prüfung – Components of final grade: Bearbeitung von Aufgaben (50 %), mündliche Prüfung (50 %) oder Klausur (je 30 %), mündliche Prüfung (40 %) – Form of module retake examination: Klausur (60 %) und mündliche Prüfung (40 %)			
Language: Deutsch			

BK-105-EN	BK-105-EN Ecology and Biodiversity	6 CP
	Ecology and Biodiversity	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement	2. Sem.
	Offered for the first time: SS 2027	
	Intake capacity: nicht limitiert	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Landschaftsökologie und Landschaftsplanung		
Applies to the Study Programmes: Environmental Sciences, Bachelor (2.); Global Food Systems, Bachelor (2.);		
Prerequisites for Participation: None		
Learning Outcomes: The students – know fundamental concepts of ecology; – are familiar with key types of ecological studies and can differentiate between their approaches; – develop a basic understanding of ecological relationships; – understand the functioning of ecological systems and their scale dependency; – are able to analyze interactions between biotic and abiotic factors as well as human influences in ecological systems; – know the different components of biodiversity; – have knowledge of the importance of biodiversity for ecosystem functioning; – can describe and contextualize the impacts of global change on ecosystems and their biological diversity.		
Module Content: – Disciplines in ecology – Types of ecological studies – Principles of the structure of ecological systems – Biogeochemical cycles (nutrient cycles) – Population ecology, community ecology, landscape ecology – Biodiversity patterns – Metrics for quantifying biodiversity – Functional biodiversity – Relationship between biodiversity and ecosystem functions, including ecosystem services – Biodiversity and global change (land-use change, climate change, nitrogen deposition, invasive species)		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	56	112
Excursion	4	8
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination		
Language: Englisch		

BK-106-EN	BK-106-EN Agricultural Production and its Environmental Impacts	6 CP
	Agricultural Production and ist Environmental Impacts	
Core Module / Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Pflanzenernährung	2. Sem.
	Offered for the first time: SS 2027	
	Intake capacity: nicht limitiert	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Pflanzenernährung		
Applies to the Study Programmes: Environmental Sciences, Bachelor (2.); Global Food Systems, Bachelor (2.);		
Prerequisites for Participation: None		
Learning Outcomes: The students – know the main agricultural land use systems and can classify them systematically; – understand key cultivation practices of major crops and can explain their application; – know major livestock production systems and can describe their characteristics; – analyze and assess the environmental impacts of crop and animal production.		
Module Content: Agricultural Production: – Principles of crop production and yield formation – Soil fertility and soil cultivation – Crop plants as food and renewable resources – Husbandry of cattle, pigs, poultry, sheeps and goats – Animal husbandry systems Environmental Impacts: – Effects of climate change on agricultural production systems – Climate gas emissions from crop and animal production systems – Soil degradation and soil erosion – Nutrient emissions and eutrophication – Emission of plant protection agents – Loss of biodiversity – Water consumption and soil salinization – Deforestation		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	60	120
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination		
Language: Englisch		

BK-107-EN	BK-107-EN Land Use Systems	6 CP
	Land Use Systems	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement	3. Sem.
	Offered for the first time: WS 2027/28	
	Intake capacity: nicht limitiert	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Landnutzungssysteme mit dem Schwerpunkt Agroforst		
Applies to the Study Programmes: Environmental Sciences, Bachelor (3.); Global Food Systems, Bachelor (3.);		
Prerequisites for Participation: None		
Learning Outcomes: The students – are able to define and systematize land use systems and trace their historical and global development; – are familiar with the characteristics, benefits and trade-offs of a range of traditional and innovative land use systems; – are able to critically assess the ecological functions, resource flows, and socio economic outcomes of diverse land use systems; – can develop a robust experimental design to investigate specific effects of a land use system.		
Module Content: – Definition and classification of land use systems – In-depth discussion of selected traditional and innovative land use systems – Ecological processes and resource flows in land use systems – Socio-economic aspects of land use systems – Hypothesis formulation, experimental design and write-up		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	40	80
Exercises	20	40
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Written assignment (3-5 pages) and presentation (5-10 min.) – Components of final grade: Written assignment (50 %), presentation (50 %) – Form of module retake examination: Presentation (5-10 min., 50 %) and revision of the written assignment within four weeks (50 %)		
Language: Englisch		

BK-108-EN	BK-108-EN Climate Science		6 CP
	Climate Science		
Core Module / Optional Module	Extern / Extern		3. Sem.
	Offered for the first time: WS 2027/28		
	Intake capacity: nicht limitiert		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Extern			
Applies to the Study Programmes: Environmental Sciences, Bachelor (3.); Global Food Systems, Bachelor (3.);			
Prerequisites for Participation: None			
Learning Outcomes: The students – understand the physical processes that determine the Earth’s energy balance; – explain the sources and transformation processes of greenhouse gases; – analyze the drivers of past, present, and future climate change; – are able to explain and contextualize the impacts of climate change on nature and human well-being; – analyze climate scenarios in terms of their development, assumptions, and implications; – explain key milestones in climate change research and policy-making and can assess their relevance.			
Module Content: – Global energy budget – Greenhouse gases, sources and transformation processes – Past, current and future climate change, its drivers and impacts – Feedback loops and tipping points – Climate change scenarios – History of climate change research – Key legislation and policies related to climate change			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	60	120	
Total:	180		
Prerequisites for Examination: None			
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination			
Language: Englisch			

BK-109-EN	BK-109-EN Intercultural Communication		6 CP
	Intercultural Communication and Presentation		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Ernährungswissenschaft		3. Sem.
	Offered for the first time: SS 2008		
	Intake capacity: nicht limitiert		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Internationale Ernährungssicherung			
Applies to the Study Programmes: Environmental Sciences, Bachelor (3.); Global Food Systems, Bachelor (3.);			
Prerequisites for Participation: None			
Learning Outcomes: The students – develop intercultural sensitivity and are able to apply it reflectively in international contexts; – present and discuss scientific content in a target-group-oriented manner; – collaborate effectively in international teams.			
Module Content: – Intercultural Communication – Presentation Techniques – Scientific Writing and Presentation – Group Work and Discussion			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Seminar	30	60	
Exercises	30	60	
Total:	180		
Prerequisites for Examination: None			
Module Examination: – Form(s) of assessment: Assignment set (4-6) and Presentation (5-10 min.) – Components of final grade: Assignment set (50 %), Presentation (50 %) – Form of module retake examination: Written assignment (8-10 pages)			
Language: Englisch			

BK-110-EN	BK-110-EN Fundamentals of Life Cycle Assessment	6 CP
	Fundamentals of Life Cycle Assessment	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement	4. Sem.
	Offered for the first time: SS 2008	
	Intake capacity: nicht limitiert	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Umweltbilanzierung		
Applies to the Study Programmes: Environmental Sciences, Bachelor (4.); Global Food Systems, Bachelor (4.);		
Prerequisites for Participation: None		
Learning Outcomes: Students are able to – explain the scope of an LCA and distinguish it from other environmental assessment methods; – explain the four phases of an LCA (ISO 14040/44) and describe their components; – define the scope and framework of the study, including the functional unit and system boundaries; – calculate simple life cycle inventories (LCI) and apply allocation methods; – explain the basic principles of impact assessment and describe selected impact categories (e.g., climate impact); – distinguish between and interpret analytical elements such as hotspot, contribution, or sensitivity analyses; – critically evaluate LCA results.		
Module Content: – Introduction to LCA: Motivation, fields of application, distinction from other methods – Overview of the four phases of LCA according to ISO 14040/44 – Scope and framework: functional unit, system boundaries – Life Cycle Inventory (LCI): process chains, input/output data, data types, calculations, allocation methods – Impact assessment (LCIA): Basic principles, midpoints and endpoints, selected impact categories – Analytical elements: Contribution and sensitivity analyses – Interpretation of results: Evaluation, uncertainties – Case studies on application.		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Exercises	30	60
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination		
Language: Englisch		

BK-111-EN	BK-111-EN Thesis Lab: Scientific Writing and Communication	6 CP
	Thesis Lab: Scientific Writing and Communication	
Core Module / Optional Module		6. Sem.
	Offered for the first time: WS 2027/28	
	Intake capacity: nicht limitiert	
Frequency and Duration: WS, 1 Semester		
Module Coordinator:		
Applies to the Study Programmes: Environmental Sciences, Bachelor (6.); Global Food Systems, Bachelor (6.);		
Prerequisites for Participation: At least ten core modules and at least five elective (profile) modules must be successfully completed.		
Learning Outcomes: The students – use reference management software effectively for academic work; – critically, reflectively, and responsibly apply artificial intelligence in academic work; – create scientific graphics and graphical abstracts for scientific communication; – communicate scientific content in a target-group-oriented manner across different formats (social media, websites, press releases); – develop a clear, coherent, and feasible research concept.		
Module Content: – Use of reference software for specific academic content – Drafting an annotated outline of the thesis – Development and presentation of the thesis’ project concept and initial findings – Creation of a visual abstract, social media post and press release – How to handle copyright and dealing with plagiarism – Use of various AI models		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	20	40
Seminar	40	80
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Presentation (15-30 min.) and written assignment (2-3 pages) – Components of final grade: Presentation (50 %), written assignment (50 %) – Form of module retake examination: Oral examination (50 %) and revision of the written assignment within four weeks (50 %)		
Language: Englisch		

BK-120-EN	BK-120-EN Environmental Physics		6 CP
	Environmental Physics		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		2. Sem.
	Offered for the first time: SS 2027		
	Intake capacity: nicht limitiert		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Umweltbilanzierung			
Applies to the Study Programmes: Environmental Sciences, Bachelor (2.);			
Prerequisites for Participation: None			
Learning Outcomes: The students are able to – explain fundamental physical principles as the basis for understanding environmental processes; – provide physical explanations for key environmental issues (e.g., climate change, air pollution, water pollution); – describe transport, radiation, and energy balance processes qualitatively and, in simple cases, quantitatively; – apply and interpret simple mass and energy balances as well as models for analyzing environmental processes; – classify basic measurement methods and evaluate measurement and model results in the context of environmental assessment.			
Module Content: – Fundamentals of environmental physics: physical state variables, forms of energy and conservation of energy, as well as the composition and structure of the atmosphere, hydrosphere, and pedosphere, and the physical aspects of key material cycles – Physical processes in environmental compartments: transport processes (diffusion, advection, mixing), radiation and energy balance, heat and flow processes – Physical mechanisms of key environmental problems, particularly climate change, air pollution, and processes in water bodies (e.g., stratification, eutrophication, acidification) – Measurement and observation methods for recording physical environmental parameters, as well as fundamentals of data analysis – Introduction to simple environmental models, as well as mass and energy balances – Quantitative description and analysis of environmental processes, and interpretation of measurement and model data			
Forms of Instruction:		Contact hours	Preparation and follow-up work
Lecture		45	90
Seminar		15	30
Total:		180	
Prerequisites for Examination: None			
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination			
Language: Englisch			

BK-121-EN	BK-121-EN Soil Science		6 CP
	Soil Science		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Bodenkunde und Bodenerhaltung		2. Sem.
	Offered for the first time: SS 2027		
	Intake capacity: nicht limitiert		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Bodenressourcen und Bodenschutz			
Applies to the Study Programmes: Environmental Sciences, Bachelor (2.); Global Food Systems, Bachelor (2.);			
Prerequisites for Participation: None			
Learning Outcomes: The students – understand the central role of soils for the functioning and sustainable use of ecosystems; – analyze soil formation and development over time under the influence of pedogenic factors; – derive physical and chemical soil properties and assess their significance for soil functions and land use; – identify key soil types and evaluate their potential for sustainable use.			
Module Content: – Significance of soils and their functions in ecosystems – Mineral soil constituents – Organic soil constituents – Soils as habitats – Soils as regulators of the cycling of water, carbon and nutrients in ecosystems – Soils as foundation for cropping and forestry – Soil as filter and buffer of pollutant inputs – Soil-forming factors and processes across climate and vegetation zones – Principles of soil classification – Formation, distribution, and use of major soil types			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	52	120	
Practical training	4		
Excursion	4		
Total:	180		
Prerequisites for Examination: None			
Module Examination: – Form(s) of assessment: Written examination – Components of final grade: Written examination (100 %) – Form of module retake examination: Written examination			
Language: Englisch			

BK-122-EN / BP-076	BK-122-EN / BP-076 Geographic Information Systems (GIS)	6 CP
	Geographische Informationssysteme (GIS)	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement	3./5. Sem.
	Offered for the first time: WS 2001/02	
	Intake capacity: 90 (3 Gruppen à 30)	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt		
Applies to the Study Programmes: Environmental Sciences, Bachelor (3.); Profil, Bachelor (3./5.);		
Prerequisites for Participation: Keine		
Learning Outcomes: Die Studierenden – kennen den Aufbau, die Funktionen und die Einsatzmöglichkeiten von Geo-Informationssystemen in der Landschaftsforschung; – haben Grundkenntnisse in der Anwendung und Nutzung von fachspezifischen GIS-Funktionalitäten im Bereich der Landschaftsforschung; – können selbständig ein ArcGIS-Projekt im Bereich der Landschaftsforschung aufbauen; – haben ihre Kenntnisse anhand von praktischen Projektbeispielen aus der hydrologischen und landschaftsökologischen Forschung vertieft und erweitert.		
Module Content: – Einführung in die Grundlagen der GIS (z.B. ArcGIS) – Datentypen, Datenerfassung und Datenverwaltung, Koordinationssysteme, Analysemöglichkeiten – GIS-Funktionalitäten: Anlegen digitaler Karten, Digitalisieren, Editieren, Legendenerstellung, Datenkooperationen, Analyse von Rasterkarten – Praktische Übungen am PC mit einem GIS (z.B. Landschaftsentwicklung, hydrologische Fragestellungen) – Praktischer Umgang mit GPS-Technik		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Practical training	30	60
Total:	180	
Prerequisites for Examination: Keine		
Module Examination: – Form(s) of assessment: Klausur – Components of final grade: Klausur (100 %) – Form of module retake examination: Klausur		
Language: Deutsch und/oder Englisch		

BK-123-EN / BK-034	BK-123-EN / BK-034 Applied and Environmental Microbiology	6 CP
	Angewandte und Umweltmikrobiologie	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Bodenkunde und Bodenerhaltung	3. Sem.
	Offered for the first time: WS 2015/16	
	Intake capacity: 120	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Bodenressourcen und Bodenschutz		
Applies to the Study Programmes: Environmental Sciences, Bachelor (3.); Umwelt und globaler Wandel, Bachelor (3.);		
Prerequisites for Participation: None		
Learning Outcomes: The students – have knowledge of microbiological nutrient cycles; – learn the microbiological and technical fundamentals of environmental protection relevant processes in wastewater treatment, drinking water abstraction and purification, and air pollution control; – are familiar with basic microbiological working techniques.		
Module Content: – Basic knowledge of applied and environmental microbiology, energy recovery, C-, N-, P-cycles, environmental biotechnological applications in the field of material and energy recycling (wastewater treatment, drinking water purification, air pollution control) – Sterile working techniques, culture media; cultivation of microorganisms; handling of the microscope, cell and colony forms, microscopy of bacteria and differentiation by staining, quantification of bacteria and phages – Key differences and environmental microbiological role of bacterial and fungal groups (Enterobacteria, Actinomycetes; spore-forming bacteria, yeasts, Fungi imperfecti) – Problematic of antimicrobial resistance spread from wastewater streams into the environment – Microbiological analysis of wastewater (antimicrobial resistant detection) and drinking water		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Practical training	30	60
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Written examination and written assignment (max. 3 pages) – Components of final grade: Written examination (80 %), written assignment (20 %) – Form of module retake examination: Written examination		
Language: Deutsch und/oder Englisch		

BK-124-EN	BK-124-EN Environmental Monitoring of Terrestrial Ecosystems	6 CP
	Environmental Monitoring of Terrestrial Ecosystems	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement	4. Sem.
	Offered for the first time: SS 2028	
	Intake capacity: nicht limitiert	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt		
Applies to the Study Programmes: Environmental Sciences, Bachelor (4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students – explain fundamental concepts of measurement and environmental monitoring in terrestrial ecosystems (soil, vegetation, atmosphere); – analyze measurement principles, calibration procedures, and aspects of data quality; – apply measurement systems in field and laboratory settings and independently collect environmental data; – process, analyze, and interpret environmental data using appropriate methods; – evaluate the suitability of different monitoring approaches for specific research questions; – communicate environmental monitoring results in a target-group-oriented manner in presentations and reports.		
Module Content: – Fundamentals of environmental monitoring in terrestrial ecosystems (soil, vegetation, atmosphere) – Measurement principles, sensor systems, and monitoring technologies – Calibration, quality assurance, and data quality – Field and laboratory methods for environmental data collection (including excursions) – Data processing, management, and analysis – Evaluation and interpretation of monitoring data – Assessment and communication of monitoring results		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	20	40
Practical training	40	80
Total:	180	
Prerequisites for Examination: None		
Module Examination: – Form(s) of assessment: Presentation (10-15 min.) and written assignment (5-10 pages) – Components of final grade: Presentation (20 %), written assignment (80 %) – Form of module retake examination: Written assignment (10-15 pages)		
Language: Englisch		

BK-125-EN	BK-125-EN Environmental Modelling		6 CP
	Environmental Modelling		
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		4. Sem.
	Offered for the first time: SS 2028		
	Intake capacity: nicht limitiert		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Landnutzung und Klimaresilienz			
Applies to the Study Programmes: Environmental Sciences, Bachelor (4.);			
Prerequisites for Participation: None			
Learning Outcomes: The students are able to – explain core concepts of environmental modelling, including model types and underlying assumptions; – acquire, clean, and preprocess environmental data for analysis; – run and interpret simple environmental models; – apply basic validation and sensitivity analysis techniques to assess and critically evaluate model performance; – communicate modelling results clearly through written reports and visualisations.			
Module Content: – Load and explore datasets – Clean and preprocess data (including interpolation of missing values and creation of derived variables) – Apply a simple environmental/process model – Validate the model (calculate error metrics, analyze and visualize residuals) – Communicate the modelling workflow and results – Document the modelling process according to domain standards			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	30	60	
Practical training	30	60	
Total:	180		
Prerequisites for Examination: None			
Module Examination: – Form(s) of assessment: Written assignment (5-8 pages) – Components of final grade: Written assignment (100 %) – Form of module retake examination: Revision of the written assignment within 4 weeks			
Language: Englisch			