Modulhandbuch

Course Book

M.Sc. Planetary Health (PH)

Studienbeginn ab WS 2026/2027

Beginning of studies from WS 2026/2027

Modul-Übersicht/ Directory of modules

Abkürzungen/Abbreviations:

Häufigkeit/Course cycle

SS=Sommersemester/Summer semester

WS=Wintersemester/Winter semester

Verwendbarkeit des Moduls/Study program allocation

P/C=Pflichtmodul/Compulsory

WP/E=Wahlpflichtmodul/Elective

fWP/O=freies Wahlpflichtmodul/Optional

PM=Projektmodul/Project module

Lehr- und Lernformen/Teaching and learning methodes

V/L=Vorlesung/Lecture

Ü/T=Übung/Tutorial

S=Seminar

P=Praktikum/Practical training

E=Exkursion/Excursion

prÜ/pT=praktische Übung/ Practical course

PS=Projektseminar/Project seminar

T/sT=Tutorium/Student tutorial

K/C=Kolloquium/Colloquium

AG/SG=Arbeitsgemeinschaft/Study group

B-Arb/BT=Bachelorarbeit/Bachelorthesis

M-Arb/MT=Masterarbeit/Masterthesis

Mit Asterisk (*) gekennzeichnet: Lehrveranstaltungen, für die gemäß § 13 Abs. 6 der POO als Voraussetzung für die Teilnahme an Modulprüfungen die verpflichtende Teilnahme festgelegt ist. Die Pflicht zur Teilnahme besteht dann zusätzlich zu etwaigen sonstigen aufgeführten Studienleistungen.

Marked with an asterisk (*): Courses for which, in accordance with § 13 Paragraph 6 of the POO, compulsory attendance is specified as a prerequisite for taking module examinations. The compulsory attendance then exists in addition to any other listed academic achievements.

Compulsory modules

30 ECTS-CP must be completed.

Introduction to Planetary Health

Module ID/Code: PH-100

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Basic concepts of Planetary Health and relationships to Global Health and OneHealth agendas as well as perspectives on Planetary Health from the social, environmental, and medical sciences.
Intended learning outcomes	Students can distinguish conceptual approaches to Planetary Health from the concepts of Global Health and OneHealth. They are able to frame sustainability challenges as Planetary Health issues and understand different disciplinary concepts and terminologies used to address Planetary Health issues in the social, environmental, and medical sciences.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Introduction to Planetary Health	WS	English	50	2	60
S	Discussion of Planetary Health Issues	WS	English	50	2	60
Time for self-study	-	-	-	-	-	60

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	Compulsory	1

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	none	6
Examination and examination language	Oral Exam (English)	

7. Frequency				8. Workload	9. Duration
Winter semester	X	Winter and summer semester	☐	180h	1 semester
Summer semester	☐				

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Jan Börner
Institute/Department	AEI/ILR

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Methods of Empirical Research

Module ID/Code: BAS-110 [780761110]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Quantitative Research Introduction into R; inference and hypothesis testing; linear regression analysis (OLS) and Gauss Markov theorem; use of non-metric (dummy) variables; logistic regression Qualitative Research Research in Social Science; philosophy of science; key aspects of qualitative research; methods of qualitative research (observation, interview, focus groups); application of qualitative research including analysis
Intended learning outcomes	After a successful completion of the Quantitative Research Part of the course, the students… - comprehend the theoretical basics of linear regression and logistics regression. - can prepare data for analysis and perform empirical research using OLS. - are able to generate and test hypotheses (t-test, F-test and Anova) and to interpret p-values. - are able to perform a trend analysis for typical time series data along the agri-food chain. - are able to interpret statistical software outputs. After a successful completion of the Qualitative Research Part of the course, the students… - can explain major epistemological approaches in social science, different ways of scientific reasoning and the basic assumptions of critical rationalism and the positivism dispute. - are able to describe the key aspects and quality criteria in qualitative research and how it differentiates from quantitative research. - can summarize different methods of qualitative research. - are able to design a qualitative study, collect and analyse the data and interpret the results. are able to present and discuss own study results and reflect on those of others.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Quantitative Methods	WS, SS	English	60	1	25
T	Quantitative Methods: Exercises with R	WS, SS	English	30	1	35
L	Qualitative Methods	WS, SS	English	60	2	60
Time for self-study	-	-	-	-	-	60

3. Prerequisites for the module

Compulsory	none
Recommended	Introductory course in methods of empirical research

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics	Compulsory	1, 2
	MSc Planetary Health	Compulsory	1, 2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Presentation and written report for the project work (English)	6
Examination and examination language	Project work (50%, English), Written exam (50%, English)	

7. Frequency	8. Workload	9. Duration

Winter semester ☐ Summer semester ☐	Winter and summer semester ☒	180 hours	1 semester
Module coordination			
Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/		
Module coordinator	Prof. Dr. Monika Hartmann		
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften		
Further information			
(Reading lists, information links, etc.)	The computer Lab is necessary for the exercises with R (see above)		
(e.g. self-study courses)			
(e.g. e-learning tools)			

Transdisciplinary Project Seminar

Module ID/Code: PH-110

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	- Introduction to Planetary Health as a transdisciplinary field - Global and local challenges in the Anthropocene: climate change, biodiversity loss, health inequity - Practical tools and frameworks for interdisciplinary collaboration - Fundamentals of co-creation and knowledge integration - Group-based, real-world project work on problems provided by external partners (e.g. UN, local governments, NGOs) - Stakeholder engagement, coordination, and development of a common language across disciplines - Communication of interdisciplinary outcomes (e.g. white papers, policy briefs, technical reports)
Intended learning outcomes	After a successful completion of the course, the students will... - understand the foundational concepts of Planetary Health and its transdisciplinary nature - have practical experience applying tools and methods to co-create science-based solutions in interdisciplinary and transdisciplinary teams - collaborate with practitioners to apply these methods to a defined real-world Planetary Health challenge - engage with data, feedback, and stakeholder inputs to steer a group project toward actionable results - produce and communicate joint outputs that synthesize interdisciplinary findings (e.g. policy briefs, technical documents)

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Tools and approaches for co-creating science-based solutions	WS	English	50	1	20
S	Discussions and Presentations	WS	English	50	1	20
PS	Work in interdisciplinary teams and in exchange with practitioners	WS	English	50	-	50
Time for self-study	-	-	-	-	-	90

3. Prerequisites for the module

Compulsory	None
Recommended	Interest in interdisciplinary collaboration, sustainability, or global health topics

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	Compulsory/	1

5. Requirements for the award of credits (ECTS) / 6. Credits

Required achievements	none	6
Examination and examination language	presentation (50%), group presentation (50%) (English)	

7. Frequency				8. Workload	9. Duration
Winter semester	X	Winter and summer semester	☐	180h	1 semester
Summer semester	☐				

Module coordination	
Teacher	tbd
Module coordinator	Cory Whitney
Institute/Department	
Further information	
(Reading lists, information links, etc.)	Topics and data for real-world problems will be provided by international and local partners (e.g. UN agencies, NGOs, municipal bodies). These partners will pitch their topics at the beginning of the term and provide input throughout the semester. Readings: Whitmee et al. (2015) Safeguarding Human Health in the Anthropocene Epoch – The Lancet 10.1016/S0140-6736(15)60901-1 Myers & Frumkin (eds.) (2020). Planetary Health: Protecting Nature to Protect Ourselves https://doi.org/10.1093/ije/dyaa254 Buse et al. (2022). Planetary Health: Safeguarding Human Health and the Environment in the Anthropocene https://doi.org/10.1111/joim.13774
(e.g. self-study courses)	…
(e.g. e-learning tools)	…

Planetary Health – Research Topics

Module ID/Code: PH-120

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	This seminar module will introduce students to the state-of-the-art in research on topics with relevance to Planetary Health. Students will read recent published research papers and do background research on underlying theory, methods and the state of knowledge in the respective area. They will then present the essence of these research papers, i.e., objectives, conceptual approach, methodology and main results to their fellow students and put these papers in the perspective of the current state of the literature. The research papers considered will be chosen anew each instance of the course in communication with the program's instructors and will encompass interdisciplinary research papers with a broader perspective of Planetary Health as well as papers more aligned with the tracks of human, environmental and societal health.
Intended learning outcomes	Students have gained knowledge on scope, results and limitations of current research in Planetary Health and comprehend state-of-the-art concepts and approaches of analysis. They also do first steps in evaluating the contribution of research in view of the literature and in identifying research gaps. They will acquire skills in preparing and giving presentations as well as in participating in and moderating scientific discussions.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Seminar	Current research papers on Planetary Health	WS	English,	20	1	60
Time for self-study	Background research on paper topics, theory and methodology; Preparation of presentations	-	-	-	-	120

3. Prerequisites for the module

Compulsory	None
Recommended	None

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc. Planetary Health	Compulsory	1

5. Requirements for the award of credits (ECTS) / 6. Credits

		6. Credits
Required achievements	none	6
Examination and examination language	Presentation (60%), scheduled assignments during the semester (40%) (in English)	

7. Frequency				8. Workload	9. Duration
Winter semester	x	Winter and summer semester	☐	180 hours	in semester format
Summer semester	☐				

Module coordination

Teacher	Thomas Heckelei with contributions from others
Module coordinator	Thomas Heckelei
Institute/Department	Institute of Food and Resource Economics; Teaching unit Agriculture, Forestry and Nutrition

Further information

(Reading lists, information links, etc.)	Reading list will be provided two weeks before the begin of the teaching period

Master Thesis Proposal Seminar

Module ID/Code: PH-300

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Literature studies, preparation of a research concept and a thesis proposal; presentations of the state of the art in the field of the thesis proposal and defense of research hypothesis and/or objectives; scientific discussion of own research topic and topic of others.
Intended learning outcomes	Students are able to independently analyze the state of the art, derive a research gap and objectives, provide methods to address the objectives, can develop and present a thesis proposal, and engage in scientific debates.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Seminar	Class discussions, presentations, feedback	WS, SS	English	15	2	60
Time for self-study	Literature work, proposal writing	-	English	15	0	120

3. Prerequisites for the module

Compulsory	24 ECTS in compulsory modules and 12 ECTS in elective modules within the chosen specialization
Recommended	

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Planetary Health	Compulsory	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	none	6 ECTS
Examination and examination language	English: Presentation (40%), Term paper (60%)	

7. Frequency	8. Workload	9. Duration
Winter semester ☐ Summer semester ☐ Winter and summer semester ☒	180 hours	1 semester

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Julian Klaus
Institute/Department	Geography; Institute of Food and Resource Economics; Teaching unit Agriculture, Forestry and Nutrition; Institute for Hygiene and Public Health

Further information

(Reading lists, information links, etc.)	Supplementary information on timing/scheduling and/or anything else useful for the students to know (e.g. a reading list, tips on online self-study courses complete with links or e-learning tools used complete with links)

Specialization Field Environmental Health (EH)

Requirements for the Specialization Field EH:
- Modules accounting for 30 ECTS-CP in the Specialization Field EH
- Three modules for a total of 18 ECTS-LP in the trans-specialization modules
- 6 ECTS-LP each in elective modules of the Specialization Fields HH and SH

Forschungsprojekt Geographie

Module ID/Code: EH-210

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	• Current interdisciplinary and research-relevant topics on water in global change • Current recording and evaluation methods and research approaches. • Development of research questions and projects • Practical relevance • Excursions • Project and time management
Intended learning outcomes	• Ability to cognize and analytically penetrate scientific problems and to reflect on possible solutions. • Ability to identify and reflect on the criteria of empirical studies relevant to the use and choice of methods. • Ability to independently design, coherently structure, organize and carry out a small research project conceived around a problem and a workable project aim • Critical analysis with research approaches Empirical work • Developing possible courses of action • Targeted time management

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
PS	Study field Physical Geography	SS	German or English	15	6	540

3. Prerequisites for the module

Compulsory	None
Recommended	• Very good subject-specific foundations • Ability to differentiate between analytical and normative dimensions • Recognition of interdisciplinary connections • Ability to apply theoretical content to practical problem solving • Communicative competence (ability to guide, moderate and mediate in teamwork situations)

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc.Geographie	Elective	2
	MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		18
Examination and examination language	Project work (German or English)	

7. Frequency			8. Workload	9. Duration
Winter semester	☐	Winter and summer semester ☐	540 h of which 120 h attendance time, 420 h self-study time (incl. timer for groupwork)	1 semester
Summer semester	☒			

Module coordination

Teacher	Lecturers in Physical Geography

Module coordinator	Prof. Dr. M. Evers
Institute/Department	Geographie
Further information	
(Reading lists, information links, etc.)	Preparation and follow-up of the sessions with reading texts and exercises, short statements or moderation tasks. The course can partly (2 SWS) take place in a block, costs may be incurred.

Integrated Approaches to Monitoring Ecosystem Health

Module ID/Code: EH-200

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	This module equips students with the knowledge and skills to design and implement ecosystem health monitoring programs employing state-of-the-art techniques. Students will gain practical experience with laboratory analysis, field methods, remote sensing products, and the utilization of open-access data to assess ecosystem health. Key indicators covered include biodiversity, soil quality and fertility, water quality and dynamics, carbon storage, greenhouse gas emissions, air quality, etc. Students will also acquire the knowledge to evaluate the impacts of climate change and human activities on ecosystems. Through a practical project at a designated site, students will implement multidisciplinary monitoring campaigns and data collection on various ecosystem health indicators. This practical experience will enable students to apply a diverse range of monitoring approaches for different health indicators. Subsequently, the information from all monitoring approaches will be collectively evaluated to assess ecosystem health and develop sustainable management strategies.
Intended learning outcomes	After a successful completion of the course, the students… - Have knowledge of potential indicators that can be used to monitor different aspects of ecosystem health. - Describe methods to monitor the above-mentioned indicators. - Apply a variety of monitoring methods to assess different aspects of ecosystem health. - Analyze the data obtained from different monitoring approaches to assess ecosystem health. - Are able to evaluate the ecosystem health of a certain site/ecosystem based on all the gathered information. - Propose sustainable management strategies

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	Theoretical background	SS	English	20	0.5	10
pT	Monitoring of ecosystem health	SS	English	20	3	40
Seminar	Presentation of projects and joint evaluation	SS	English	20	0.5	10
Time for self-study	-	SS		-	-	120

3. Prerequisites for the module

Compulsory	
Recommended	

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Planetary Health	Elective	2
M.Sc. Agricultural Science and Resource Management in the Tropics	Elective	2
M.Sc. Crop Sciences	Elective	2
M.Sc. Nature Conservation and Landscape Ecology	Elective	2

5. Requirements for the award of credits (ECTS) — 6. Credits

Required achievements	Regular attendance and participation in the joint project throughout the semester (English)	6
Examination and examination language	Graded report on a selected method used in the practical project (20%); Graded presentation of project results (80%); English	

7. Frequency		8. Workload	9. Duration
Winter semester ☐ Summer semester ☒	Winter and summer semester ☐	180 hours	1 semester
Module coordination			
Teacher	Prof. Dr. Ana Meijide; Prof. Dr. Anna Cord		
Module coordinator	Prof. Dr. Ana Meijide		
Institute/Department	INRES, Environment Modeling		
Further information			
(Reading lists, information links, etc.)	Ideally as 4h block to be able to perform monitoring activities in the field		
(e.g. self-study courses)			
(e.g. e-learning tools)			

Climate Dynamics

Module ID/Code: pea732

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Physical and chemical principles of climate modeling, conservation equations and cycles, hierarchy of climate models, numerical methods in climate modeling, prognostic and diagnostic energy and water balance considerations.
Intended learning outcomes	Physical understanding of important climate processes.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	Climate Dynamics	WS	English	30	2	60
Exercise	Climate Dynamics	WS	English	30	2	120

3. Prerequisites for the module

Compulsory	none
Recommended	NA

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	Physics of the Earth and Atmosphere	Elective	1, 2
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Successful performance of the exercises/homework	6 ECTS
Examination and examination language	Graded oral examination	

7. Frequency				8. Workload	9. Duration
Winter semester	X	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination

Teacher	Prof. Dr. Leonie Esters
Module coordinator	Prof. Dr. Leonie Esters
Institute/Department	Institute of Geosciences

Further information

(Reading lists, information links, etc.)	• Trenberth, K. (Ed.): Climate System Modeling, Cambridge University • Press, 2. Aufl. (1995) • Monin, A.S.: An Introduction to the Theory of Climate. D. Reidel • Publishing Company • Morrison, D.F., Multivariate Statistical Methods, McGraw Hill Series • in Probability and Statistics • Anderson, T.W., An Introduction to Multivariate Statistical Analysis, • 2nd Edition, J. Wiley & Sons
(e.g. self-study courses)	
(e.g. e-learning tools)	

Soil Resources of the World

Module ID/Code: ARTS-BS01

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	In this course students will be introduced to the properties of major soils of the world and will discuss soil-specific land-use options and associated risks in the frame of sustainable agricultural production and ensuring global food security. The course is structured into three parts: - Lecture on major soil types around the world according to the World Reference Base of Soil Resources (WRB). For each of these soil types, the lectures address specific properties of these soils, with a special focus their susceptibility to degradation processes as well as their relevance for element cycling in the context of agricultural production. - Seminar: In the seminar the students present examples of land use strategies found around the world and discuss their adaptation to the respective dominant soil properties in order to maintain healthy soils for agricultural production and to avoid soil degradation. - Practical course: In half- to full-day excursions the students are introduced to different soil types based on archived soil monoliths and field sites in Western Germany
Intended learning outcomes	After successful completion of the course, the students - can describe the major soil properties and classification of soil types occurring around the globe, - can compare soils according to their potential use for agricultural production, - can identify risks associated with different types of land-use on these soils, - can derive recommendations for suitable agricultural management based on observed soil properties for the major reference groups

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	Soil properties for agricultural production and susceptibility to degradation	SS	English	25	1,5	30
Seminar	Soil management strategies around the world	SS	English	25	1,0	20
Practical training	Soil classification and characterization	SS	English	25	2,0	20
Time for self-study	-	-	-	-	-	110

3. Prerequisites for the module

Compulsory	
Recommended	- basic knowledge on soil properties and processes - basic knowledge on agricultural management systems

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural Science and Resource Management in the Tropics and Subtropics (ARTS)	Elective	2
	M.Sc. Crop Science	Elective	2
	M.Sc. Nature Conservation and Landscape Ecology	Elective	2
	M.Sc. Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Presentation in the seminar, regular attendance	6,0

Examination and examination language	Presentation (graded, 25%, English) Oral exam (graded, 75%, English)	

7. Frequency				8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	☐	180 hours	1 semester
Summer semester	x				

Module coordination	
Teacher	Ramona Mörchen
Module coordinator	Ramona Mörchen
Institute/Department	Institute of Crop Science and Resource Conservation
Further information	
(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Stoffliche Belastung von Ökosystemen: Einträge, Schadstoffverhalten, Risiken

Module ID/Code: NALA-022

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	The module consists of two sub-units (usually lectures combined with practical learning content), each unit corresponds to 90 CP and are respectively weighted 75% and 25% in the examination. (i) Soil contamination and its risk to the environment (lecture): Aim of this lecture is to provide an understanding of the fate of different pollutants in ecosystems, focussing on soil. Basic principles of ecotoxicology and environmental risk analysis for soil contaminants (limits, PEC, PNEC etc) are presented. The lecture deals with different exposure pathways and patterns for soil contaminants and explains the mechanisms of contaminant dynamics such as volatilization, biotransformation, bioaccumulation, sorption, ageing and transport in ecosystems. Pollutant properties and partition coefficients (Henry law, Koc etc) are evaluated concerning their significance for assessing the environmental behavior of a pollutant. This is followed by special stresses caused by inorganic pollutants (e.g., effects of acid rain on forest ecosystems, mobilization of heavy metals and arsenic, immobilization of radionuclides) as well as emerging risks from "modern" organic pollutant loads (e.g. antibiotics, other pharmaceuticals, hormones, petroleum, nanoparticles, microplastics). (ii) Novel entities: Analysis and risks of emerging pollutants (1 day excursion & 2 day block course): In seminar form students will discuss emergent contaminants like PFAS, BPA or desinfections and will have an insight into the analysis of pollutants. This will be accompanied by a 1 day excursion to gain practical insights, visiting e.g., Bayer, BASF, wastewater treatment facility.
Intended learning outcomes	After successful completion of the course, the students - have knowledge of key priority pollutants, - are familiar with environmental risk assessment (ERA) principle, - can name the most important pathways in the so-called e-fate of pollutants and enumerate the principles of their ecotoxicological parameters - can predict the behavior of priority pollutants in the environment based on selected physicochemical properties in the environment

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	Soil contamination and its risks to the environment	SS	English	50	2,0	20
Seminar	Novel entities: Analysis and risks of emerging pollutants	SS	English	25	1,0	18
Tutorial	Novel entities: Practical insights	SS	English	25	1,0	8
Time for self-study	-	-	-	-	-	125

3. Prerequisites for the module

Compulsory	-
Recommended	chemical basic knowledge

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Nature Conservation and Landscape Ecology	Elective	2
M.Sc. Crop Science	Elective	2

	M.Sc. Agricultural Science and Resource Management in the Tropics and Subtropics (ARTS)	Elective	2
	M.Sc. Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		**6. Credits**
Required achievements	Presentation in the seminar, regular attendance	6,0
Examination and examination language	Presentation (graded, 25%, English) Oral exam (graded, 75%, English)	

7. Frequency		**8. Workload**	**9. Duration**
Winter semester ☐ Summer semester x	Winter and summer semester ☐	180 hours	1 semester

Module coordination	
Teacher	Wulf Amelung, Melanie Braun
Module coordinator	Wulf Amelung
Institute/Department	Institute of Crop Science and Resource Conservation
Further information	
(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Vertiefung Geographie

Module ID/Code: EH-310

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	• Reflection on the theory and practice of geographical studies Environmental systems in transition, water in global change. Ability to differentiate between analytical and normative dimensions • Recording and analysing the processes taking place in different environmental systems. • Feedback between physical, chemical, biological and social system components. • Current recording and evaluation methods and research approaches. • Models and simulations for understanding current and past developments and deriving scenarios or forecasts. • Complex, coupled, non-linear systems and methods for observation, recording and evaluation.
Intended learning outcomes	• Differentiated understanding of the concepts and methods of the chosen field of study. • Knowledge of impact chains of environmental systems and interactions with social systems (Anthropocene). • Ability to analyse spatially significant processes at different scales and knowledge of factors, processes and interactions in different environmental systems. • Ability to constructively apply theoretical content to - self-chosen or given - fields of practice. •

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S	**Specialisation in Physical Geography**	WS	German or English	15	4	360

3. Prerequisites for the module

Compulsory	None
Recommended	• Ability to differentiate between analytical and normative dimensions. • Recognition of interdisciplinary contexts. • Ability to apply theoretical content to practical problem solving. • Acceptance of the always limited capture of complexity.

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc.Geographie	Elective	3
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		12
Examination and examination language	Presentation (30%) and term paper (70%), presentation and term paper must be passed (German or English)	

7. Frequency	8. Workload	9. Duration
Winter semester ☒ Summer semester ☐ Winter and summer semester ☐	360 h of which 60 h attendance time, 300 h self-study time	1 semester

Module coordination

Teacher	Lecturers in Physical Geography
Module coordinator	Prof. Dr. L. Schrott
Institute/Department	Geography
Further information	
(Reading lists, information links, etc.)	Preparation and follow-up of the sessions with reading texts and exercises, short statements or moderation tasks

Understanding the Triple Planetary Crisis: Biodiversity loss, climate change and pollution

Module ID/Code: EH-300

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	This module examines the ecological and environmental dimensions of the Triple Planetary Crisis, highlighting the complex feedback loops between biodiversity loss, climate change, and pollution, and how these crises intensify one another. Drawing on ecological theory and environmental science, the module will explore the impacts of these human-driven crises on ecosystems, human health (e.g., zoonotic diseases), and nature's contributions to people, such as carbon sequestration, water purification, and soil fertility. Students will become familiar with key datasets and indicators used to track and report on the Triple Planetary Crisis, as well as important methods for scientific synthesis, such as systematic reviews and meta-analyses, enabling them to effectively engage with scientific literature and international reports. Through lectures, presentations, and interactive discussions, students will gain an understanding of the global dimensions of the Triple Planetary Crisis and critically evaluate strategies for ecosystem restoration, mitigation, and adaptation, using case study examples.
Intended learning outcomes	After a successful completion of the course, the students… - Understand the scientific basis of the Triple Planetary Crisis, in particular the ecological, biogeochemical and atmospheric processes involved - Can evaluate the global and local impacts of these crises on ecosystems, human health (e.g. zoonotic diseases), and nature's contributions to people - Are familiar with key datasets and indicators used to track and report on the Triple Planetary Crisis - Know important methods for scientific synthesis, enabling them to effectively engage with scientific literature and international reports - Can assess integrative strategies for ecosystem restoration, mitigation, and adaptation

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	Theoretical background	WS	English	20	1	14
Colloquium	Presentation and discussion of journal articles	WS	English	20	2	28
Seminar	Group work on scientific synthesis methods & discussions	WS	English	20	1	14
Time for self-study	-	WS	English	-	-	124

3. Prerequisites for the module

Compulsory	None
Recommended	Integrated approaches to monitoring ecosystem health

4. Degree program allocation

	M.Sc. Agricultural Science and Resource Management	Freely elective	Program-related semester (PRS)
	M.Sc. Nature Conservation and Landscape Ecology	Freely elective	3
	M.Sc. Crop Science	Freely elective	3
	M.Sc. Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Regular class attendance (group discussions)	6

Examination and examination language	Topical or paper presentation (English) - graded	

7. Frequency				8. Workload	9. Duration
Winter semester	X	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination	
Teacher	Prof. Dr. Anna Cord, Prof. Dr. Ana Meijide
Module coordinator	Prof. Dr. Anna Cord
Institute/Department	Institut für Nutzpflanzenwissenschaften und Ressourcenschutz (INRES)
Further information	
(Reading lists, information links, etc.)	
(e.g. self-study courses)	…
(e.g. e-learning tools)	…

Spatial Ecology and Conservation Biology

Module ID/Code: NPW-055

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Students will learn the basic principles of conservation biology, with a special focus on applications related to spatial ecology and management of natural resources (including those in agroecosystems). The course will cover the goals of conservation, elaborating on the main current threats to biodiversity (e.g. land-use change, habitat loss, climate change, invasive species, etc.), the units of conservation (e.g. genes, populations, species, habitats, ecosystem services, etc.), existing conservation measures (e.g. agri-environment schemes, protected areas, etc.) and their evaluation. Students will learn about the biological basis of conservation, including insights from spatial ecology of populations and species. Practical conservation issues, such as how to select areas for conservation, the role of indicator/flagship species in conservation, restoration and rewilding programmes, will be critically discussed. The course will include practical exercises using spatial data and spatial prioritization softwares on personal laptops.
Intended learning outcomes	After a successful completion of the course, the students… - Learn key concepts in conservation biology and current pressing threats to biodiversity - Learn on the different units of conservation, and different spatial scales at which conservation measures act - Understand the basic principles of spatial ecology and the features of spatial data - Understand how to evaluate the effectiveness of conservation measures - Apply basic (spatial) ecology concepts to propose solutions to practical conservation problems - Present and critically discuss recent published articles in the field of conservation biology and spatial ecology

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Theory of spatial ecology and conservation biology	WS	English	20	1	34
S*	Scientific presentations and group discussions	WS	English	20	1	54
pT*	Practical exercise with laptop	WS	English	20	2	92

3. Prerequisites for the module

Compulsory	None
Recommended	Basic knowledge of the programming language R is necessary to complete the practical exercises. Own laptop is required to complete the practical exercises. Basic knowledge of spatial data/softwares (e.g. ArcGIS, QGIS) is desirable.

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Nature Conservation and Landscape Ecology	E	3
	M.Sc. Planetary Health	E	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Scientific presentations and participation ingroup discussions	6
Required achievements	Participation in practical exercise	
Examination and examination language	Written assignment (English)	

7. Frequency	8. Workload	9. Duration

Winter semester X Summer semester ☐	Winter and summer semester ☐	180 hours	1 semester

Module coordination	
Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Dr. Stephanie Roilo
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften
Further information	
(Reading lists, information links, etc.)	Spatial Ecology and Conservation Modelling - Springer (https://link.springer.com/book/10.1007/978-3-030-01989-1) Conservation Biology - Springer (https://link.springer.com/book/10.1007/978-3-030-39534-6)
(e.g. self-study courses)	
(e.g. e-learning tools)	

Field exercises on climate-smart agriculture

Module ID/Code: NALA-046

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Smart Agriculture (CSA) from an applied perspective, with a focus on collecting and analysing data on the interactions between crops, soil, water, and climate, and learn how to evaluate management practices that balance food production with environmental stewardship. A central component of the course is practical fieldwork and data collection. Students will conduct measurements to assess resource use efficiency—including water and nutrient dynamics—in different cropping systems. Through hands-on experiments and case studies, they will develop skills in monitoring crop performance, analysing water use efficiency, and interpreting data to inform climate-resilient agricultural practices. By the end of the course, students will be able to design methods to evaluate agricultural systems in terms of sustainability and climate adaptation, and apply.
Intended learning outcomes	After a successful completion of the course, the students… - are able to outline the core concepts and practices of Climate smart agriculture, identify examples in regarding to different management options and cropping system and describe their impact on climate change mitigation - understand how agricultural systems influence GHG, water and energy fluxes and microclimatic effects of ecosystem management - acquired basic knowledge of measurement techniques for assessing crop performance as well as GHG and water fluxes from croplands - understand how to design field trials and measurement campaigns for evaluating crop-soil-water-nutrient dynamics - are able to plan and conduct field measurements to assess the effect of different management practices as tools for climate-smart agriculture - analyse data gathered in the field - interpret data gathered in the field and discuss it in the framework of existing literature

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
P*	One week of field work (5 days)	SS	English	12	3	45
S	Introductory session, guided	SS	English	12	2	30
Time for self-study						105

3. Prerequisites for the module

Compulsory	None
Recommended	None

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Nature Conservation and Landscape Ecology	E	2
	M.Sc. Planetary Health	E	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	-	6
Examination and examination language	Report (English or German, 50%), term paper (English or German, 50%)	

7. Frequency				8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	☐	180 hours	1 semester
Summer semester	X				

Module coordination	
Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Ana Meijide
Institute/Department	INRES
Further information	
(Reading lists, information links, etc.)	One week trip for practical parts and excursion to various experimental sites to ZALF (Müncheberg). Two-day introductory sessions before the practical part and 3 days for data analysis, presentation of results and discussions after the practical part, all in Bonn.
(e.g. self-study courses)	
(e.g. e-learning tools)	

Climate Smart Ecosystem Management

Module ID/Code: NPW-059 [780800590]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	In this course, students will gain insights into Climate-Smart Ecosystem Management (CSEM), focusing on key concepts and strategies for effectively managing diverse ecosystems in a changing climate. Lectures will cover climate change patterns and trends, and its impacts on agriculture, forestry, and peatlands. Students will learn about techniques for measuring greenhouse gas (GHG) and water fluxes from various ecosystems (e.g., chambers, eddy covariance, and remote sensing), including a visit to a GHG measurement station. The course will also address the effects of management practices across these ecosystems as tools to mitigate climatic impacts, with a focus on reducing GHG emissions and increasing soil organic carbon sequestration. International agreements and policies related to climate change mitigation will be presented, alongside emission inventories. Students will become familiar with strategies for climate change adaptation and mitigation, including climate-smart integrated production systems (e.g., agroforestry, etc.). The seminars will include lectures by stakeholders working in CSEM and presentations of case studies by students in groups. This module will equip students with the knowledge and skills to devise innovative solutions for mitigating climatic impacts from diverse ecosystems and building climate-resilient ecosystems.
Intended learning outcomes	After a successful completion of the course, the students… - outline the core concepts and practices of CSEM, identify examples from different ecosystems, and describe their impact on climate change mitigation and adaptation. - describe the mechanisms responsible for GHG production and consumption in ecosystems. - know about water and energy fluxes in various ecosystems and the microclimatic effects of ecosystem management practices. - acquire basic knowledge of measurement techniques for GHG and water fluxes from agriculture, forest and peatlands. - identify international organizations and relevant actors in climate mitigation and adaptation. - interpret climate change patterns and trends, and discuss their implications on crop yields, forest productivity, water availability, and other relevant factors. - identify key practices for mitigating GHG emissions and increasing soil organic carbon storage. - analyse the effectiveness of different climate-smart ecosystem management plans and strategies, and propose modifications and improvements.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	CSEM lectures	WS	English	24	2	30
S*	Case studies and stakeholders	WS	English	24	2	30
Time for self/studz						120

3. Prerequisites for the module

Compulsory	None
Recommended	None

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Agricultural Science and Resource Management	E	1, 3
M.Sc. Nature Conservation and Landscape Ecology	E	1, 3

	M.Sc. Crop Science	E	1, 3
	M.Sc. Planetary Health	E	1, 3
5. Requirements for the award of credits (ECTS)			**6. Credits**
Required achievements			6
Examination and examination language	Presentation (English, 30%), Report (English, 30%), Oral exam (English, 40%).		
7. Frequency		**8. Workload**	**9. Duration**
Winter semester X Summer semester☐	Winter and summer semester ☐	180 hours	1 semester
Module coordination			
Teacher	Dr. Najeeb A.A. Iddris, Prof. Dr. Ana Meijide		
Module coordinator	Dr. Najeeb A.A. Iddris		
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften		
Further information			
(Reading lists, information links, etc.)	Guest lectures from key stakeholders and experts in the field (N.N.), including representatives from private companies and international organizations.		
(e.g. self-study courses)			
(e.g. e-learning tools)			

Ecological Climatology

Module ID/Code: NPW-060 [780800600]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Students will learn about the atmospheric processes responsible of local and global climates and how they influence ecosystem processes and fluxes in the plant-soil-air interface. They will also understand how ecosystems feed back to the atmosphere at local and global scales. This will set the basis for understanding the impact of climate change on ecosystems. The lectures will give an overview on atmospheric variables such as radiation, humidity, temperature, and wind and their interactions with terrestrial ecosystems. In the seminar/exercise class, the understanding will be deepened by quantitative exercises and group presentations. The students will be trained in quantitative and qualitative scientific methods to describe and study climate-dependent physical, chemical and biological processes in terrestrial ecosystems enabling them to understand and evaluate the current discussion on climate change and its impact on terrestrial ecosystems.
Intended learning outcomes	After a successful completion of the course, the students… - identify the key components of cycles of earth systems and climate. - recall the most important climatological and hydrological variables and what governs them at different scales. - explain how climate controls the functioning and distribution of plants in different terrestrial environments. - comprehend how interactions between climate and terrestrial ecosystems function and how these may feed back into climate change. - illustrate the climatological, hydrological and nutrient conditions in different terrestrial environments. - assess how changes in land cover or land use impact the climatological, hydrological and nutrient conditions at local and regional scales. - evaluate how changes in climate reflect on different terrestrial ecosystems. - recognise suitable approaches and methods to study interactions between climate and terrestrial ecosystems.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Basics of ecological climatology	WS	English	24	1	30
S*	Practical exercises related to the course	WS	English	24	1	30
Time for self-study						120

3. Prerequisites for the module

Compulsory	None
Recommended	None

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Agricultural Science and Resource Management	E	1, 3
M.Sc. Nature Conservation and Landscape Ecology	O	1, 3
M.Sc. Crop Science	E	1, 3
M.Sc. Planetary Health	E	1, 3

5. Requirements for the award of credits (ECTS) — 6. Credits

Required achievements		6
Examination and examination language	Presentation (English, 50%), Oral examination (English, 50%)	

7. Frequency		8. Workload	9. Duration
Winter semester X Summer semester☐	Winter and summer semester ☐	180 hours	1 semester
Module coordination			
Teacher	Dr. Vilna Tyystjärvi, Prof. Dr. Ana Meijide		
Module coordinator	Dr. Vilna Tyystjärvi		
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften		
Further information			
(Reading lists, information links, etc.)	We will partially follow the structure and use some of the material form the book "Ecological Climatology" 2016, by Bonan Gordon.		
(e.g. self-study courses)			
(e.g. e-learning tools)			

Data Analysis on Ecosystem-atmosphere Interactions

Module ID/Code: NALA 045

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	This module introduces students to key concepts and methodologies for understanding and evaluating environmental interactions between ecosystems (soils and plants), and the atmosphere and how to use different environmental data. The course will introduce theory of different processes and mechanisms related to ecosystematmosphere interactions, but has a strong focus on practical exercises of data analysis approaches. It will cover greenhouse gas emissions (e.g., CO_2 and N_2O), evapotranspiration, photosynthesis and ecosystem respiration, air quality, drought indicators as well as the evaluation of meteorological variables such as precipitation, air temperature or soil moisture, including long-term data series to assess climate change. Using measured data and open-source datasets (Fluxnet, ERA5, etc.) a practical exercise focusing on each of these topics will be performed every 1-2 weeks. The course offers training in handling time-series of environmental data, focusing on data preparation, quality control and trend detection to assess climate change and its effects on ecosystem-atmosphere interactions, and will introduce spatial analysis methods for mapping spatial variability. Through practical exercises, students will learn about the different ecosystem-atmosphere interaction processes and mechanisms and how to integrate spatial and temporal data to monitor and evaluate environmental changes.
Intended learning outcomes	After a successful completion of the course, the students… - Identify main ecosystem-atmosphere interaction processes ad mechanisms , - Are aware of most relevant open-source environmental and climate datasets to analyze soil-plant-atmosphere interactions, - Identify data needed to address questions on ecosystem-atmosphere interactions, - Prepare and perform quality-control of time-series data, - Compute ecosystem greenhouse gas (GHG) fluxes and water fluxes based on different data sources, - Evaluate trends and patterns of different environmental data (i.e. climate data, ecosystem fluxes, air quality, drought, etc.), - Conduct spatial data analysis and mapping to assess spatial variability in meteorological, climatological and flux data, - Integrate multiple environmental datasets to assess ecosystem-atmosphere processes and interactions with the climate.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L		WS	English	15	1	15
P	Practical exercises of ecosystem-atmosphere interactions	WS	English	15	3	45
Time for self-study						120

3. Prerequisites for the module

Compulsory	Basic knowledge of R is recommended
Recommended	

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Agricultural Science and Resource Management	O	1, 3
M.Sc. Nature Conservation and Landscape Ecology	O	1, 3
M.Sc. Crop Science	O	1, 3
M.Sc. Planetary Health	E	1, 3

5. Requirements for the award of credits (ECTS)		**6. Credits**
Required achievements	Having submitted all individual reports for each exercise	6
Examination and examination language	Report (English, 40%), Project work (English, 60%)	

7. Frequency		**8. Workload**	**9. Duration**
Winter semester Summer semester X	Winter and summer semester ☐	180 hours	1 semester

Module coordination	
Teacher	Dr. Farshid Jahanbakhshi, Prof. Dr. Ana Meijide
Module coordinator	Dr. Farshid Jahanbakhshi
Institute/Department	Institut für Nutzpflanzenwissenschaften und Ressourcenschutz (INRES)
Further information	
(Reading lists, information links, etc.)	Students will have to submit the outcome of each of the individual exercises (i.e. figure or map evaluating different data); Final examination will be an individual project work evaluating specific datasets.
(e.g. self-study courses)	
(e.g. e-learning tools)	

Sustainable Farming Practices for Agrobiodiversity

Module ID/Code: NALA-047 [780790500]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	This interdisciplinary module explores how biodiversity contributes to more sustainable and resilient farming systems. It combines conceptual foundations with practical approaches, enabling students to understand, assess, and apply principles of agrobiodiversity from field to landscape scale. The courses links ecological processes to real-world farming practices and focuses on how diversification, ecological intensification, and participatory approaches can support sustainability in farming systems.
Intended learning outcomes	After a successful completion of the course, the students… - Know main principles of sustainable farming and agrobiodiversity. - Know basic tools and methods for biodiversity monitoring at field and landscape scales. - Understand interactions between farming practices, biodiversity, and ecosystem functions. - Are able to integrate ecological, social, and policy perspectives when evaluating farming systems. - Have co-designed a biodiversity-based farm management plan in a group setting. - Have presented and critically discuss recent published articles in the field.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Theoretical foundations and case studies	SS	English	20	1	34
S*	Presentation and discussion of journal articles/ Group project	SS	English	20	1	54
pT*	Field and GIS-based exercises	SS	English	20	2	92

3. Prerequisites for the module

Compulsory	None
Recommended	Basic knowledge of spatial data/softwares (e.g. ArcGIS, QGIS) is desirable.

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Agricultural Science and Resource Management	E	2, 4
M.Sc. Nature Conservation and Landscape Ecology	E	2, 4
M.Sc. Crop Science	E	2, 4
M.Sc. Planetary Health	E	2, 4

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Regular class attendance (group discussions)	6
Examination and examination language	Written assignment	

7. Frequency		8. Workload	9. Duration
Winter semester ☐ Summer semester X	Winter and summer semester ☐	180 hours	1 semester

Module coordination

Teacher	Dr. Clara Oliva Gonçalves Bazzo Prof. Dr. Anna Cord
Module coordinator	Dr. Clara Oliva Gonçalves Bazzo

Institute/Department	Institut für Nutzpflanzenwissenschaften und Ressourcenschutz (INRES)
Further information	
(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Specialization Field Human Health (HH)

Requirements for the Specialization Field HH:
- Modules accounting for 30 ECTS-CP in the Specialization Field HH
- Three modules for a total of 18 ECTS-LP in the trans-specialization modules
- 6 ECTS-LP each in elective modules of the Specialization Fields EH and SH

Nutrition and Prevention of Chronic Diseases
(Ernährung und Prävention chronischer Erkrankungen)

Module ID/Code: EW-018 [780770180]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	- Public Health; Concepts and forms of prevention; Importance of sustainable diets; Background and origin of evidence-based dietary recommendations and difference from evidence-based medicine; Organizations, actors, and professional societies like DGE, WCRF, ADA; International comparison of food-based dietary guidelines (FBDG); Role of nutritional epidemiology in politics - Conducting systematic literature searches and meta-analyses; Creating scientific posters - Presentation of various international FBDGs; Pro/con debate, e.g., about scientific transparency and comprehensibility of various international FBDGs - Presentation on a diet-related, non-communicable (chronic) disease (NCD); Literature search using the Cochrane database; Evidence-based dietary recommendations for the prevention of NCDs
Intended learning outcomes	Upon successful completion of the module, students can: - Describe the origin of evidence-based, food-related dietary guidelines (FBDG) - Identify related organizations and professional societies - Represent different stages of prevention - Name significant risk factors for non-communicable diseases (NCDs) - Discuss and compare international FBDGs in terms of feasibility, comprehensibility, complexity, transparency, and timeliness - Use current literature to determine evidence-based dietary recommendations for NCD prevention - Relate general, existing FBDGs to the prevention of specific NCDs

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S*		SS	English,	32	2	22
PS		SS	German or English	4	0.5	7
Time for self-study		SS				151

3. Prerequisites for the module

Compulsory	none
Recommended	Nutritional Epidemiology

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Ernährungswissenschaften	E	2
	M.Sc. Molekulare Lebensmitteltechnologie	E	2
	M.Ed. Ernährungs- und Hauswirtschaftswissenschaft Lehramt Berufskolleg	E	2 / 4
	MSc Planetary Health	E	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Presentation, poster presentation, for/against debate	6
Examination and examination language	Oral exam [20 minutes], English	

7. Frequency				8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	☐	180 hours	1 semester
Summer semester	X				

Module coordination	
Teacher	Die durchführenden Lehrpersonen im aktuellen Semester finden Sie in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Ute Nöthlings
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften
Further information	
(Reading lists, information links, etc.)	…
(e.g. self-study courses)	…
(e.g. e-learning tools)	…

Analytical Epidemiology with SAS and R
(Analytische Epidemiologie mit SAS und R)

Module ID/Code: EW-016 [780770160]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	- Introduction to statistical programs SAS and R - Introduction to data processing - Task-based descriptive statistics - Application of regression models (linear, logistic, Cox) to epidemiological data sets - Handling confounding and interaction - Interpretation of results
Intended learning outcomes	Upon successful completion of the module, students can: - Describe essential elements of descriptive and analytical statistics for epidemiology - Interpret statistical analyses - Work with epidemiological data sets (e.g., data cleaning, handling missing values) - Conduct basic analyses (e.g., descriptive statistics) and advanced analyses (e.g., regression models) using SAS and R - Develop analysis strategies for epidemiological data sets - Evaluate their own results on epidemiological research questions according to scientific standards

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
pT		SS	German	25	4	45
Time for self-study		SS				135

3. Prerequisites for the module

Compulsory	Nutritional Epidemiology
Recommended	

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Ernährungswissenschaften	E	2
M.Sc. Molekulare Lebensmitteltechnologie	E	2
M.Ed. Ernährungs- und Hauswirtschaftswissenschaft Lehramt Berufskolleg	E	2 / 4
MSc Planetary Health	E	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Regular participation in practical exercises	6
Examination and examination language	Presentation [780770169]	

7. Frequency				8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	☐	180 hours	1 semester
Summer semester	X				

Module coordination

Teacher	Die durchführenden Lehrpersonen im aktuellen Semester finden Sie in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Ute Nöthlings
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Scenarios in international food security

Module ID/Code: HH-200 (EW-026)

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	1. Introduction and Concepts Part 1 (Climate Change, Planetary Boundaries) 2. Concepts Part 2 (Holistic Health Concepts, Sustainable Development Goals) 3. The Food System and Its Indicators Using the Example of the Food System Dashboard 4. Sustainable Diets in the Context of Current Dietary Recommendations 5. Scenario Workshop for Achieving SDG 2 – Zero Hunger – Part 1: Environmental Analysis 6. Scenario Workshop for Achieving SDG 2 – Zero Hunger – Part 2: Evaluating Descriptors 7. Scenario Workshop for Achieving SDG 2 – Zero Hunger – Part 3: Identifying Key Uncertainties, Developing Projections 8. Scenario Workshop for Achieving SDG 2 – Zero Hunger – Part 4: Situation Description, Backcasting 9. Scenario Workshop for Achieving SDG 2 – Zero Hunger – Part 5: Visualization/Verbalization of Scenarios 10. Scenario Workshop for Achieving SDG 2 – Zero Hunger – Part 6: Presentation of Results and Feedback
Intended learning outcomes	After successfully completing the module, students will be able to… • Understand and apply the concepts of climate change, planetary boundaries, holistic health concepts, and the Sustainable Development Goals (SDGs) • Identify and interpret SDG indicators, metrics of food systems, and methods of futures research • Conduct scenario analysis and work with indicators for SDGs 2, 3, and 13 • Explain determinants of health and climate protection • Achieve SDGs 2, 3, and 13 using the socio-ecological model of health • Create a newspaper article, radio feature, or blog post based on the developed scenario

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	1-4	SS und WS	English,	30	2	22
S*	5-10	SS und WS	English	30	2	22
Time for self-study		SS und WS				136

3. Prerequisites for the module

Compulsory	none
Recommended	Knowledge about climate change impacts, adaptation and mitigation; interest in concepts of future research; experience with assessments of dietary intake and nutritional status among population groups

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Nutrition Science	E	1 - 4
M.Sc. Agricultural and Food Economics (AFECO)	E	1 - 4
MSc Planetary Health	E	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Regular participation in the seminar	6

Examination and examination language	Presentation	

7. Frequency				8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	☐	180 hours	1 semester
Summer semester	X				

Module coordination	
Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Ina Danquah
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften
Further information	
(Reading lists, information links, etc.)	1. Haines, Andy and Ebi, Kristie. 2019. "The Imperative for Climate Action to Protect Health" The New England Journal of Medicine 380:263-273. 2. Gabriel J. A scientific enquiry into the future. Eur J Futures Res. 2014;15:31. 3. Burlingame, Barbara. 2010. "Sustainable Diets and Biodiversity – Directions and Solutions for Policy, Research and Action" Food and Agriculture Organization of the United Nations (FAO), Rome. Available at http://www.fao.org/3/a-i3004e.pdf
(e.g. self-study courses)	
(e.g. e-learning tools)	

Introduction to Public Health

Module ID/Code: HH-100

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Models of health and disease are introduced, pathogenic and salutogenic models are differentiated. Linked to this fundamental understanding of health and disease, an understanding of the social determinant of health (Dahlgren & Whitehead) are conveyed. Furthermore, spatial and structural determinants of health are emphasized. Different human health systems (Beveridge, Bismark, Semashko, NHI, private) are introduced and their advantages and disadvantages discussed. The German health system structure is explained and the role and function of public health services emphasized. Types of diseases are introduced (waterborne, airborne, vector-borne, non-communicable) and placed into context of social and structural health determinants. Transmission pathways and exposures are explored and various measures of human health (physical and mental health) are outlined.
Intended learning outcomes	At the end of the module students are able to: - define health and disease with reference to pathogenic and salutogenic models - name the social determinants of health and give examples for their health relevance - discuss the health effects of the structural determinants of health outlining the consequent spatial patterns of health and disease - explain and differentiate between different types of health systems - name the responsibilities and functions of public health services at global, international, national and local level - classify different types of diseases with reference to the transmission pathways and determinants - explain which human health indicators are most relevant for which purpose

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	Introduction to Public Health	SS	English	20	2	30
Seminar	Diseases & Transmission Pathways	SS	English	20	2	30
Time for self-study	Introduction to Public Health	SS	-	-	-	120

3. Prerequisites for the module

Compulsory	none
Recommended	

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	E	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Active attendance, oral presentation in Seminar	6 ECTS
Examination and examination language	Written Exam (English)	

7. Frequency	8. Workload	9. Duration
Winter semester ☐ Summer semester ☒ Winter and summer semester ☐	180 hours	1 Semester

Module coordination	
Teacher	PD Dr. Timo Falkenberg
Module coordinator	PD Dr. Timo Falkenberg
Institute/Department	Institute for Hygiene and Public Health
Further information	
(Reading lists, information links, etc.)	Recommended Reading: - McDowell, I. (2023) Understand Health Determinants: Explanatory Theories for Social Epidemiology. Springer Cham: Switzerland. https://doi.org/10.1007/978-3-031-28986-6. - Engel GL. (1977) The need for a new medical model: a challenge for biomedicine. Science 196(4286):129-36. https://doi.org/10.1126/science.847460 - Farre, A., & Rapley, T. (2017). The New Old (and Old New) Medical Model: Four Decades Navigating the Biomedical and Psychosocial Understandings of Health and Illness. Healthcare (Basel, Switzerland), 5(4), 88. https://doi.org/10.3390/healthcare5040088 - Hofmann, B. (2016). Disease, illness, and sickness. The Routledge Companion to Philosophy of Medicine (pg.16–26). London: Routledge. www.routledgehandbooks.com/pdf/doi/10.4324/9781315720739.ch2 - Antonovsky, A. (1979). *Health, stress and coping*. London: Jossey-Bass.

Food security and sustainable food systems

Module ID/Code: APO-260 [780763260]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Students will learn to look at agriculture and nutrition through a food systems lens and understand synergies and tradeoffs between human health and environmental health goals. Concepts and measurement of food security, dietary quality, and the triple burden of malnutrition, as well as related policy interventions, will be discussed. Links between agriculture, biodiversity, climate change, diets, nutrition, and planetary health will be analyzed from a global perspective and with empirical examples from low-, middle-, and high-income countries. Case studies will be used to evaluate specific food systems topics from a comprehensive sustainable development perspective. Case studies will include topics such as organic farming, GMOs, meat consumption, palm oil, nutrition-sensitive agriculture, and the supermarket revolution, among others.
Intended learning outcomes	After a successful completion of the course, the students… - are able to define key terms related to food security and sustainable diets. - can explain how food systems relate to the various sustainable development goals (SDGs). - can identify policy needs and analyze the sustainability implications of specific interventions. - can evaluate the arguments in the public debate around sustainable agriculture and nutrition. - can construct and use dietary surveys and nutrition assessment tools.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L		WS	English	120	4	180

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Agricultural and Food Economics	Elective	1 or 3
MSc Planetary Health	Elective	1 or 3
M.Sc. Agricultural Science and Resource Management in the Tropics and Subtropics (ARTS)	Compulsory	1
M.Sc. Nutrition Science	Elective	3
M.Sc. Molecular Food Technology	Elective	3

5. Requirements for the award of credits (ECTS) — 6. Credits

Required achievements		6
Examination and examination language	Written exam (100%, Eglish)	

7. Frequency			8. Workload	9. Duration
Winter semester	☒	Winter and summer semester ☐	180 hours	1 semester
Summer semester	☐			

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Matin Qaim
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Sustainability and Ecologies of Health and Disease

Module ID/Code: HH-310

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Utilizing specific examples and case studies the following topics are explored: - Environmental stressors (radiation, noise, heat, air quality) - Interactions of water and health - Physiological adaptations to stress environments - Spatial-temporal dynamics of communicable and non-communicable diseases - Sustainability implications of healthcare and health interventions - Dimension reduction to derive associations between climatic variables, dietary habits, and nutritional status Emphasis is placed on understanding the complex interactions between social, economic and environmental systems in determining patterns of health and disease. A wide range of diseases and exposures are discussed.
Intended learning outcomes	At the end of the module students are able to: - match different exposures and stressors with specific diseases - investigate the complex causalities of disease patterns - illustrate and assess the sustainability implications of healthcare and health interventions - critically discuss the bidirectional relationship between health and sustainable development - Determine relationships between weather indicators and dietary intake - Calculate relationships between weather patterns and nutritional outcomes

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Seminar	Ecologies of Health and Disease	WS	English	20	2	30
Seminar	Health and Sustainable Development	WS	English	20	2	30
Seminar	Dimension reduction techniques for climate and health research	WS	English	20	0,5	8
Time for self-study	Sustainability and Ecologies of Health and Disease	WS	-	-	-	112

3. Prerequisites for the module

Compulsory	none
Recommended	Completion of “Introduction to Public Health”

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Active attendance	6 ECTS
Examination and examination language	20% Oral Presentation 80% AssignmentsEnglish	

7. Frequency	8. Workload	9. Duration
Winter semester ☒ Summer semester ☐ Winter and summer semester ☐	180 hours	1 semester

Module coordination	
Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	PD Dr. Timo Falkenberg & Prof. Dr. Ina Danquah
Institute/Department	Institute of Hygiene and Public Health
Further information	
(Reading lists, information links, etc.)	Recommended Reading: - Crooks, V.A., Andrews, G.J. & Pearce, J. (eds.) (2018). Routledge Handbook of Health Geography. Routledge: London. https://doi.org/10.4324/9781315104584 - Hazen, H. & Anthamatten, P. (2019). An Introduction to the Geography of Health. Routledge: London. https://doi.org/10.4324/9780429024115 - Townsend, P.K. (2011). The Ecology of Disease and Health. In Singer, M. & Erickson, P.I. (eds.) A Companion to Medical Anthropology. Blackwell Publishing Ltd.: Oxford. https://doi.org/10.1002/9781444395303.ch9 - King, K.C., Hall, M.D., Wolinska, J. (2023). Infectious disease ecology and evolution in a changing world. Phil. Trans. R. Soc. B378: 20220002. https://doi.org/10.1098/rstb.2022.0002 - Lenzen, M., Malik, A., Li, M., Fry, J., Weisz, H., Pichler, P. P., ... & Pencheon, D. (2020). The environmental footprint of health care: a global assessment. The Lancet Planetary Health, 4(7), e271-e279. https://doi.org/10.1016/S2542-5196(20)30121-2 - Romanello, Marina et al. (2023). The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centred response in a world facing irreversible harms. The Lancet, 402(10419), 2346-2394. https://doi.org/10.1016/S0140-6736(23)01859-7 - World Health Organization (2020). WHO Guidance for climate resilient and environmentally sustainable health care facilities. WHO Team Climate Change and Health. https://www.who.int/publications/i/item/9789240012226 - Haines, Andy and Ebi, Kristie. The Imperative for Climate Action to Protect Health. New Eng J Medicine. 2019;380:263-273. - FAO. Sustainable Diets and Biodiversity - Directions and solutions for policy, research and action. 2012 - Mank I et al. Dietary habits associated with growth development of children aged < 5 years in the Nouna Health and Demographic Surveillance System, Burkina Faso. Nutr J. 2020;19(1):81

Sustainable Healthy Diets

Module ID/Code: HH-300

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Guiding principles of sustainable healthy diets (e.g., WHO, FAO, DGE); Assessing the sustainability of diets (environmental, economic, health and societal effects of the dietary patterns); Situation in the Global North, Situation in Germany (e.g., DONALD, COPLANT) Main principles of food safety in the context of climate change Risk assessment of different substance groups in food (e.g. contaminants, residues, additives). Sustainable diets in the Global South (e.g., RODAM, IPTI) Physiological and health-related aspects of sustainable diets (e.g., covering the nutritional requirements of "critical nutrients" such as vitamin B12, iron, and zinc; anti-nutritive compounds; digestibility of plant protein; nutritional impact of plant-based alternatives)
Intended learning outcomes	Students are able to explain the guiding principles of sustainable healthy diets and the principles of assessing the sustainability of diets. In addition, they know the principles of food safety in the context of climate change and are familiar with the risk assessment of different substance groups in food. Students are able to carry out a nutritional and health assessment of sustainable dietary patterns. Students are able to explain the situation in the Global South and Global North. Students are able to analyze and interpret works of literature.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	principles of sustainable healthy diets, food safety, Global South, Physiological and health-related aspects	WS	English	20	1	45
Seminar	principles of sustainable healthy diets, food safety, Global South, Physiological and health-related aspects	WS	English	20	3	135

3. Prerequisites for the module

Compulsory	
Recommended	Basic knowledge in nutritional and food science

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	Ms. Sc. Planetary Health	Elective	3
	Ms. Sc. Nutritional Science	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Regular participation. At least 75% presence.	6,0
Examination and examination language	Presentation (graded). English. Full participation.	

7. Frequency	8. Workload	9. Duration

Winter semester x Summer semester ☐	Winter and summer semester ☐	180 hours	1 semester

Module coordination	
Teacher	Nöthlings, Danquah, Hintzsche, Egert
Module coordinator	Egert
Institute/Department	Institute of nutritional and food science (IEL, AEI, University of Bonn)
Further information	
(Reading lists, information links, etc.)	-
(e.g. self-study courses)	-
(e.g. e-learning tools)	-

Specialization Field Societal Health (SH)

Requirements for the Specialization Field SH:
- Modules accounting for 30 ECTS-CP in the Specialization Field SH
- Three modules for a total of 18 ECTS-LP in the trans-specialization modules
- 6 ECTS-LP each in elective modules of the Specialization Fields EH and HH

Advanced Applied Econometrics

Module ID/Code: APO-230 [780763230]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	- Review of the General Linear Model, OLS and GLS practicing matrix algebra - Model specification (functional form and variable choice) - Endogenous regressors (instrumental variable estimation, Generalised Method of Moments, identification strategies) - Panel data analysis - Maximum Likelihood Estimation - Limited dependent variable models
Intended learning outcomes	After a successful completion of the course, the students… - are able to correctly interpret excerpts from econometric textbooks and articles. - are able to apply matrix algebra in the context of statistics. - are capable of applying econometric methods to estimate quantitative economic models derived from economic theory. - select appropriate econometric methods based on the analysis of the data situation and research question. - correctly use and interpret outputs from econometric software packages.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Advanced Applied Econometrics	SS	English	120	3	85
T	Advanced Applied Econometrics	SS	English	20	1	95

3. Prerequisites for the module

Compulsory	Completed module BAS-110
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics	Elective	2
	MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		6
Examination and examination language	Assignments (English)	

7. Frequency			8. Workload	9. Duration
Winter semester	☐	Winter and summer semester ☐	180 hours	1 semester
Summer semester	☒			

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Thomas Heckelei
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Impact Evaluation of Conservation & Development Projects and Environmental Policies

Module ID/Code: ENV-130 [780764130]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	- Role of impact evaluation in guiding the design of development and environmental conservation initiatives - Understanding and developing a theory of change - Overview, hands-on application, and critical assessment of quantitative evaluation methods including experimental and quasi-experimental research designs - Evaluation case studies; advanced topics, such as impact heterogeneity and mediation analysis.
Intended learning outcomes	After a successful completion of the course, the students… - know alternative quantitative evaluation methods and their underlying assumptions. - understand how different types of biases affect evaluations of development and conservation initiatives. - apply selected evaluation methods to real world problems. - critically interpret findings from evaluation studies.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Impact evauation	SS	English	25	2	90
T	Exercice	SS	English	25	2	90

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics	Elective	2
	MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS) / 6. Credits

Required achievements		6
Examination and examination language	Graded assignment [780764139]	

7. Frequency				8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☒				

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Jan Börner
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Sustainable Entrepreneurship & Venturing

Module ID/Code: ARTS-BC08 [780750100]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	The module "Sustainable Entrepreneurship & Venturing" is designed for students interested in start-ups and how entrepreneurship may help foster urgent sustainability transformations. The module provides an overview of the entrepreneurial process of discovering, evaluating, and implementing new business ideas and models to promote sustainable development. During the course, students will explore the concept of sustainable entrepreneurship, which encompasses the fundamentals of entrepreneurship and sustainable business models as well as entrepreneurial tools for sustainability. Building on this, sustainable venturing embraces an active role and aims to harness the innovative power of entrepreneurship to solve global social and environmental challenges. In this context, students will work in teams to develop a sustainable business idea. Course participants will be able to identify social and environmental problems, develop ideas for solutions, analyse and evaluate alternatives, and develop plans to implement their solution. Students are guided through the process of applying entrepreneurial tools to advance their entrepreneurial ideas and turn them into business models. Students are also familiarized with concepts and tools for presenting their business idea.
Intended learning outcomes	After a successful completion of the course, the students… - understand the specificities and requirements of sustainable entrepreneurship. - are able to apply tools for sustainability-oriented idea generation and evaluation. - have knowledge and skills to identify, develop, evaluate, and determine sustainable business models. create the foundations of an entrepreneurial mindset.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S		SS	English	25	4	45
Time for self-study		SS				135

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural Science and Resource Management in the Tropics and Subtropics (ARTS)	E	2
	M.Sc. Nutrition Science	E	2
	M.Sc. Molecular Food Technology	E	2
	MSc Planetary Health	E	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Regular participation	6
Examination and examination language	Project work [780750109], English	

7. Frequency			8. Workload	9. Duration
Winter semester ☐	Summer semester X	Winter and summer semester ☐	180 hours	1 semester

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/

Module coordinator	Prof. Dr. Denise Fischer-Kreer
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften
Further information	
(Reading lists, information links, etc.)	
(e.g. self-study courses)	…
(e.g. e-learning tools)	…

Forschungsprojekt Globalisierung

Module ID/Code: SH-210

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	• Independent work on current issues based on small case studies on topics related to the geographical fields of study Water in Global Change or Development & Globalisation • The concrete topics are based on current geographical problems and scientific debates
Intended learning outcomes	• Ability to identify and independently work on spatial and socially relevant questions in the context of small case studies. • Ability to formulate a manageable research topic and structure a research project focussed on it • Ability to analytically penetrate, acquire knowledge based on theory and search for solutions when dealing with geographical problems in the context of development and globalisation. • Ability to select methods based on theory and appropriate to the subject. Ability to critically reflect epistemologically on the choice of methods, positionality and representativeness in the research process. • Ability to critically reflect on research ethics. • Ability to independently design, structure, organise and carry out a small research project. In detail it is necessary - to sharpen a recognised general problem to a research-pragmatic project goal. - organise the division of labour in the team in a goal-oriented and efficient manner. - select adequate research methods to achieve the project objective. - analyse empirical data with reference to their own research question. - present the project results in an understandable way. - deal constructively with the difficulties of incomplete data bases, i.e. to come to well-founded conclusions, but also to recognise and problematise the limitations of one's own conclusions or to document them for others in a verifiable manner. - deal responsibly with practical recommendations for action and their possible consequences

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
PS	Study Field Globalisation	SS	German or English	15	6	540

3. Prerequisites for the module

Compulsory	None
Recommended	• Communicative competence (ability to guide, moderate and mediate in teamwork situations). • Ability to work in a team and creativity.

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc.Geographie	Elective	2
	MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		18
Examination and examination language	Project work	

7. Frequency				8. Workload	9. Duration
Winter semester Summer semester	☐ ☒	Winter and summer semester	☐	540 h of which 120 h attendance time, 420 h self-study time (incl. group work time)	1 semester
Module coordination					
Teacher	Lecturers in Human Geography				
Module coordinator	Prof. Dr. L. Schipper				
Institute/Department	Geography				
Further information					
(Reading lists, information links, etc.)	Preparation and follow-up of the sessions with reading texts and exercises, short statements or moderation tasks				

Sustainable Technologies and Innovation

Module ID/Code: SH-200

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	The main focus of this course relates to the ability of organizations to innovate, including the tools, frameworks, processes, strategies, and structures that are relevant. Thus, this course will provide a detailed overview of strategic technology and innovation management approaches and tools; explore how these help to support and design the management of innovative projects and organizations; assist in the creation of an innovation-oriented and innovation-supporting environment; and facilitate the development and evaluation of appropriate strategies for the implementation of new product and technology development processes.
Intended learning outcomes	After a successful completion of the course, the students are able to… • interpret, explain and summarize relevant topics and phases of management and development of new products. • characterize and classify different forms and types of innovations. • differentiate types of technology and innovation strategies • understand and evaluate the challenges and opportunities of open innovation • summarize the different options for structuring innovation processes • name sources of innovative ideas and know methods for generating these ideas • understand and evaluate business models

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Sustainable Technologies & Innovation	SS	English	20	1	56
Time for self-study	-	-	-	-	-	124

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	E	2
	…	…	…

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	none	6,0
Examination and examination language	Mid-term presentation, (50%, English language; Written report (50%), English language	

7. Frequency			8. Workload	9. Duration
Winter semester	☐	Winter and summer semester ☐	180 hours	1 semester
Summer semester	X			

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. David Antons
Institute/Department	Institute of Entrepreneurship, Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	Supplementary information on timing/scheduling and/or anything else can be found in eCampus.
	(Maybe) Harvard cases (Harvard Business School) need to be bought, approx 5 € / case

Sustainability Economics

Module ID/Code: ENV-100 [780764100]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Basic approaches of ecological and environmental economics; intertemporal allocation of renewable and non-renewable resources; concepts and indicators for sustainability; systemic linkages in complex systems; analysis of policies and governance for sustainability and transformative change.
Intended learning outcomes	After a successful completion of the course, the students… - can apply alternative approaches in economic thinking to concepts of sustainability. - can identify and analyze systemic relationships related to selected sustainability challenges - can assess and critically discuss advantages and disadvantages of alternative policy options and governance arrangements

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Economics of sustainability	WS	English	20	2	70
T	Economics of sustainability	WS	English	20	2	110

3. Prerequisites for the module

Compulsory	none
Recommended	Solid knowledge of microeconomics, institutional economics, and welfare theory. Methods of Empirical Research

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
M.Sc. Agricultural and Food Economics	Elective	1
MSc Planetary Health	Elective	1
M.Ed. Agricultural Science (Teacher's Training)	Elective	1

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		6
Examination and examination language	Written exam (120 min) English	

7. Frequency				8. Workload	9. Duration
Winter semester	☒	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Jan Börner
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Vertiefung Globalisierung

Module ID/Code: SH-310

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	• Reflection on the theory and practice of geographical studies Water in Global Change or Development and Globalisation. Ability to differentiate between analytical and normative dimensions • In-depth discussion of development theories and alternative theoretical and conceptual approaches to the analysis with the Global South (including post-colonial perspectives, post-development, political ecology, political economy, science and technology studies). • Analysis of central problem areas in the area of conflict between global change and sustainability (e.g. trade, mobility, health, resource use and protection, climate policy, knowledge production). • Analysis of crisis and conflict processes in the Global South and their global interconnections. • Critical examination of development policy practice against the background of current theoretical perspectives.
Intended learning outcomes	• Differentiated understanding of concepts. • Ability to analyze spatially relevant processes at different scale levels and insight into the complex relationships and interconnections between the different (scale) levels. • Understanding of the differentiation and disciplinary history of the chosen specialization. • Ability to constructively apply theoretical content to - self-chosen or given - practical fields. • Imparting knowledge of regional science.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S	Globalisation	WS	German or English	15	4	360

3. Prerequisites for the module

Compulsory	None
Recommended	• Utilization of theoretical content for practical problem solving. • Ability to differentiate between analytical and normative dimensions. • Acceptance of the always limited understanding of complexity. • Strengthening skills in the area of intercultural communication.

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc.Geographie	Elective	3
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		12
Examination and examination language	Presentation (30%) and term paper (70%), presentation and term paper must be passed (German or English)	

7. Frequency				8. Workload	9. Duration
Winter semester	☒	Winter and summer semester	☐	360 h, of which 60 h in presence, 300 h individual work	1 semester
Summer semester	☐				

Module coordination

Teacher	Lecturers in Human Geography
Module coordinator	Prof. Dr. J. Budds
Institute/Department	Geography
Further information	
(Reading lists, information links, etc.)	Preparation and follow-up of the sessions with reading texts and exercises, short statements or moderation tasks

Satellite Data in Agricultural Economics

Module ID/Code: ENV-320 [780764320]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Introduction and Overview, a primer on satellite data, opportunities arising from satellite data, what can be measured with satellite data, pitfalls, impact evaluations using satellite data, final discussion and conclusion.
Intended learning outcomes	After a successful completion of the course, the students… - are able to work with satellite data in Google Earth Engine and in R. - understand potentials and pitfalls of satellite data in agricultural, environmental, and resource economics. - have a working knowledge of how to answer economic questions with geospatial data.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Lecture Satellite Data	WS	English	16	1,5	70
T	Lecture Satellite Data	WS	English	16	0,5	20
L	Lecture Analysis and Modelling	WS	English	16	1,5	70
T	Lecture Analysis and Modelling	WS	English	16	0,5	20

3. Prerequisites for the module

Compulsory	none
Recommended	Statistics, Econometrics, Impact Evaluation, GIS, R, Foundations of Agricultural, Environmental, and Resource Economics, Google Earth Engine, Python

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics	Elective	3
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		6
Examination and examination language	Written exam [90 min] [780764329] (English)	

7. Frequency				8. Workload	9. Duration
Winter semester	☒	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. David Wüpper
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Probabilistic Programming for Applied Agricultural Economics

Module ID/Code: APO-320 [780763320]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Students learn to apply Bayesian Probabilistic Programming to answer quantitative causal research questions. Probabilistic Programming is a novel data science tool combining Bayesian Statistical Modelling, elements of Machine Learning, and standard econometrics. The course contributes to the master's degree by deepening student's quantitative skills and extending their methodical toolkit. Students will learn a basic workflow to perform theory-guided, applied statistical analysis of questions relevant to policy and business. The workflow is intensively practiced with guided coding examples and exercises (in Python). Along the way, the course covers the basics of Bayesian modeling and how to interpret Bayesian modeling results. The course contributes to student's skills relevant to data analytic jobs in research or the private sector.
Intended learning outcomes	After a successful completion of the course, the students… - are able to interpret Bayesian modeling results. - are able to compute statistics of interest from Bayesian model results. - are able to apply Probabilistic Programming for their own empirical application (e.g. the Master Thesis or following data science projects). - are able to explain and evaluate the benefits of (Bayesian) Probabilistic Programming approaches compared to other commonly applied econometric approaches. - have obtained (python) coding experience and data science skills beneficial for the future academic or private sector job market.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Theory	WS	English	20	2	90
pT	Application	WS	English	20	2	90

3. Prerequisites for the module

Compulsory	none
Recommended	Successful completion of APO-230 or similar

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics	Elective	3
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		6
Examination and examination language	Assignment [780763329] (100%, English)	

7. Frequency	8. Workload	9. Duration
Winter semester ☒ Winter and summer semester ☐ Summer semester ☐	180 hours	1 semester

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Dr. Hugo Storm
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	Guided coding examples and exercises will be provided in Python, but no previous Python experience is required. It is sufficient that students have gained some previous

	experience in coding in general, for example by completing either APO-230 or ENV-130 (both using R) successfully. Nevertheless, a strong interest and motivation to learn Python basics is expected. Background Links: - McElreath, Richard. 2020. Statistical Rethinking: A Bayesian Course with Examples in R and Stan. Chapman and Hall/CRC. - Storm, H., Heckelei, T., Baylis, K. (2024): Probabilistic programming for embedding theory and quantifying uncertainty in econometric analysis. European Review of Agricultural Economics, 51(3):589-616. https://doi.org/10.1093/erae/jbae016. - NumPyro Documentation: https://num.pyro.ai/en/stable/
(e.g. self-study courses)	
(e.g. e-learning tools)	

Microeconomics

Module ID/Code: BAS-130 [780761130]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Choice and demand: utility maximization, expenditure minimization, Slutsky equation market demand, welfare measures Product supply and factor demand: production functions, cost minimization, profit maximization Coordination of supply and demand through - competitive markets for products and primary factors - Strategic interaction (game theory), common pool recources, imperfect competition
Intended learning outcomes	After a successful completion of the course, the students… - are able to explain the basic theory of supply, demand and markets at a formal mathematical level. - are able to formulate and solve unconstrained and constrained optimization problems and apply optimization tools to solve quantitative economic problems. - analyse the description of economic decision problems and choose and apply the appropriate quantitative analytical framework. - apply mathematical and numerical techniques to analyze and quantitatively model economic decision problems.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Microeconomics	WS, SS	English	120	3	105
T	Microeconomics	WS, SS	English	50	1	75

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics	Compulsory	1
	MSc Planetary Health	Elective	2, 3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		6
Examination and examination language	Written exam [780761139] (50%) and Assignment [780761138] (50%), (English)	

7. Frequency				8. Workload	9. Duration
Winter semester	☒	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Thomas Heckelei
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

The Economics of Agricultural Transformation

Module ID/Code: ABS-130 [780762130]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Transformations of agricultural production systems – past developments and future challenges towards sustainability; Economic and interdisciplinary concepts, theories and quantitative methods for analysing production system transformation in Agriculture; Application to case studies; Developing recommendations for sustainable transformations for stakeholders.
Intended learning outcomes	After successfully completing the module, students will be able to name important past changes and future challenges for transforming agricultural production systems. They can name important theories and quantitative methods and apply them to case studies and data in order to identify decisive factors and barriers for change. They develop and critically discuss resulting recommendations for actors in the agricultural sector, such as farmers, industry and policymakers.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	The Economics of Agricultural Transformation Lecture	WS	English	40	4	56
Time for self-study		WS				124

3. Prerequisites for the module

Compulsory	none
Recommended	Methods of Empirical Research

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics (AFECO)	E	3
	M.Ed. Agricultural Science (Teacher's Training)	E	3
	M.Ed. Nutrition Science and Home Economics (Teacher's Training)	E	3
	MSc Planetary Health	E	3

5. Requirements for the award of credits (ECTS) / 6. Credits

Required achievements	keine
Examination and examination language	Assignment [780762129] (70%), Presentation [780762128] (30%), English

6 Credits

7. Frequency / 8. Workload / 9. Duration

7. Frequency		8. Workload	9. Duration
Winter semester ☒ Summer semester ☐	Winter and summer semester ☐	180 hours	1 semester

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. Niklas Möhring
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	…
(e.g. e-learning tools)	…

Sustainable Business Practices

Module ID/Code: SH-300

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Participants gain an overview of theoretical concepts and frameworks, approaches and methods in management that are state of the art both in research and managerial practice. They will review these approaches in the light of future challenges of our society, particularly in the context of sustainability, and discuss ways for improvement. These theory concepts are also applied and discussed to case studies drawn from leading international business schools (e.g. Harvard Business School).
Intended learning outcomes	After a successful completion of the course, the students are able to… • Distinguish important theoretical approaches in management • Relate different theoretical approaches and views and recognize differences and similarities between them • Evaluate current management approaches in the context of sustainability • Extract relevant information from scientific literature and relate practical industrial cases to theory • Illustrate the areas of application of different theories and give examples • Identify management problems, find possible solutions and formulate an action strategy • Illustrate case studies and relate management theories to real-world examples • Select and apply the most appropriate strategic tools for practical management cases

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Sustainable Business Practices	WS	English	50	1	56,0
Time for self-study	-	-	-	-	-	124

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	E	3

5. Requirements for the award of credits (ECTS) / 6. Credits

Required achievements	none	6,0
Examination and examination language	Mid-term presentation, (50%, English language; Written report (50%), English language	

7. Frequency				8. Workload	9. Duration
Winter semester	X	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Prof. Dr. David Antons
Institute/Department	Institute of Entrepreneurship, Agrar-, Forst- und Ernährungswissenschaften

Further information

(Reading lists, information links, etc.)	Supplementary information on timing/scheduling and/or anything else can be found in eCampus.
	Harvard cases (Harvard Business School) need to be bought, approx 5 € / case

Trans-specialization modules

18 ECTS-CP must be completed, 6 ECTS each in S1, S2 and S3.

Integrated Assessment Modeling

Module ID/Code: PH-140

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	This seminar module will teach students how to develop and apply Integrated Assessment Models in the domain of Planetary Health. Based on published research papers and model descriptions, students will present the conceptual approaches of selected Integrated Assessment Models, their model components and identify differences and similarities among them as well as advantages and limitations of these models for a range of research questions and applications. Students will also configure and parameterize Integrated Assessment Models composed of a cropping system model (SIMPLACE, https://www.simplace.net/index.php), a bio-economic farm-level model (FarmDyn, https://farmdyn.github.io/documentation/) and a simple market model (SIMPLE-G, https://www.gtap.agecon.purdue.edu/simple-g/) to address specific research questions related to climate change (adaptation and mitigation options), food security and market volatility. Consideration of other models representing impacts on biodiversity and the environment, as well as data-driven models based on Machine learning methods, can be explored depending on the interest and expertise of the students. Based on scenario analysis within the frame of a concrete research project, students will quantify and understand the impact of selected drivers on different components of Planetary Health. Finally, they will learn to condense the multitude of obtained results to a format understandable by different stakeholders, including scientists and policymakers.
Intended learning outcomes	Students have gained knowledge on the conceptual structure of Integrated Assessment Models, including their scope and limitations for addressing challenges of Planetary Health. They can configure and parameterize simple Integrated Assessment Models and apply these models for questions related to Planetary Health. Students have also acquired skills in synthesizing results from comprehensive scenario analyses by these models into (visual) formats understandable by different stakeholders, including policymakers and practitioners.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S*	Current research papers on Planetary Health	WS	English,	20	1	60
Time for self-study	Background research on paper topics, theory and methodology; Preparation of presentations	-	-	-	-	120

3. Prerequisites for the module

Compulsory	None
Recommended	None

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc. Planetary Health	Elective	PRS 1

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		6

Examination and examination language	Presentation (60%), scheduled assignments during the semester (40%) (in English)	

7. Frequency				**8. Workload**	**9. Duration**
Winter semester	x	Winter and summer semester	☐	180 hours	in semester format
Summer semester	☐				

Module coordination	
Teacher	Frank Ewert, with contributions from Amit Kumar Srivastava and others
Module coordinator	Frank Ewert
Institute/Department	Institute of Crop Science and Resource Conservation; Teaching unit Agriculture, Forestry and Nutrition
Further information	
(Reading lists, information links, etc.)	A reading list will be provided two weeks before the beginning of the teaching period

Sustainability, Risk and Transformation

Module ID/Code: ENV-260 [780764260]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Knowledge about sustainability, risk(s) and transformation is key to understanding the societal challenges of global change and to considering them in one's own field of action. In this course we take an interdisciplinary approach to teaching these concepts integrating knowledge from social and natural theory and science. Starting from the current state of global sustainability problems and transformation perspectives as well as associated political processes, this interdisciplinary and multi-perspective course first illustrates the fundamentals of the terms 'sustainability', 'risk' and ' transformation' as well as other related concepts and terms. Building on this theoretical underpinning, particular attention is paid to the 2030 Agenda for Sustainable Development by critically discussing aspects such as implementation and measurement of the Sustainable Development Goals (SDGs) including the basics and critical aspects of economic growth. Furthermore, we explore how farmers, consumers and insurances take decisions in the face of increasing risks associated with global change as well as transformation. This is done by providing insights into the field of sustainable consumption, such as on types, motives and barriers of sustainable production and consumption, as well as on measures to promote sustainable consumer behaviour. We furthermore explore how natural ecosystems manage risks and if and how these principles could be also applied in an agricultural context e.g. in the context of pest management. Furthermore, we introduce complex systems thinking as a tool to deal with risks. The examples used during the course often refer to agriculture and the food industry, but are intentionally not limited to them. Besides the continuous use of built-in short exercises, interactive teaching formats (e.g. live quizzes, case studies, simulation game), students will be engaged in lively discussions on the topics and encouraged to bring in own perspectives. As a basis for the grading, students will engage in group work to develop and implement either a board game or a small self-experiment (will be decided each year) incorporating aspects of risks, sustainability or transformation. The results of this group work will be presented during a public game or poster presentation.
Intended learning outcomes	After a successful completion of the course, the students … • know about the different scientific and political debates as well as their development in the context of sustainability, risks and transformation • have developed a general and interdisciplinary understanding of complex challenges and concepts related to sustainability, risks and transformation • understand the practical challenges and chances related to these concepts for agriculture in different contexts (different countries, different farm sizes etc.) • are able to apply these concepts in the context of research questions related to agriculture and land use

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L		WS	English	50	4	180

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related

			semester (PRS)
	M.Sc. Agricultural and Food Economics	Elective	3
	M.Sc. Agricultural Science and Resource Management in the Tropics and Subtropics (ARTS)	Compulsory	3
	M.Sc. Crop Science	Elective Focus PERC	3
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		**6. Credits**
Required achievements		6
Examination and examination language	Presentation of a Game or Experiment (English)	

7. Frequency			**8. Workload**	**9. Duration**
Winter semester ☒ Summer semester ☐	Winter and summer semester ☐		180 hours	1 semester

Module coordination	
Teacher	Jun-Prof. Dr. Lisa Biber-Freudenberger, Prof. Dr. Zita Sebesvari, Jun-Prof. Dr. Daniel Herrmann, Prof. Dr. Niklas Möhring, Dr. Schulte-Filthaus, Jun-Prof. Dr Wolfram Barfuss, Jun-Prof.Dr. Dominic Lemken, Jun-Prof. Janina Dierks
Module coordinator	Jun-Prof. Dr. Lisa Biber-Freudenberger
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften
Further information	
(Reading lists, information links, etc.)	External guests e.g. farmers to talk about their perspectives on sustainability, risks and transformation
(e.g. self-study courses)	
(e.g. e-learning tools)	

Science and Ethics

Module ID/Code: PH-220

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Science is one of the most fundamental institutions of modern society, and yet there is a preoccupying lack of consciousness about its ethical dimension and accountability. Today, science is everywhere around us, and even within our minds and our bodies. Everything we consume, including food and water, the houses we live in, all the different technologies we use every day, but also the way we think and perceive ourselves and the world, in short, the entire way we live is strongly influenced by science. This module aims to empower students to attain responsibility in their scientific praxis, by helping them to come to a better understanding of the multi-fold (socio-political, economic, environmental, ethical) implications and impacts of scientific activity in its historical and geo-political context. The course offers an introduction in relevant foundational theorical approaches in - History of Science - Philosophy of Science - Sociology of Science - Science and Technology Studies (STS) - Anthropology of Knowledge - Intersections/Crossroads of Ethics, Epistemology, Ontology and Practice
Intended learning outcomes	The module offers the knowledge and its practical application to develop the necessary skills for doing science in a way that is conscious abouts its potential impacts on life, and thus, ethically responsible and accountable. Skills to be developed include: - Comprehend the multiple ethical dimensions of doing science understood as a situated social practice. - Capacity to locate the own scientific work within its social, political and historical context and to identify resulting ethical implication and responsibilities. - Develop and execute ethically responsible and accountable research projects. - Communicate ethical issues to different audiences (including colleagues, students and the general public) in an open and comprehensive way.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Ethical implications of theoretical and epistemological presuppositions	SS	English	40	2	30h
pT	Ethical implications of scientific practice	SS	English	40	2	90h
Time for self-study	-	-	-	-	-	60h

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	(Original) Master in Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Presentation and session moderation (50h/English)	6

	Research exercises (50h/English)	
Examination and examination language	Term paper (100h/English)	

7. Frequency			8. Workload	9. Duration
Winter semester ☐ Summer semester X	Winter and summer semester ☐		180 hours	1 semester

Module coordination	
Teacher	Jan Linhart, Christiane Woopen, Stefan Partelow, Peter Bröckerhoff, Sebastian Müller, Jan Mehlich, Nicolas Knecht
Module coordinator	Jan Linhart
Institute/Department	Center for Life Ethics, TRA 4, University of Bonn
Further information	
(Reading lists, information links, etc.)	Recommended Literature: Aronowitz S 1988: Science as Power: Discourse and Ideology in Modern Society. University of Minnesota Press: Minneapolis. Chapter 1 & 12. Blaser M 2010: Storytelling Glbalization from the Chaco and Beyond. Duke 'University Press: Diham / London. Introduction. Collingwood RG 1998 (1940): An Essay on Metaphysics. Oxford: Clarendon Press (Kindle edition). Part I: On Metaphysics Debaise D & Stengers I 2022: An ecology of trust? Consenting to a pluralist universe. *The Sociological Review*, *70*(2), 402–415. https://doi.org/10.1177/00380261221084794 Jonas H 1979: Das Prinzip Verantwortung. Kapitel I, IV, V. Haraway D 1988: Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies*, *14*(3), 575. https://doi.org/10.2307/3178066 Harding S 1992: After the Neutrality Ideal: Science, Politics, and "Strong Objectivity". Social Research, Vol. 59, No. 3, Science and Politics (FALL 1992), pp. 567-587 Linhart J 2026: Science and the Other: An Inquiry into the Geopolotics of Knowledge, Potiguara Ontology and the Hard Problem of Modern Science, Springer. Part I. Mannheim K 1954: *Ideology and Utopia: An Introduction to the Sociology of Knowledge*. Routledge & Kegan Paul. Chapter V. Merchant C 2006: The Scientific Revolution and the Death of Nature. Isis, 97, 513–533 Mignolo WD 2002: The Geopolitics of Knowledge and the Colonial Difference. *South Atlantic Quarterly*, *101*(1), 57–96. https://doi.org/10.1215/00382876-101-1- Quine WvO 1951: Two Dogmas of Empiricism. The Philosophical Review, Vol. 60, No. 1 (Jan., 1951), Duke University Press, 20-43 Smith LT 1999: Decolonizing Methodologies: Research and Indigenous Peoples.University of Otago Press: Dunedin. Introduction; Chapter 10. Wallerstein I 2006: European Universalism: The Rhetoric of Power, The new Press: NY, London. Chapter 3.
(e.g. self-study courses)	
(e.g. e-learning tools)	

Knowledge co-production

Module ID/Code: PH-200

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Co-production has become a cornerstone for collaborative science, enabling multi-actor, inter- and transdisciplinary ways of creating knowledge and action in the world. Knowledge co-production is closely associated with producing knowledge beyond academia, in close collaboration with non-academic actors who can use the co-created knowledge to take direct actions, for example, towards societal change for sustainability or more ethical futures. There are many ethical dimensions to co-production including the 'means' and 'ends' of doing science with the goal of leading to direct actions and activities in the world. Questions may include: what to focus on? Who to include? How to collaborate? How to deal with implications and responsibilities? There are also different ways of doing co-production which embody certain modes, principles and practices. The course will also deal with how knowledge co-production embodies different onto-epistemic practices, and how co-production can coincide with and support other ways of doing science.
Intended learning outcomes	• Understand the value and challenges of knowledge co-production methods and practices in science compared to other approaches • Understand the centrality of co-production practices in inter- and transdisciplinary research • Understand different principles, modes and practices of co-production • Be able to evaluate ethical issues in co-production and make arguments for and against different perspectives • Better understand how science can more effectively work with different societal actors, as well as potential limitations and challenges • Design and manage a problem-driven, solution-oriented co-production project

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S	Knowledge co-production	SS	English	40	4	60
Time for self-study	Knowledge co-production	-	-	-	-	120

3. Prerequisites for the module

Compulsory	No specific requirements.
Recommended	General knowledge of sustainability problems and social science research concepts.

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Participation in Seminars and Discussions	6 ECTS
Examination and examination language	Written paper or practical development tasks	

7. Frequency			8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	180	1 Semester
Summer semester	X			

Module coordination

Teacher	Stefan Partelow, Jan Linhart, Christiane Woopen
Module coordinator	Prof. Dr. Stefan Partelow
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften , and Center for Life Ethics, TRA 4, University of Bonn

Further information	
(Reading lists, information links, etc.)	Chambers, et al (2022). Co-productive agility and four collaborative pathways to sustainability transformations. Global Environmental Change, 72. https://doi.org/10.1016/j.gloenvcha.2021.102422 Chambers et al (2021). Six modes of co-production for sustainability. Nature Sustainability, 4(11), 983–996. https://doi.org/10.1038/s41893-021-00755-x Latulippe, N., & Klenk, N. (2020). Making room and moving over: knowledge co-production, Indigenous knowledge sovereignty and the politics of global environmental change decision-making. In Current Opinion in Environmental Sustainability (Vol. 42, pp. 7–14). Elsevier B.V. https://doi.org/10.1016/j.cosust.2019.10.010 Lemos et al (2018). To co-produce or not to co-produce. Nature Sustainability, 1(12), 722–724. https://doi.org/10.1038/s41893-018-0191-0 Norström et al (2020). Principles for knowledge co-production in sustainability research. Nature Sustainability, 3(3), 182–190. https://doi.org/10.1038/s41893-019-0448-2 Partelow, S., Luederitz, C., Huang, Y.-S., von Wehrden, H., & Woopen, C. (2024). Building ethical awareness to strengthen co-production for transformation. Sustainability Science. https://doi.org/10.1007/s11625-024-01582-7 Polk, M. (2015). Transdisciplinary co-production: Designing and testing a transdisciplinary research framework for societal problem solving. Futures, 65, 110–122. https://doi.org/10.1016/j.futures.2014.11.001 Turnhout, E., Metze, T., Wyborn, C., Klenk, N., & Louder, E. (2020). The politics of co-production: participation, power, and transformation. In Current Opinion in Environmental Sustainability (Vol. 42, pp. 15–21). Elsevier B.V. https://doi.org/10.1016/j.cosust.2019.11.009
(e.g. self-study courses)	…
(e.g. e-learning tools)	https://www.participatorymethods.org/

Forschungsmethoden Geographie 1

Module ID/Code: PH-160

UNIVERSITÄT BONN

1. Content and intended learning outcomes	
Content	• Scientific and epistemological perspectives in human geography. • Qualitative and quantitative methods - approaches and instruments - of empirical social research (interview procedures, narrative research, ethnography, 'grounded theory', 'case study' research, PRA and PAR) • Methods of text hermeneutics and phenomenology, discourse analysis • Scientific theory and methodology in physical geography • Methods and procedures in the sub-disciplines of climatology, biogeography, geomorphology, soil geography, hydrology, and landscape ecology in physical geography (possible combination of several sub-areas).
Intended learning outcomes	• Insight into and reflective examination of philosophical and epistemological basic assumptions with reference to methodological approaches and the resulting perspectives of knowledge acquisition. • Analytical examination of intercultural and ethical framework conditions of empirical data collection in human geography. • Differentiated knowledge of the range of methods relevant to the respective disciplinary orientation, taking into account ontological and epistemological perspectives. • Competent and creative engagement with the dichotomy of inductive and deductive methodological approaches and procedures. • Ability to competent differentiation and decision-making in view of the diverse spectrum of possible methodological approaches and survey techniques in empirical research. • Ability to independently plan and conduct methodologically demanding studies to analyze complex socio-spatial issues. • Ability to carry out a useful stakeholder analysis to identify appropriate methodological decisions in research design. • Ability to record, reflect on and evaluate methods in a problem-oriented and comparative manner with regard to their reliability and suitability for specific data quality requirements. • Ability and willingness to take a differentiated look at research results from one's own discipline and neighboring disciplines (e.g. sociology, ethnology). • Ability to reflect methodologically on research results and research designs (own and others). • Insight into and reflective examination of epistemological assumptions with regard to methodological approaches and the resulting limitations of knowledge acquisition. • Differentiated knowledge of the range of methods relevant to the respective disciplinary orientation. • Ability to competent differentiation and decision-making in view of the diverse spectrum of possible working methods, procedures and methods for problem solving. • Ability to independently plan and conduct methodologically demanding investigations for the analysis of complex spatial andspatial-relevant structures and processes. • Ability to problem-oriented and comparative recording, reflection and evaluation of methods with regard to their reliability and suitability for specific • Ability to record, reflect on and evaluate methods in a problem-oriented and comparative manner with regard to their reliability and suitability for specific research topics. • Ability and willingness to reflectively engage with research results from one's own discipline and related disciplines (e.g. climatology, geology, soil science). • Ability to engage in reflective methodological discussion of research results and research designs (both your own and those of others). • Ability to evaluate methods in relation to space-time scales.
2. Teaching and learning methods	

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S	Methods in Geography	WS	German or English	15	2	180

3. Prerequisites for the module	
Compulsory	none
Recommended	Ability to precise object definition, observation and description. Competence in designing methodological operationalizations of research questions appropriate to the target group. - Competence with regard to questions of data processing and evaluation for further use. Disposition (willingness and ability) to consciously deal with one's own values and norms in an inter-social and inter-cultural confrontation and in a relevant comparison with ‘research subjects’.

4. Degree program allocation			
	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc.Geographie	Elective	1, 2
	MSc Planetary Health	Elective	1

5. Requirements for the award of credits (ECTS)		**6. Credits**
Required achievements		6
Examination and examination language	Tasks during the semester (German or English)	

7. Frequency	**8. Workload**	**9. Duration**
Winter semester ☒ Summer semester ☐ Winter and summer semester	180 h incl. 30 h in presence, 150 h self-study	1 semester

Module coordination	
Teacher	Lecturers in geography
Module coordinator	Prof. Dr. M. Evers
Institute/Department	Geographie

Further information	
	Preparation and follow-up of the sessions with reading texts, short statements or moderation tasks

Forschungsmethoden Geographie 2 Module ID/Code: PH-260	UNIVERSITÄT BONN

1. Content and intended learning outcomes	
Content	• Scientific and epistemological perspectives in human geography. • Qualitative and quantitative methods - approaches and instruments - of empirical social research (interview procedures, narrative research, ethnography, 'grounded theory', 'case study' research, PRA and PAR) • Methods of text hermeneutics and phenomenology, discourse analysis • Scientific theory and methodology in physical geography • Methods and procedures in the sub-disciplines of climatology, biogeography, geomorphology, soil geography, hydrology, and landscape ecology in physical geography (possible combination of several sub-areas).
Intended learning outcomes	• Insight into and reflective examination of philosophical and epistemological basic assumptions with reference to methodological approaches and the resulting perspectives of knowledge acquisition. • Analytical examination of intercultural and ethical framework conditions of empirical data collection in human geography. • Differentiated knowledge of the range of methods relevant to the respective disciplinary orientation, taking into account ontological and epistemological perspectives. • Competent and creative engagement with the dichotomy of inductive and deductive methodological approaches and procedures. • Ability to competent differentiation and decision-making in view of the diverse spectrum of possible methodological approaches and survey techniques in empirical research. • Ability to independently plan and conduct methodologically demanding studies to analyze complex socio-spatial issues. • Ability to carry out a useful stakeholder analysis to identify appropriate methodological decisions in research design. • Ability to record, reflect on and evaluate methods in a problem-oriented and comparative manner with regard to their reliability and suitability for specific data quality requirements. • Ability and willingness to take a differentiated look at research results from one's own discipline and neighboring disciplines (e.g. sociology, ethnology). • Ability to reflect methodologically on research results and research designs (own and others). • Insight into and reflective examination of epistemological assumptions with regard to methodological approaches and the resulting limitations of knowledge acquisition. • Differentiated knowledge of the range of methods relevant to the respective disciplinary orientation. • Ability to competent differentiation and decision-making in view of the diverse spectrum of possible working methods, procedures and methods for problem solving. • Ability to independently plan and conduct methodologically demanding investigations for the analysis of complex spatial andspatial-relevant structures and processes. • Ability to problem-oriented and comparative recording, reflection and evaluation of methods with regard to their reliability and suitability for specific • Ability to record, reflect on and evaluate methods in a problem-oriented and comparative manner with regard to their reliability and suitability for specific research topics. • Ability and willingness to reflectively engage with research results from one's own discipline and related disciplines (e.g. climatology, geology, soil science). • Ability to engage in reflective methodological discussion of research results and research designs (both your own and those of others). • Ability to evaluate methods in relation to space-time scales.
2. Teaching and learning methods	

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
S	Methods in Geography	SS	German or English	15	2	180

3. Prerequisites for the module	
Compulsory	none
Recommended	Ability to precise object definition, observation and description. Competence in designing methodological operationalizations of research questions appropriate to the target group. - Competence with regard to questions of data processing and evaluation for further use. Disposition (willingness and ability) to consciously deal with one's own values and norms in an inter-social and inter-cultural confrontation and in a relevant comparison with ‘research subjects’.

4. Degree program allocation			
	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc.Geographie	Elective	1, 2
	MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		**6. Credits**
Required achievements		6
Examination and examination language	Tasks during the semester (German or English)	

7. Frequency	**8. Workload**	**9. Duration**
Winter semester ☐ Summer semester ☒ Winter and summer semester	180 h incl. 30 h in presence, 150 h self-study	1 semester

Module coordination	
Teacher	Lecturers in geography
Module coordinator	Prof. Dr. M. Evers
Institute/Department	Geographie

Further information	
	Preparation and follow-up of the sessions with reading texts, short statements or moderation tasks

Research Ethics and Bioethics

Module ID/Code: PH-210

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	The lecture series is part of the interdisciplinary central seminar series „Research Ethics and Bioethics“. It will introduce students to the argumentative tools of normative ethics and moral decision making and their application to a variety of cases within the bioethical context as well as a philosophical understanding of basic concepts like health and different ways to analyse these concepts through a variety of philosophical lenses. The conceptual analysis will be tied to normative questions, in order to evaluate the moral implications of the different understandings of these basic concepts. Based on these foundations, a variety of topics will be highlighted, such as the moral status of life and the moral value of biodiversity, the interconnectedness of human health and the environment or the impact of environmental destruction on mental health.
Intended learning outcomes	Students will learn to evaluate morally relevant situations based on the most important ethical theories and case studies. Students will not only learn the basic concepts and principles of ethical analysis but also forms of argument and methods of ethical thought. Through this general knowledge, students will learn how to identify the morally salient features of a variety of bioethically relevant situations.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Research Ethics and Bioethics	SS	English	80-120	2	26
Time for self-study	-	SS	-	-	-	78

3. Prerequisites for the module

Compulsory	None
Recommended	No prior knowledge of ethics is required

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
MSc Medical Immunosciences and Infection	Compulsory	2
MSc Molecular Cell Biology	Compulsory	2
MSc Neurosciences	Compulsory	2
MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		4
Examination and examination language	Written exam, 60Min., English	

7. Frequency			8. Workload	9. Duration
Winter semester	☐	Winter and summer semester ☐	104 h	1 Semester
Summer semester	X			

Module coordination

Teacher	Prof. Dirk Lanzerath, Prof. Tade Spranger, Dr. Aurélie Halsband, Dr. Marius Bartmann, Dr. Roman Wagner, Dr. Jan Mehlich, Dr. Julia Mönig, Sandra Scholl (M.A.), Fabian Fischbach (M.A.)
Module coordinator	Roman Wagner
Institute/Department	Deutsches Referenzzentrum für Ethik in den Biowissenschaften (DRZE)

Further information

(Reading lists, information links, etc.)	…
(e.g. self-study courses)	…
(e.g. e-learning tools)	…

Machine Learning for Prediction and Causal Analysis

Module ID/Code: PH-310

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Introduction to Machine learning (ML) for applied economists; principles of training ML models, coverage of major model types, modeling specification strategies, tools for interpreting model results; applied focus with coding examples; specific focus on Causal ML tools
Intended learning outcomes	Students have a fundamental understanding of the different types of ML approaches. They can decide when and where ML is appropriate to answer a given research question and understand the limitations of the approaches. Students also have the required coding skills to apply the various approaches to their own projects. They can evaluate model quality, compare different models against each other, and can apply tools to interpret model predictions. Students understand how ML models can be used to estimate causal effects.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Lecture	WS	English	25	2,0	30
T	Exercise	WS	English	25	2,0	30
Time for self-study	-	-	-	-	-	120

3. Prerequisites for the module

Compulsory	BAS-110.
Recommended	Basic coding skills, particularly in some statistical coding language (Python, R)

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	MSc Planetary Health	Elective	3

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	none	6,0
Examination and examination language	Coding Assignments, English	

7. Frequency				8. Workload	9. Duration
Winter semester	X	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination

Teacher	Hugo Storm, Thomas Heckelei
Module coordinator	Hugo Storm
Institute/Department	ILR, Data Science in Agricultural Economics

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Data Wrangling, Visualization and GIS Data Analysis with R

Module ID/Code: ENV-270 [780764270]

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Students will learn how to effectively prepare and visualize data and research results in different ways. Different types of data visualization in particular different kinds of plotting methods will be shown and applied in exercises. Particular emphasis will be given to spatial data and GIS analyses. Students will learn about the basics of GIS and spatial data projections, different spatial data types including raster and vector data, how to import and visualize them and how to combine them in spatial analyses. They will specifically learn how to work with spatial data in R and how to use this free and open source tool to visualize their results in publication ready maps. Students will apply the methods to visualize data of their own choice and present their results during the course.
Intended learning outcomes	After a successful completion of the course, the students… - understand the peculiarities of different data formats and how to work with them. - understand the basics of GIS. - are able to work with different data in R. - are able to visualize different data in R. - conduct spatial analyses with data of different formats. - are able to apply the packages and methods learned to their own case studies. - are able to conduct their own analyses and to visualize publication-ready maps.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
L	Data Wrangling, Visualization and GIS Data Analysis with R	SS	English	25	2	90
T	Solving Exercises Together	SS	English	25	2	90

3. Prerequisites for the module

Compulsory	none
Recommended	none

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Agricultural and Food Economics	Elective	2
	MSc Planetary Health	Elective	2

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements	Submission of all reports before the presentations.	6
Examination and examination language	Report [780764279] (50%, English), presentation [780764278] (50%, English)	

7. Frequency				8. Workload	9. Duration
Winter semester	☐	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☒				

Module coordination

Teacher	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Module coordinator	Jun.-Prof. Dr. Lisa Biber-Freudenberger
Institute/Department	Agrar-, Forst- und Ernährungswissenschaften

Further information	
(Reading lists, information links, etc.)	
(e.g. self-study courses)	
(e.g. e-learning tools)	

Data Resources, Access and Data Management

Module ID/Code: PH-320

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	As research data management (RDM) is relevant to researchers at all career levels, we offer a basic course on the main aspects of RDM and give practical advice on data management topics. This module will cover the entire research cycle and analyse relevant data infrastructures for the different areas of planetary health. We will also show how to find, select and access appropriate data resources.
Intended learning outcomes	This course is designed to provide students with a comprehensive foundation in RMD, encompassing essential concepts such as data documentation and organisation, effective data publication, and the principles of FAIR data management. Participants will also learn how and where to find relevant resources and how to select and use them. The lectures are complemented by exercises that span the entire research cycle and the students learn from practical examples in the various domains of planetary health. Students will also analyse one data resource relevant to planetary health in detail and an overview will be prepared for this. A presentation on this resource will be given. This provides students with a solid foundation in data types and instils in them the importance of thorough data preparation and description for effective reuse.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Lecture	Fundamentals of research data management (RDM)	Winter semester	English	20	1	45
Exercise, scientific/practical	Fundamentals of research data management (RDM)			20	2	75
Seminar	Fundamentals of research data management (RDM)			20	1	60

3. Prerequisites for the module

Compulsory	none.
Recommended	none.

4. Degree program allocation

Study program	Compulsory/ Elective	Program-related semester (PRS)
MSc Planetary Health	Elective	3
…	…	…

5. Requirements for the award of credits (ECTS) / 6. Credits

Required achievements	75% of the exercises accepted, oral presentation, (English)	6 ECTS
Examination and examination language	_	

7. Frequency				8. Workload	9. Duration
Winter semester	X	Winter and summer semester	☐	180 hours	1 semester
Summer semester	☐				

Module coordination

Teacher	Prof. Fluck/Dr. Lucia Vedder
Module coordinator	Lucia Vedder
Institute/Department	IGG - Informationsmanagement

Further information

(Reading lists, information links, etc.)	
(e.g. self-study courses)	…
(e.g. e-learning tools)	…

Masterthesis

The masterthesis credits 30 ECTS-CP.

Master Thesis

Module ID/Code: M-401

UNIVERSITÄT BONN

1. Content and intended learning outcomes

Content	Independent work on a research project in the field of the research groups within a given time frame. Details are specified in the examination regulation and examination organization regulation (available only in German).
Intended learning outcomes	After a successful completion of the course, the students… - can work independently and efficiently. - know how to handle feedback from supervisors. - can define a research question. - can build a sound theoretical and methodological framework. - can collect data in a systematic and verifiable manner. - analyse data critically and correctly. - can formulate sound conclusions based on a comprehensive discussion of the results. - can write a comprehensive, consistent and concise thesis. - The editing time is a minimum of two and a maximum of six months.

2. Teaching and learning methods

Type of instruction	Topic	When taught	Language of instruction	Group size	Course units per week	Workload [h]
Proj (blocked)	Research project work	WS / SS	English,	1	0	15
Time for self-study	Research project work	WS / SS	…	…	…	885

3. Prerequisites for the module

Compulsory	Regardless of the Chair with which the student is writing the thesis, all compulsory modules and at least 30 ECTS in the elective modules must have been completed before registering the thesis.
Recommended	

4. Degree program allocation

	Study program	Compulsory/ Elective	Program-related semester (PRS)
	M.Sc. Planetary Health	C	4

5. Requirements for the award of credits (ECTS)		6. Credits
Required achievements		30
Examination and examination language	Masterthesis [8900], English	

7. Frequency			8. Workload	9. Duration
Winter semester ☐	Winter and summer semester		900 hours	1 semesters
Summer semester ☐		X		

Module coordination

Teacher	All independent teaching staff
Module coordinator	The teaching persons in the current semester can be found in basis: https://basis.uni-bonn.de/
Institute/Department	Geography; Institute of Food and Resource Economics; Teaching unit Agriculture, Forestry and Nutrition; Institute for Hygiene and Public Health

Further information

(Reading lists, information links, etc.)	…

(e.g. self-study courses)	…
(e.g. e-learning tools)	…