UNIVERSITÄT BAYREUTH

Module Handbook
Master's Programme
Environment,
Climate Change and Health
University of Bayreuth

Content

Module Area	Basics in Environment, Climate Change and Health
Module Title	Climate Change
Module Coordinator	Professor Dr. Buermann (lecture), Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel (seminar)
Language	English
Learning outcomes	This module is interdisciplinary. In the lecture, students acquire fundamental knowledge, wherefore global environmental changes can be described by the students. Multifaceted consequences will be reflected in the seminar. Based on this knowledge, students are able to define transformation needs in different sectors and on all levels, whose implementation is necessary for a healthy life under consideration of the planetary boundaries.
Content	Basic principles of the climate system; naturally-occurring climate, variability, climate change in the past; reconstruction of past climate; natural forcing-factors, circulation dynamics; human impact on the climate system; global warming; Greenhouse effect; land use change; aerosols; ozone depletion; global circulation models; forecasts; scenarios; fundamentals of energy and mass balance; modelling; sensitive parameters of global change
Teaching Formats	lecture (2 hours per week) and accompanying seminars (2 hour per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology (lecture), M.Sc. Global Food, Nutrition and Health (seminar)
Requirements for the Award of ECTS Points	oral exam or report or presentation or term paper
ECTS Points	5: lecture: 2 ECTS; seminar: 3 ECTS
Frequency	winter semester (recommendation: 1st semester)
Workload	Lectures and seminar: 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Basics in Environment, Climate Change and Health
Module Title	Medicine and Climate Change I
Module Coordinator	Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel Dr. Thomas
Language	English
Learning outcomes	The students acquire fundamental knowledge about organ systems, their anatomical localizations, their physiological functions and climate change associated diseases and health-related consequences. In this context, students will develop a deeper understanding of the multiple interrelationships between climate changes and human health.
Content	• Determinants of health • Organ systems: anatomy and physiology • Climate change-associated diseases
Teaching Formats	lecture (2 hours per week), accompanying seminar (2 hour per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health; M.Sc. Global Change Ecology
Requirements for the Award of ECTS Points	written examination (100%)
ECTS Points	5: lecture: 3ECTS, seminar: 2ECTS
Frequency	winter semester (recommendation: 1st semester)
Workload	Lectures and seminar: 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Basics in Environment, Climate Change and Health
Module Title	Global Change Ecology
Module Coordinator	Professor Dr. Beierkuhnlein, Professorin Dr. Jentsch
Language	English
Learning outcomes	Development and Change of Biodiversity Module aim is to teach about development and distribution of the variety of life on earth. Students learn about the spatial features of organisms and biotic communities on different spatial scales. The role of biodiversity for a functioning ecosystem will be discussed along with global change and its impact. The lecture deals with the evolution of variety on earth, prior major extinctions, the significance of the variety of ecosystem functions and current trends Disturbance Ecology: Aim of this module is to teach about occurrence and impact of natural risks and extreme events in ecology. Reoccurring events are included as well as single disasters; those with stabilizing, effects and those with catastrophic consequences and regime shift. The impact of climatic, biotic and geomorphological events on biodiversity, ecology, provision of services, and cultural landscapes is covered. The learning objective is the ability to deal with in-depth theories and methods of Disturbance Ecology and to research extreme events. Fundamentals for a scientific study of interdisciplinary disaster research and risk management will be developed.
Content	Development and Change of Biodiversity Through global climate change, material flow, land-use and the linking between habitats will greatly impact the biodiversity on earth that had had millions of years to develop. Local, regional and global losses are the result. Possible consequences will be worked out in the course. Biogeography is undergoing great change, as more and more questions about the complex relationships on a global cale are being asked. Disturbance Ecology: Climate and land-use change are leading to global changes in disturbance regimes and to an increase in the frequency and magnitude of extreme events. In this module, we deal with, geomorphological hazards, abrupt climate change and extreme weather events like heat waves, drought, intense rainfall, tropical cyclones and extra-tropical severe storms. Furthermore, avalanches, mass movement, large fires, insect calamities, pandemics, volcano eruptions and floods will be covered. The ecological consequences of possible future extreme events such as a lack of cold winter and occurrence of late frosts in the northern hemisphere will be addressed. Developing and presenting a scientific expert presentation trains students in analyzing and understanding the progress in current scientific literature on extreme events.
Teaching Formats	Lecture Development and Change of Biodiversity and lecture Disturbane Ecology (4 hours per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology

Requirements for the Award of ECTS Points	written/ oral exam or report or presentation or term paper
ECTS Points	5: lecture Development and Change of Biodiversity (3 ECTS) and lecture Disturbance Ecology (2 ECTS)
Frequency	winter semester (recommendation: 1st semester)
Workload	Lectures 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Basics in Environment, Climate Change and Health
Module Title	Global Health Policy
Module Coordinator	Professor Dr. Dorlach
Language	English
Learning outcomes	Students acquire a basic understanding of the political institutions and actors that shape global health outcomes. Based on this knowledge, they are able to analyze current developments in global health policy and to evaluate pertinent reform proposals.
Content	• Political Determinants of Health • Institutions and Actors in Global Health Policy • Reform Options for Global Health Policy
Teaching Formats	lecture (2 hours per week)
Requirements for Participation	None Literature recommendation: Clinton, C. & Sridhar, D. (2017). Governing global health: Who runs the world and why? Oxford University Press.
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Food, Nutrition and Health, M.A. Development Studies
Requirements for the Award of ECTS Points	final essay (100 %)
ECTS Points	5
Frequency	winter semester (recommendation: 1st semester)
Workload	Lectures: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Basics in Environment, Climate Change and Health
Module Title	Ecosystem under Climate Change and Human Impact
Module Coordinator	Professorin Dr. Lehndorff, Professorin Dr. Nölscher, Professorin Dr. Pausch, Dr. Hopp, Professor Dr. Köllner
Language	English
Learning outcomes	The module communicates basics in hydrology, soil, plant and atmospheric science with focus on changes forced by climate and human activities. Climate change and human activity puts pressure on natural resources such as water, soil fertility, and atmospheric quality as well as on ecosystem services. The module focuses on depletion and pollution of resources which are critical for natural ecosystems as well as for agroecosystems and as such for food production and human health.
Content	The lecture focusses on aspects of hydrology (water stores, quality and pollution), soil science and pollution, agrarecology, and atmospheric science as well as on ecosystem services that are under emerging changes forced by climate and human activities. The seminar allows to deepen understanding in topics related to water, soil, plants or atmosphere with focus on climate change, pollution or land use problems. Field trips give basic practical experience in water supply and agricultural land use.
Teaching Formats	lecture (2 hours per week) accompanying block seminar and field trips (2x 1 day trips)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health
Requirements for the Award of ECTS Points	Written/oral exam or report or presentation or term paper
ECTS Points	5
Frequency	winter semester (recommendation: 1st semester)
Workload	Lectures and seminars: 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Basics in Environment, Climate Change and Health
Module Title	Integrative Module: Lessons Learned + Lecture Series
Module Coordinator	Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel, N.N.
Language	English
Learning outcomes	In Lessons Learned individual scientific background will be analysed in form of presentations given by the students. This will also help to improve presentation skills. Students also including senior students are able to share and exchange their individual experience and knowledges and to discuss current study and research issues. After attending the lecture series, students will have: - acquired basic knowledge of the most important political aspects of environment, climate change and health worldwide. - been able to put different subject areas into context with environment, climate change and health. - been able to name climate and health organization global and worldwide. - gained a deeper insight into the structure of NGOs. - been able to identify influencing factors on climate and environmental change - acquired knowledge of current issues in global health and climate change.
Content	Main topic of the seminar Lessons Learned are presentations concerning individual (scientific) experiences and background, logistical and organisational details and repetition of scientific core skills needed for master program The Lecture Series consists of experts from the university of Bayreuth as well as from different fields within the framework of environment, climate change and health, who provide an in-depth and multi-faceted insight in this area. The experts (and senior students) report on their everyday experiences and projects in companies, governmental institutions as well as non-governmental organisations. Topics from the field of environment, climate change and health are discussed from an interdisciplinary perspective. Students have the opportunity to reflect this faceted insights or research areas with every speaker.
Teaching Formats	2 hour per week
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology (lecture series), M.Sc. Global, Food, Nutrition and Health (lecture series)
Requirements for the Award of ECTS Points	presentation or report or research plan or essay (lecture series)
ECTS Points	5

Frequency	winter semester and summer semester (recommendation: 1st and 2nd)
Workload	Seminars 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	2 semester

Module Area	Environment, Climate Change and Health: International
Module Title	Globalization of Economies and the Environment
Module Coordinator	Professor Dr. Larch, Professor Dr. Köllner
Language	English
Learning outcomes	The increasing demand for goods and services as well as the globalization of markets has far-reaching economic, ecological, and social effects. On the one hand, developing countries could benefit economically from increased export of raw materials (e.g. biofuels) or through direct investment from industrial nations (e.g. in the agricultural sector), on the other hand, ecosystems could be sustainably damaged due to low environmental standards in developing countries. The aim of this module is to understand 1) the flows of goods and services in global financial and raw materials markets, 2) their economic and ecological effects, and 3) to critically examine environmental policy instruments.
Content	• Global Ecosystems and their services (land use, freshwater use, use of marine environment) • Basic of function, actors, evolution and crisis in financial sectors • International trade theories • Environmental economics • Consequences of international environmental trade • International policies • Utilization of natural resources • Market-based policy instruments
Teaching Formats	lecture (2 hours per week) accompanying seminar (2 hours per week), seminar as block course
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology
Requirements for the Award of ECTS Points	report or term paper (50 %) and presentation (50 %)
ECTS Points	5: lecture: 2 ECTS, seminar: 3 ECTS
Frequency	summer semester (recommendation: 2nd semester)
Workload	Lectures and seminar: 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Environment, Climate Change and Health: International
Module Title	Medicine and Climate Change II (Biodiversity, Climate Change and Health)
Module Coordinator	Dr. Thomas, Dr. Pfeiffer, Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel
Language	English
Learning outcomes	At the end of this course, the students will have acquired a good understanding of how drivers such as loss of biodiversity, land use change or climate change can impact on human and animal health
Content	The lecture synthesizes information on the most important interlinkages between biodiversity, climate change and health. The current global situation of food and nutrition, water scarcity, pollution, migration and urbanization is synthezised and linked with human health. The lecture includes an overview of reports from WHO, OIC, FAO, CBD, IPBES and related Sustainable Development Goals. In the seminar we review and discuss current contributions which cover impacts of global change on animal and human health especially for zoonotic infectious diseases and use this knowledge to articulate future research priorities
Teaching Formats	lecture (2 hours per week), accompanying seminar (2 hour per week)
Requirements for Participation	
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology, M.Sc. Global Food, Nutrition and Health
Requirements for the Award of ECTS Points	oral exam or presentation or report or essay
ECTS Points	5: lecture: 2ECTS, seminar: 3ECTS
Frequency	summer semester (recommendation: 2nd semester)
Workload	Lectures and seminar: 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Environment and Economics
Module Coordinator	Professor Dr. Ulrich, Professor Dr. Stadelmann
Language	English
Learning outcomes	In this module, students will first be acquainted with basic conceptual tools in economics. They will learn how economic analysis can help to understand and solve problems related to the environment, climate, and public health. Course participants will understand the importance of incentives, markets, market failure, and the interaction between markets and government. The module focusses on an economic way of thinking about real world problems. Special attention will be given to the health care sector. It is be taught, how the economic efficiency in health care can be measured and how economic evaluations can be performed.
Content	• Analyze the importance of economic incentives • Understand the relevance of market failure and solutions to market failure • Evaluate link between economic performance and the environment • Analyze economic consequences of climate change and costs/benefits of climate protection • Perform economic evaluations related to health care sector • Explore types of economic evaluations (cost-minimization analysis, cost-effectiveness analysis, cost-utility analysis) • Programme budgeting and marginal analysis in health care sector
Teaching Formats	lecture (2 hours per week), optional as block course
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health
Requirements for the Award of ECTS Points	written/ oral exam or report or term paper
ECTS Points	5
Frequency	Summer semester (recommendation: 2nd semester)
Workload	Lectures: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Environment, Climate Change and Health: International
Module Title	Geographical and Spatial Dimensions of Global Change
Module Coordinator	Professor Dr. Rothfuß
Language	English
Learning outcomes	The objective of this module is to gain understanding about societal and geographical perspectives on global environmental change. In this context, theories of socio-spatial inequalities to global change will be taught
Content	• Sociological and geographical perspectives on climate change-associated interactions • Social and individual differences in adaptions to global change • Social and spatial inequalities and climate change
Teaching Formats	lecture (2 hours per week), optional as block course
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Human Geography
Requirements for the Award of ECTS Points	written/ oral exam or report or term paper
ECTS Points	5
Frequency	summer semester (recommendation: 2nd semester)
Workload	Lectures: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Environment, Climate Change and Health: International
Module Title	Skills and Competences: a) Scientific Writing b) Academic Working Methods and Skills c) Science and Communication d) Project Management and scientific coordination
Module Coordinator	a) Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel b) Dr. Thomas c) Dr. Sommer d) Dr. Schweiger, Dr. Thies, Moske-Guhr
Language	English
Learning outcomes	a) The aim of this module is to gain insight into inter- and transdisciplinary research and to learn the rules of scientific writing b) The aim of this module is to train students with hands-on experiences in academic working methods and skills. The participants gain an overview of the central steps in knowledge processing: beginning with the selection of suitable sources of information up to structuring the content and preparing written reports and oral presentations. c) The seminar science and communication provides an overview of the challenges associated with scientific communication, especially science outreach typically conducted by scientists to non-expert audiences. At the end of the seminar, students will have acquitted a good understanding of the multiple factors shaping the success of different communication strategies and tools – from social media to popular science talk d) The aim of this module is to provide practical insight into project management, especially in a scientific environment. It seeks to prepare students to carry out tasks relating to coordination in research and the professional world
Content	a) Students will get an overview of relevant publications and corresponding research instruments (for example reports and essays). Moreover, students will get to know the rules of a peer-review-process including writing a letter to the editor and how to start writing your own manuscript. In this context, students will practice scientific writing. Using current manuscripts, their strengths and weaknesses will be discussed, too. b) Literature data bases, structuring with Mind Map, visualization, organization of written and oral presentations (written report, poster, talk), discussion phase, stage fright,

	body language, feedback, video analysis of presentations c) Science communication skills are needed to get support for scientific research, to inform decision making, or to engage stake-holder. A major component of this course will be to provide students with the chance to apply knowledge acquired in previous modules to defend their envisaged solution to typical climate change or conservation challenges or discussions. d) Depending on the needs and interests of the course participants, practical tasks in science management are addressed (the national and international research funding landscape, requesting funding, setting up research associations and international research networks, communication and quality control, public relations). In addition to such insights, the course also reflects on chances and risks in project management based on personal experience.
Teaching Formats	seminars (each 2 hours per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology (Academic Working Methods and Skills, Science and Communication, Project Management and scientific coordination)
Requirements for the Award of ECTS Points	oral exam or report or presentation or essay (optional ungraded)
ECTS Points	10 ECTS: Scientific Writing: 3 ECTS, Academic Working Methods and Skills: 2 ECTS, Science and Communication: 3 ECTS, Project Management and scientific coordination: 2 ECTS
Frequency	Winter and summer semester (recommendation: 1st and 2nd semester)
Workload	seminars: 140 h Self-study (incl. assessment) 160 h Total: 300 h
Duration	2 semester

Module Area	Multidisciplinary Training
Module Title	Global Urban Health
Module Coordinator	Professor Dr. Rothfuß
Language	English
Learning outcomes	In the seminar, students acquire knowledge on the development of urban areas in a global perspective. They will learn how health can be/is influenced by demographic structure, labour and which (urban and regional) concepts and theories exists to reflect on societal health effects.
Content	• Development of urban areas and associated health conditions in the Global North and South • Interactions of society, demographic structure, labour and health • Theories and concepts on cities, urbanity, sustainability and life quality
Teaching Formats	seminar (2 hours per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Human Geography
Requirements for the Award of ECTS Points	written/ oral exam or report or term paper
ECTS Points	5
Frequency	winter semester (recommendation: 3rd semester)
Workload	Seminar: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Migration and Health
Module Coordinator	Professorin Dr. Wirtz, Aljadeeah
Language	English
Learning outcomes	The aim of the module is to learn how health and health care can be influenced by migration. Students will gain basic knowledge about interactions between migration, legal regulations, and climate change as well as between migration movements and social conditions.
Content	• migration and legal regulations • migration and climate change • migration and influence on health (care) • migration movement and social conditions
Teaching Formats	lecture (2 hours per week), optional as block course
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health
Requirements for the Award of ECTS Points	written/ oral exam or report or term paper
ECTS Points	5
Frequency	winter semester (recommendation: 3rd semester)
Workload	Lectures: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	International Environmental and Sustainable Development Law
Module Coordinator	Professor Dr. Kaime
Language	English
Learning outcomes	The aim of the module is to learn what is meant by an environment and climate change law. In this context, constitutional basics will be learned and conservation law, state climate law, environmental information act, environmental private law and environmental liability law will be introduced. Furthermore, organizations, procedures and types of action will be taught.
Content	• constitutional basics • conservation law • state climate law and climate law in Europe • environmental liability law, environmental private law, environmental information act
Teaching Formats	lecture (2 hours per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology
Requirements for the Award of ECTS Points	active participation and term paper
ECTS Points	5
Frequency	summer semester (recommendation: 4th semester)
Workload	Lectures: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Statistical Data Analysis with R
Module Coordinator	Ecosystem Analysis and Stimulation (Prof. Dr. Hülsmann, Dr. Mair)
Language	English
Learning outcomes	In this course, the participants will learn and practice different methods of data analysis. Also, participants will consolidate their use of the programming language R, which is the de facto standard for statistical data analysis. They will be enabled to understand basic concepts of statistics, to choose appropriate statistical methods to answer common ecological questions, to apply these methods in R and to interpret the results correctly.
Content	Topics covered in the course include: using R and RStudio, descriptive statistics and visualization, hypothesis testing, linear models, generalized linear Models, mixed models, confounders, causality and Directed Acyclic Graphs (DAGs), data management and experimental design. The module introduction to GIS as complementary module (accounting for 5 ECTS) is recommended.
Teaching Formats	block course
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health; M.Sc. Global Change Ecology
Requirements for the Award of ECTS Points	oral exam or report or presentation or essay (optional ungraded)
ECTS Points	3
Frequency	summer semester (recommendation: 2nd semester)
Workload	Seminar: 60 h Self-study (incl. assessment) 30 h Total: 90 h
Duration	1 semester

Module Area	Multidisciplinary Training – Statistic and Analysis Tools
Module Title	Introduction to GIS
Module Coordinator	BayCEER (IT and Databases), Oliver Archner
Language	English
Learning outcomes	Students will become familiar with the most important concepts and functions of Geographical Information Systems (GIS). After completing the course, they will be able to conduct a simple spatial analysis independently.
Content	Training in GIS software and its functionality: modelling spatial information, spatial reference systems, ways to produce geodata, spatial and factual queries, selected methods of spatial analysis, formulation of analyses using process models, basic techniques of cartographic presentation.
Teaching Formats	block course
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology
Requirements for the Award of ECTS Points	report (optional ungraded)
ECTS Points	2
Frequency	winter semester (recommendation: 3rd semester)
Workload	Seminar: 30 h Self-study (incl. assessment) 30 h Total: 60 h
Duration	1 semester

Module Area	Multidisciplinary Training – Statistic and Analysis Tools
Module Title	Spatial Statistics and Visualization with R
Module Coordinator	Ecological Services: Professor Dr. Köllner/ Hänsel.
Language	English
Learning outcomes	Spatial data often require specific methods of analysis. The aim of this exercise is the development of skills in dealing with different types of spatial datasets. The focus is on learning statistical methods for the analysis of spatial patterns.
Content	Different methodological approaches will be presented and practically implemented with the statistical software R. An exemplary selection of covered topics are: Viszualization of spatial data, spatial point pattern analysis, variograms, and the modelling of areal data using SAR and CAR models The module introduction to GIS as complementary module (accounting for 5 ECTS) is recommended.
Teaching Formats	Seminar (2 hours per week)
Requirements for Participation	Experiences in the use of the software R as well as basic statistical knowledge (for example seminar Statistical Data Analysis with R)
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health; M.Sc. Global Change Ecology
Requirements for the Award of ECTS Points	written exam or report or presentation or essay (optional ungraded)
ECTS Points	3
Frequency	summer semester (recommendation: 4th semester)
Workload	Lectures and seminars: 30 h Self-study (incl. assessment) 60 h Total: 90 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Food, Health and Climate Communication
Module Coordinator	Professorin Dr. Bartelmeß
Language	English
Learning outcomes	Students acquire detailed and differentiated knowledge of theories, strategies, and methods of climate change communication. Furthermore, they know successful strategies of public engagement for food and health-related challenges of climate change and are able to develop their own creative communication approaches.
Content	• Climate change communication research: theories, strategies, approaches • factors that influence public understanding of climate change • food, nutrition, and health in the context of climate change innovative climate change communication approaches and strategies
Teaching Formats	blocked seminar (30 hours per semester)
Requirements for Participation	Basic knowledge on the linkages of food, nutrition, health, and climate change
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Food, Nutrition and Health, M.Sc. Food, Quality and Safety
Requirements for the Award of ECTS Points	term paper or essay (50 %), presentation (50 %)
ECTS Points	5
Frequency	summer semester (recommendation: 4th semester)
Workload	Seminar: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Environmental and Resource Technology
Module Coordinator	Professor Dr. Jess, Professor Dr. Helbig
Language	English
Learning outcomes	The module focuses on the earth planet and its atmosphere, on greenhouse and warming effects as well as on anthropogenic material and energy flows and their limitations. Energy and water demand, stable ecosystems and production and recycling of waste will be discussed.
Content	• Bio geosphere • Energy balance of the earth • Anthropogenic material and energy flows and limitations • Energy demand and stable ecosystems • Sustainability product engineering • Water demand and resources • Production and recycling of waste • Agricultural technology
Teaching Formats	Lectures (4 hours per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health
Requirements for the Award of ECTS Points	written/ oral exam or report or presentation or term paper
ECTS Points	5
Frequency	winter semester (recommendation: 3rd semester)
Workload	Lectures: 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Tools in Social Research
Module Coordinator	Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel
Language	English
Learning outcomes	The students acquire detailed and differentiated knowledge about the research process in the social sciences with a specific focus on qualitative and quantitative research methods. Based on this knowledge, student are able to choose the appropriate method of data collection for a range of research questions. Furthermore, they are able to develop designs for qualitative and quantitative studies. Finally, students acquire a basic understanding of qualitative and descriptive quantitative data analysis.
Content	Free choice of different elective subjects: • Qualitative research methods (interviews, focus groups, participant observation, document analysis) • Quantitative research methods (questionnaires, experimental approaches) • Descriptively analysing and reporting quantitative and qualitative data
Teaching Formats	seminar (2 hour per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology
Requirements for the Award of ECTS Points	oral exam or report or presentation or term paper or essay
ECTS Points	5
Frequency	winter semester (recommendation: 3rd semester)
Workload	Seminar: 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Sport Ecology
Module Coordinator	Professor Dr. Steinbauer
Language	English
Learning outcomes	Upon completion of the module Sport Ecology, students understand the interactions between sports and ecological systems and are able to illustrate them with practical examples. They can identify quantitative relationships regarding the effect of outdoor sports on ecological systems from scientific publications and reflect them critically.
Content	Student learn the complex and dynamic relationship between sport and the environment. The courses impart the importance of nature sports, their potential of conflict with goals in nature and environmental protection and the potential of sports in conveying ecological understanding and derived action strategies. Students collaboratively develop conceptual, functional, and methodological foundations to an economic view on ecology and nature protection and to an analysis of the interactions between human behaviour and ecological systems in the area of sports.
Teaching Formats	Lectures/exercises (each 2 hours per week)
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Change Ecology, M.Sc. Geo-Ecology, M.Sc. Sport Economy, M.Sc. Biodiversity and Ecology, M.Sc. Geography
Requirements for the Award of ECTS Points	written/ oral exam or report or presentation or term paper or research plan
ECTS Points	5
Frequency	winter semester (recommendation: 3rd semester)
Workload	Lectures and seminar 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	1 semester

Module Area	Multidisciplinary Training
Module Title	Global Political Economy of Food
Module Coordinator	Professor Dr. Dorlach
Language	English
Learning outcomes	Students acquire a basic understanding of the political and economic processes that shape the world food system and global food security. Based on this knowledge, they are able to analyze current developments in global food governance and evaluate pertinent reform proposals
Content	• Structure and Development of the World Food System • Institutions and Actors of Global Food Governance • Reform Options for Global Food Governance
Teaching Formats	Lectures (2 hours per week)
Requirements for Participation	None Literature recommendation: Clapp, J. (2020). *Food (3rd Edition)*. Polity.
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health, M.Sc. Global Food, Nutrition and Health
Requirements for the Award of ECTS Points	Final essay (100 %)
ECTS Points	5
Frequency	summer semester (recommendation: 4th semester)
Workload	Lectures and seminar 30 h Self-study (incl. assessment) 120 h Total: 150 h
Duration	1 semester

Module Area	Summer School
Module Title	Summer School
Module Coordinator	Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel, N.N.
Language	English
Learning outcomes	During summer schools students can interact with foreign students, lecturers, real-world practitioners, (inter-)national organizations and companies. Moreover, students come into contact with current topics and research results concerning environment, climate change and health. Within the summer school students should be able to present their own research plans and results during poster presentations or scientific talks.
Content	Summer school can take place at the university of Bayreuth or at any other company or organization. It must last at least 10 days in total. However, two summer schools with each lasting at least 5 days are also welcome. Topics of the summer schools should deal with current issues concerning environment, climate change and health. Within the summer school, academic working tools and good practical science should be taught or discussed during poster presentations and scientific talks Moreover, personal skills and cores skills should be addressed.
Teaching Formats	Summer schools including different seminars, workshops, poster presentations and scientific talks
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health ; other students of the university of Bayreuth and people from outside
Requirements for the Award of ECTS Points	oral exam or report or presentation or term paper or research plan or essay or semester-related tasks (ungraded)
ECTS Points	5
Frequency	Winter/ summer semester (recommendation: 3rd semester)
Workload	Lectures and seminar 60 h Self-study (incl. assessment) 90 h Total: 150 h
Duration	10 days (1x 10 days or 2x 5 days)

Module Area	Internship
Module Title	Internship
Module Coordinator	Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel, N.N.
Language	English
Learning outcomes	Internships offer the opportunity to gain practical experience in an international, interprofessional team. Thereby, individual-initiative should be promoted.
Content	Internships are possible within different areas concerning environment, climate change and health (e.g. research, administration). The chosen business can be national or international (preferred). Internship must last at least 12 weeks.
Teaching Formats	internship
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health
Requirements for the Award of ECTS Points	report or presentation (ungraded)
ECTS Points	10
Frequency	Winter/ summer semester (recommendation: 3rd semester)
Workload	Self-study (incl. assessment) 300 h Total: 300 h
Duration	3 months resp. 12 weeks

Module Area	Master thesis
Module Title	Master thesis
Module Coordinator	Professor Dr. Dr. med. habil. Dr. phil. Dr. theol. h. c. Nagel, Professor Dr. Beierkuhnlein, Professorin Dr. Jentsch, Professor Dr. Dorlach, Dr. Hopp, Professorin Dr. Pausch, Professorin Dr. Lehndorff, Professor Dr. Larch, Professor Dr. Köllner, Professor Dr. Rothfuß, Professorin Dr. Bartelmeß, Professor Dr. Jess, Professor Dr. Steinbauer, Professor Dr. Ulrich, Professor Dr. Nölscher
Language	English
Learning outcomes	A topic within natural science, law or any other environment, climate change and health-related topic should be processed by the students independently. To complete the master thesis successfully, the students should be able to use appropriate methods, that are learned within the whole master programme
Content	• Problem detection and structuring • Explanation concerning the used methods • Discussion in context of solution possibilities • Presentation of limitations and perspectives
Teaching Formats	Self-study with corresponding supervision
Requirements for Participation	none
Usability of the Module	open for students of the following study programmes: M.Sc. Environment, Climate Change and Health
Requirements for the Award of ECTS Points	Master thesis (graded) and presentation/disputation (ungraded)
ECTS Points	30
Frequency	Winter/ summer semester (recommendation: 4th semester)
Workload	Self-study (incl. assessment) 900 h Total: 900 h
Duration	6 months