International Elite Graduate Programme

Elite Network Bavaria (ENB)

Study Guide to Global Change Ecology (M.Sc.)

Overview

June 2026

TABLE OF CONTENTS

The Study Guide to MSc Global Change Ecology (GCE)

The complete study guide to the MSc Global Change Ecology consists of the following documents:

1. Overview (this document)
2. Specialisation A "Global Climate Change and Ecosystems"
3. Specialisation B "Biodiversity and Ecosystem Functions"
4. Specialisation C "Global Policies, Economies, Civil Society and the Environment"
5. Methods Study Guide
6. Modules Handbook exported from CampusOnline/CMLife

Goals and Organisation of the Degree Programme

Why to study Global Change Ecology?

The Elite Graduate Programme „Global Change Ecology (GCE) MSc" addresses the most important and far-reaching environmental issues of the 21st century: global change of climate, biodiversity as well as ecosystem functioning and their services. The study of human reaction and the development of adaptation strategies are also included. Effects of the interaction with other globally relevant developments such as regionally specific land use changes and loss of biodiversity that can intensify the negative effects of global change are also a vital part of course content.

The interdisciplinary and entirely new problems of Global Change demand innovative and highly efficient approaches in research and teaching. For this reason, competencies at the University of Bayreuth, as well as in the Bavarian research community, along with business, public administration and international organisations are pooled together in the programme.

Changes in climate, transformation in land-use and population pressure all brings about drastic changes in the behaviour of ecological systems, making it increasingly difficult to judge. Due to the complex interaction between social and ecological processes, fields in natural science are supplemented by disciplines in social science.

There is apprehension about negative consequences on goods and services in ecological systems (e.g. drinking water, food, health, pharmaceutical resources, carbon storage). Economic, social and political risks are emerging and uncertainty is growing. Research and training needs are evident in process-oriented problem analysis, effective ecological risk management as well as in the development of optimised management strategies. These issues are of global significance for the sustainable development of societies.

The goal of this programme is to educate and train students to work in science and the environment, in politics, and in business as highly qualified experts and decision-makers. With a well-founded scientific background and expert knowledge, such individuals must be able to analyse complex issues, recognise new problems, and work out and adopt solid solutions. This program is embedded into the teaching environment at the Department of Earth Sciences at UBT.

Our Teaching in Environmental System Sciences at Department of Earth Sciences, UBT

The University of Bayreuth (UBT) is a young university but has a long history in research and teaching in environmental system sciences. It started with the MSc Geoecology in 1978 in the Department of Earth Sciences, and in 2006, the MSc Global Change Ecology was established here. Currently, 14 Chairs and Professorships in geoecology and geography contribute to the teaching in the MSc GCE. This is complemented by teachers of the faculties of biology, of economics and laws well as external ones from the University of Augsburg and partners from practice. This allows

us to offer a wide range of teaching on theories, concepts, and methods relevant to holistically address global change in climate, land use, biodiversity, and ecosystems. In March 2026, around 70 students were enrolled in the MSc GCE and 190 students in all four environmental science-oriented MSc programmes in Earth Sciences at UBT. From the winter term 2026/27 onwards, we will offer our completely revised study program.

Prerequisites for Studying GCE

The Elite Graduate Programme starts where the first academic degree (normally B.Sc.) leaves off. Applicants to the programme must fulfil above-average requirements. The programme is open to excellent, high-achieving and hard-working students from Germany and abroad. Major subject areas in the first degree can be: Biology, Geography, Geo-Ecology, Forestry, Agricultural Science, Hydrology, Limnology, Meteorology, Environmental Physics, Environmental Computer Science, Engineering Ecology, Landscape Ecology, Environmental Economics, Environmental Law and related disciplines. Applicants go through a selective admission process. Criteria for admission include submitting previous degrees and certificates and a personal written application statement. During candidate interviews, personal qualifications, willingness to work hard and motivation will be evaluated.

Inter- and Transdisciplinary Competencies

Outstanding graduates with above-average knowledge and skills who are able to deal with the practical application of global environmental problems are needed for leading managerial positions. The basis of this work requires thorough training in natural science, but also a background in social science disciplines. By directly involving students in current research projects, they will be encouraged to use their personal experience to better understand the relevant processes within the framework of Global Change. There are no ready-made solutions to the problems needing to be tackled. Single individuals, no matter how extraordinary, cannot accomplish anything on their own. Furthermore, the temporal and spatial consequences that must be taken into consideration reach far beyond an individual's own personal range of experience. For this reason, characteristics such as creativity, flexibility, team spirit and sense of responsibility are particularly encouraged in this programme, as they will be indispensable in later fields of work.

The programme Global Change Ecology places great value on the exchange of scientific knowledge with the professional world and society at large. To ensure practical application of scientific knowledge, close contact is guaranteed between the university programme with an alliance of non-university partners working on similar subject matter (particularly with research centres). Students interested in the programme should combine extraordinary intellectual skills with a pronounced sense of responsibility and high motivation. Their development is actively fostered throughout their studies. Special courses and intensive, individual support differentiate the Elite Graduate Program from conventional programmes. Direct communication with instructors is offered and encouraged between all students; international students are given special attention and are integrated into the programme.

Job Opportunities for Global Change Ecologists

Specialised training of qualified scientists in new fields of research is continually gaining importance. The current global developments in the environmental sector are becoming more relevant both in science as well as in the economy. Our graduates are extraordinarily well qualified for careers in research, in advisory or consulting capacities or as leaders in science, politics, public administration and business.

The integrative exchange with research groups and guest lecturers as well as communication with foreign partners in an international consortium of institutions encourages increasing sensitivity

for the research approaches that are under debate in the international arena. Students are specifically prepared to work in an international environment through inclusion in the programme of internationally operating businesses and research institutes. Places of work can be found in many fields: as policy advisors, in financial consulting, dealing with environmental policy, managing environmental change and risks, in Global Change research as well as in the management of scientific institutions (research centres, public agencies and organisations).

Possible employers include international organisations (e.g., the EU, NGOs), national agencies (government ministries, federal agencies, state offices), departments of sustainability, consulting businesses, insurance companies, universities, and large research centres.

Teaching and Knowledge Transfer

Didactic Approach and Learning Environment

The programme emphasises small-group teaching, intensive discussion, and flexible course design. While the Module Areas and their structure follow legally binding requirements for academic programmes in Bavaria, the content of individual courses is continuously updated to reflect current scientific developments. The combination of structured module pathways, methodological flexibility, and practical experiences ensures that students receive both a solid academic foundation and the freedom to shape their own professional trajectory.

Forms of Teaching

Lectures (*Vorlesungen, V*) present a coherent description of the central topics in each respective Module.

During *Seminars* (*Seminare, S*) current research topics are covered by term papers, homework assignments, presentations and discussions.

Tutorials (Übungen, Ü) take place in small groups and serve to deepen methodology and to teach technical knowledge through block courses with fieldwork (measurements, experiments, data evaluation). They enable students to deal intensively with methods, current issues and problems. These courses strive to form a heterogeneous structure in all group teams to take advantage of the different background experience of each individual student and to encourage discussion. Modelling exercises teach the students to use simulations and forecasts.

Research oriented *Science Schools* (Summer/Winter Schools) play an important part in the teaching concept as they offer students the opportunity to practice and deepen their specialised knowledge by dealing intensively with a specific topic. Furthermore, they encourage the exchange and contact with international students as well as allowing participants to become familiar with comparable institutions in different locations and server as a starting point for their own professional network.

External *Internships* (*Internships*) that last at least for six weeks enable participants to gain practical experience in research and administration, in businesses and in international organisations. Internships take place in institutions The internships complement the program's focus in terms of content.

The elite feature of the programme is conveyed by, among other aspects, the direct and regular conversations between instructors and students as well as in the regular weekly meetings that take place. This means that individual interests can be particularly encouraged and supported. All courses are offered annually. Examinations and performance assessments take place during the course.

Student workload is listed for each course in the number of credit points. One credit point (ECTS) is equivalent to 30 hours of work. For on-site classroom attendance, a one-hour class corresponds to 0.5-ECTS (1 SWS x 15 weeks = 15 hours). Credit points are also given for contingent necessary preparation and follow-up work. The time required for exam preparation is factored into the ECTS credits assigned to a course.

Overall Structure of the MSc GCE

The Master's programme Global Change Ecology is designed to be completed within four semesters and comprises a total of 120 credit points (ECTS). Its structure combines a clear framework with substantial flexibility, enabling students to tailor their studies to their academic background, methodological needs, and emerging research interests. The programme integrates ecological, social, and political dimensions of global change and prepares students for interdisciplinary scientific work in research institutions, governmental bodies, NGOs, and the private sector.

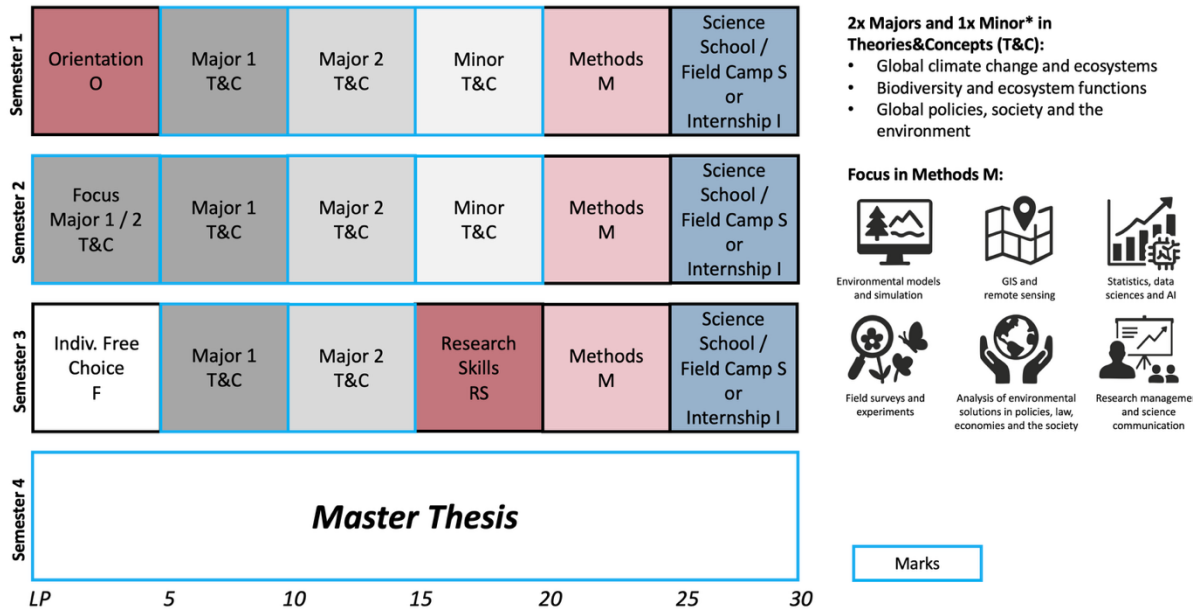

Figure 1: Schematic structure of the programme, showing the three specialisations, i.e. Global Climate Change and Ecosystems (Environmental Change), Biodiversity and Ecosystem Functions (Ecological Change), Global Policies, Economies, Civil Society and the Environment (Societal Change) alongside method-oriented and practice-oriented modules. The interdisciplinary Orientation module provides the programme framework in the first semester, while the Research Skills module prepares for the master's thesis. Flexible movement between Module Areas enables individual study design, and Major and Focus module allows specialisation. Students typically complete 30 ECTS per semester toward the 120-ECTS degree.

Teaching is organised in modules, typically worth 5 ECTS each. Students are expected to complete approximately 30 ECTS per semester. The curriculum is built around three central Module Areas "Theories & Concepts", which run in parallel throughout the programme:

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

These Module Areas form the academic backbone of the programme and ensure continuous engagement with the core dimensions of global change. They are complementary in terms of disciplines, systems, as well as scales covered (see Table 1). Students must complete at least two modules (10 ECTS) in each area as part of their foundational training. Through this structure, all students gain broad interdisciplinary competence while retaining the freedom to deepen their expertise.

Table 1: Comparison of specialisations in the MSc Global change Ecology

Specialisation:	**Global Climate Change and Ecosystems (Environmental Change)**	**Biodiversity and Ecosystem Functions (Ecological Change)**	**Global Policies, Economies, Civil Society and the Environment (Societal Change)**
MSc:	GCE	GCE & GECKO	GCE
Disciplines:			
• Ecology	●●	●●	●
• Env. Physics	●●	(●)	
• Env. Chemistry	●●	(●)	
• Physical Geography	●		
• Human Geography			●
• Law and Economics		(●)	●●
Environmental systems:			
• atmosphere (air)	●●		●
• biosphere (living organisms)	●●	●●	●
• hydrosphere (water)	●●	●	●
• cryosphere (ice)			
• pedosphere (soil)	●	●	●
• lithosphere (rock)	(●)		
Human systems:			
• human wellbeing and health			●●
• regional and global economies			●●
• environmental law and policies			●●
• urban and regional development			
Ecosystems:			
• aquatic ecosystems	●		●
• forest ecosystems	●	●	●
• mountain ecosystems		●	
• agroecosystems	●	●	●
• urban ecosystems	●		●
Spatial scale:			
• molecular			
• field	●	●	
• landscape	●	●	●
• continent		●	●
• global	●		●
Temporal scale:			
• seconds			
• days	●	●	
• years	●	●	●
• centuries	●	●	●
• millions of years		(●)	

(●) minor focus, ● focus, ●● strong focus

Global Climate Change and Ecosystems

The Global Climate Change and Ecosystems specialisation focuses on understanding how rising global temperatures affect climate systems, ecosystems, and human societies. Climate change alters rainfall patterns, evapotranspiration, and environmental conditions across local to global scales, influencing ecosystems, soils, agriculture, water systems, and urban environments. The program aims to build knowledge of climate processes and ecosystem functions while highlighting the interconnected nature of environmental and societal systems. Students learn to analyse climate impacts using field data, modelling, and interdisciplinary approaches. Courses cover topics such as climate change, ecological climatology, extreme events, land-use change, agroecosystems, soils, and hydrological systems, supported by methodological training in statistics, modelling, and climate data analysis.

-> Please find more details in the study guides for specialisations

Biodiversity and Ecosystem Functions

The **Biodiversity and Ecosystem Functions** specialisation explores how biodiversity supports the stability and resilience of Earth's ecosystems. It examines patterns, drivers, and consequences of biological diversity and its role in key ecosystem processes such as productivity, nutrient cycling, and climate regulation. The program emphasises interactions between biodiversity and abiotic factors like soil, water, and climate, highlighting feedbacks where biodiversity actively shapes environmental conditions. Students learn about the mechanisms that generate and maintain biodiversity, the threats ecosystems face, and the importance of ecosystem services for human well-being. The specialisation combines theoretical courses with fieldwork, data analysis, modelling, and science schools to develop skills in biodiversity research, ecosystem assessment, and sustainable ecosystem management.

-> Please find more details in the study guides for specialisations

Global Policies, Economies, Civil Society and the Environment

The Global Policies, Economies, Civil Society and the Environment examines how political, economic, and societal systems respond to global environmental challenges such as climate change, biodiversity loss, and declining ecosystem services. It focuses on understanding the societal processes that both create environmental problems and contribute to their mitigation. The program introduces economic, political, geographical, and socio-ecological theories while emphasising interdisciplinary perspectives on complex socio-ecological systems. Students develop skills to critically analyse global economic activities, environmental policies, and governance approaches addressing climate, land use, and biodiversity issues. Courses also explore connections between environmental change and human, animal, and ecosystem health, supported by methods in policy analysis, social science research, and sustainability assessment.

-> Please find more details in the study guides for specialisations

Program Schedule

Orientation and Early Study Phase (Module Area O, 5 ECTS)

The first semester begins with the interdisciplinary Orientation Module, which introduces the philosophy, conceptual foundations, and central research questions of the programme. It also provides an overview of current global change research and helps assess students' prior knowledge, ensuring a shared academic basis despite diverse educational backgrounds.

In parallel, students begin selecting modules from the three Module Areas and start building their methodological foundation. The programme intentionally accommodates heterogeneity by offering a wide range of method-oriented courses at different levels.

Specialisation in Theories and Concepts (T&C, 15 ECTS)

In the second or third semester, students develop an individual Major/Focus by selecting modules from the three specialisations in the area "Theories & Concepts", resulting in two majors and one minor. This allows students to deepen their expertise in a thematic field of their choice.

- Module Area A „Global Climate Change and Ecosystems (Environmental Change)"
- Module Area B „Biodiversity and Ecosystem Functions (Ecological Change)"
- Module Area C „Global Policies, Economies, Civil Society and the Environment (Societal Change)"

-> Please find more details in the study guides for specialisations

Methodological Training (M, 15 ECTS)

Method-oriented courses comprise 15 ECTS, which can be earned during the first three semesters. Introductory courses are designed to fill knowledge gaps, support individual interests, and equip students with essential skills for advanced modules and research. Those methods will also typically be applied in the master's thesis. The following method groups are offered:

- Statistics, Data Science, and Artificial Intelligence
- GIS and Remote Sensing
- Environmental Modelling and Simulation
- Field Surveys and Experiments
- Analysis of Environmental Solutions in Policies, Economies and the Civil Society
- Research Management and Science Communication

Method modules are assessed but not graded, allowing students to focus on skill acquisition.

-> Please find more details in the study guides for methods

Free Choice Module and Individual Study Design (F, 5 ECTS)

The programme includes a Free Choice Module (5 ECTS), which allows students to select any suitable course from within the MSc GCE or other study programmes. This module supports individual academic development and may include additional method courses, specialised thematic courses, language courses or research-oriented mini-projects. Suggestions for suitable electives may be provided, but there are no formal restrictions beyond relevance to the programme.

Internships and Science Schools (I&S, 15 ECTS)

To strengthen practical skills and professional orientation, students must complete 15 ECTS through Internships and Science Schools. These experiences typically take place during lecture-free periods.

Internships offer the opportunity to gain practical experience. They allow students to engage in four main areas, including research institutions (not universities), governmental agencies, NGOs, or private-sector organisations.

Science schools aim at integrating students into current developments in the rapidly changing

scientific field of global change research. Intensive external and internal courses allow students to make direct contact with not only other lecturers and real-world practitioners but also peers from other study programs, universities and countries.

Research Skills and Preparation for the Master's Thesis (RS, 5 ECTS)

A mandatory, ungraded Research Skills Module prepares students for their thesis work. It covers

- Scientific writing and research data management
- Development of a research plan
- Presentation of the master thesis

This module ensures that students are equipped to conduct independent scientific work and engage with complex interdisciplinary questions.

Master's Thesis (T, 30 ECTS)

The fourth semester is fully dedicated to the Master's Thesis (30 ECTS). The thesis must be anchored in one of the three Module Areas but should demonstrate a multidisciplinary perspective. Students typically conduct their thesis within ongoing research projects at affiliated chairs.

The thesis aims to develop students' ability to:

- Analyse complex interrelations using inter- and transdisciplinary approaches
- Engage with globally interconnected ecological, environmental and societal problem areas
- Apply modern scientific methods and tools
- Integrate current research literature and data sources
- Communicate scientific findings effectively

Successful completion of all programme requirements leads to the award of the academic degree Master of Science (M.Sc.).

List of Modules in MSc Global Change Ecology

The complete list of modules offered in the MSc Global Change Ecology is shown sorted by module area in Table 1.

Table 2: List of modules according to Fünfte Satzung zur Änderung der Prüfungs- und Studienordnung für den Internationalen Elitestudiengang Global Change Ecology (M. Sc.) im Elitenetzwerk Bayern (ENB) an der Universität Bayreuth vom 25. Februar 2026

Area Module	**ECTS**	**Final Grade**	**Responsible Chair**
O Orientation	5		
Orientation in Global Change Ecology	5		
T&C Theories & Concepts A total of 45 ECTS credits must be taken from the modules listed below. One specialisation must be completed for 20 ECTS credits (Major), one subject for 15 ECTS credits (Major), and one subject for 10 ECTS credits (Minor).	45		
A Global Climate Change and Ecosystems			

Climate Change	5	yes	Physical Geography, University of Augsburg
Ecological Climatology	5	yes	Climatology, UBT
Extreme Events and Natural Hazards	5	yes	Disturbance Ecology, UBT
Changes in Agroecosystems	5	yes	Soil Physics, UBT
Land Use Change and Microclimate	5	yes	Micrometeorology, UBT
Soils and Climate Change	5	yes	Soil Ecology, UBT
Changes in Hydrological Systems	5	yes	Hydrology, UBT
B Biodiversity and Ecosystem Functions			
Biogeography and Global Ecology	5	yes	Biogeography and Sport Ecology, UBT
Disturbance Ecology and Resilience	5	yes	Disturbance Ecology, UBT
Ecosystem Services	5	yes	Ecological Services, UBT
Rhizosphere Biogeochemistry	5	yes	Agroecology, UBT
Population Ecology in Forest Ecosystems	5	yes	Ecosystem Analysis and Simulation, UBT
Dynamic Vegetation Ecology	5	yes	Plant Ecology, UBT
Biodiversity in the Tropics	5	yes	Functional and Tropical Plant Ecology, UBT
C Global Policies, Economies, Civil Society and the Environment			
Globalization of Economies and the Environment	5	yes	Ecological Services, UBT
Socio-Economic and Political Dimensions of Global Change	5	yes	Social and Population Geography, UBT
Biodiversity Policies, Governance and Economics	5	yes	Ecological Services, UBT
Climate Policies and Economics	5	yes	Ecological Services, UBT
Land Use Policies, Markets and Ecosystems	5	yes	Ecological Services, UBT
Biodiversity, Climate Change and Health	5	yes	Biogeography and Sport Ecology, UBT
Sport Ecology	5	yes	Biogeography and Sport Ecology, UBT
M Methods Here you can freely chose 15 ECTS.	15		
Statistics, Data Sciences and Artificial Intelligence			
Introduction to R – Basics and Data Handling	2		Micrometeorology; Ecosystem analysis and simulation, UBT
Statistical Data Analysis with R	3		Ecosystem Analysis and Simulation EASI, UBT
Spatial Statistics and Visualization with R	3		Ecological Services, UBT
Time Series Analysis	5		Ecosystem Analysis and Simulation EASI, UBT
AI in Environmental and Ecological Research	3		NA
Advanced Multivariate Statistical Methods in Climate Research	3		Physical Geography, University of Augsburg
Ecoinformatics and Biogeographical Modelling	5		Biogeography and Sport Ecology, UBT
GIS and Remote Sensing			
Introduction to GIS	2		BayCEER, UBT
Advanced GIS	2		Ecological Services, UBT
Remote Sensing	3		Biogeography and Sport Ecology, UBT
Advanced Remote Sensing	3		Geoinformatics – Spatial Big Data, UBT
AI for Spatial Data Analysis	3		Geoinformatics – Spatial Big Data, UBT

Environmental Models and Simulation		
Introduction to Environmental and Ecological Modelling	2	Ecosystem Analysis and Simulation, UBT
Climate Data Modelling	3	Climatology, UBT
Mathematical Modeling for Climate and Environment	8	Scientific Computing, UBT
Modelling Soil Plant-Atmosphere Systems	5	Soil Physics, UBT
Ecosystem Services Assessment of Landscapes	2	Ecological Services, UBT
Modeling Ecosystem Services	3	Ecological Services, UBT
Methods in Dynamic Vegetation Ecology	5	Plant Ecology, UBT
Field Surveys and Experiments		
Vegetation Science	3	Disturbance Ecology, UBT
Alpine Field Course in Vegetation Science	5	Disturbance Ecology, UBT
Experimental Ecology, Biodiversity and Ecosystem Functioning	5	Disturbance Ecology, UBT
Analysis of Environmental Solutions in Policies, Economies and the Civil Society		
Sustainable Finance and Corporate Nature Reporting	3	Ecological Services, UBT
Life Cycle Assessment of Products	2	Ecological Services, UBT
International Environmental and Sustainable Development Law	5	African Legal Studies, UBT
Global Environmental Negotiations: Observing, Engaging, and Reflecting	2	Biogeography and Sport Ecology, UBT
Methodology of Social Sciences	3	Social and Population Geography, UBT
Research Management and Science Communication		
Science and Communication	3	Biogeography and Sport Ecology, UBT
Project Management	2	BayCEER, UBT
Research at the Natural and Social Science Interface	1	Ecological Services, UBT
F Free Choice	5	
Gewählt werden können alle Module der Universität Bayreuth die nicht bereits integraler Pflichtbestandteil des Masterstudiengangs Global Change Ecology sind.	5	
I & S Internships & International Science Schools In both area I and area S, at least 5 ECTS must be earned.	15	
I Internships		
Internship in Economy (6 weeks)	5	
Internship in Economy (12 weeks)	10	
Internship in Science (6 weeks)	5	
Internship in Science (12 weeks)	10	
Internship in Administration (6 weeks)	5	
Internship in Administration (12 weeks)	10	
Internship in International Organization (6 weeks)	5	
Internship in International Organization (12 weeks)	10	
S International Science Schools / Field Camps		
Science School / Field Camps (1 week)	2	
Science School / Field Camps (1 week including preparation and/or follow-up)	3	

Science School / Field Camps (2 weeks)	5		
Disturbance Ecology Field Camp	5		Disturbance Ecology, UBT
Science School / Expedition Biodiversity Research	10		Disturbance Ecology, UBT
Quantitative (Paleo-)Ecology	5		Biogeography and Sport Ecology, UBT
Science School for Ecosystem Analysis and Simulation	5		Ecosystem Analysis and Simulation, UBT
Experimental Micrometeorology	5		Micrometeorology, UBT
RS Research Skills	5		
Research Skills	5		
T Master Thesis	30		
Masterarbeit – Global Change Ecology	30	yes	
Total	120		

Details on the Modules and Courses

In the module handbook (link), you will find details on each module offered, including teaching goals, content, exam types, courses etc. The electronic study guide CM Life provides information on courses offered in each specific term.

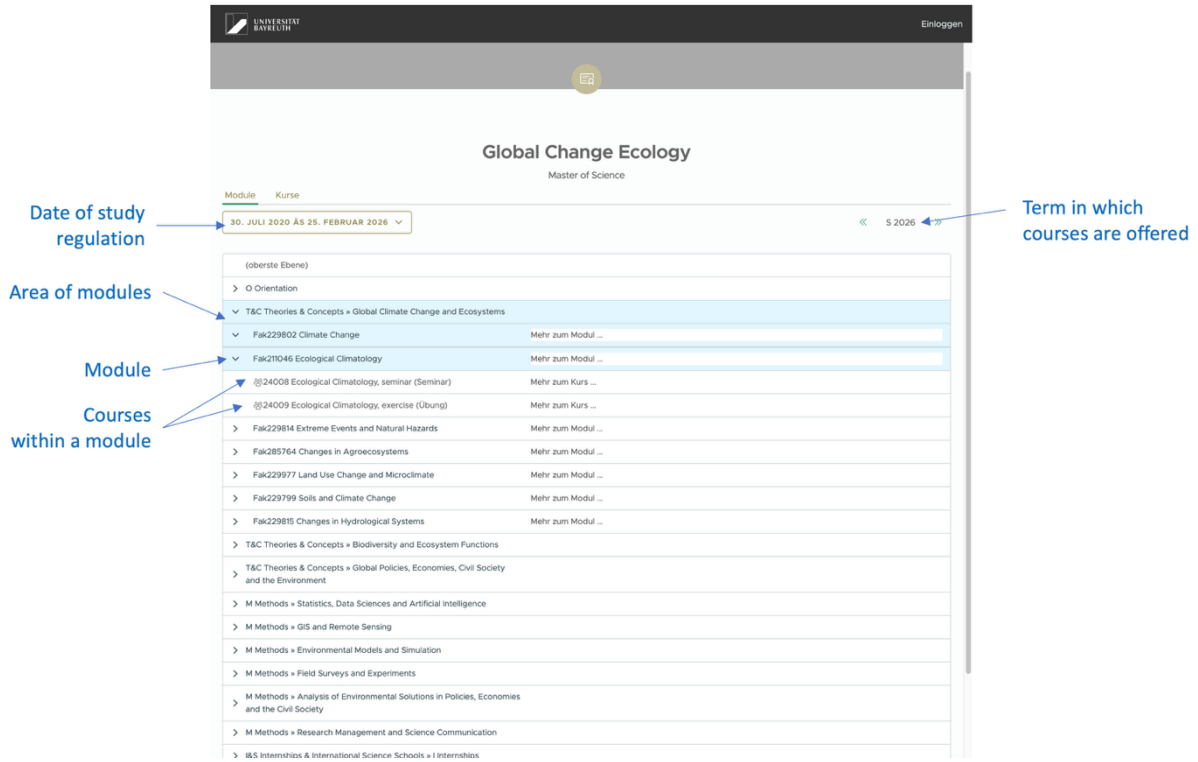

Fig: 2: Screenshot of CM Life, the electronic guide to courses and modules (https://my.uni-bayreuth.de/cmlife/welcome/programs).

-> Please find more details in the module handbook and CM Life

Exemplary study plans

Our broad range of modules allows you to tailor your study program to your preferences. Modules from **T&C Theories & Concepts**, **M Methods** and **S International Science Schools / Field Camps** closely belonging to one major are coloured accordingly:

A Global Climate Change and Ecosystems (Environmental Change)
B Biodiversity and Ecosystem Functions (Ecological Change)
C Global Policies, Economies, Civil Society and the Environment (Societal Change)

Modules without colour are equally important for all majors. Table 3 shows three exemplary study plans, for each of the specialisations one. Of course, you are free to choose your modules differently to adapt to your knowledge levels and targets, but please note the minimum ECTS for each module group.

Table 3: Three exemplary study plans for your specialisations. Blue stands for A Global Climate Change and Ecosystems, green for B Biodiversity and Ecosystem Functions and yellow for C Global Policies, Economies, Civil Society and the Environment.

Area	**ECTS**	**final grade**	**Major in**		
Module			A Global Climate Change & Ecosystems	B Biodiversity & Ecosystem Functions	C Policies, Economics, Civil Society & Environment
O Orientation	5		5	5	5
Orientation in Global Change Ecology	5		5	5	5
T&C Theories & Concepts	45		45	45	45
A total of 45 ECTS credits must be taken from the modules listed below. One specialisation must be completed for 20 ECTS credits (Major), one subject for 15 ECTS credits (Major), and one subject for 10 ECTS credits (Minor).					
A Global Climate Change and Ecosystems					
Climate Change	5	yes	5		
Ecological Climatology	5	yes	5	5	
Extreme Events and Natural Hazards	5	yes			5
Changes in Agroecosystems	5	yes		5	
Land Use Change and Microclimate	5	yes	5		
Soils and Climate Change	5	yes	5		5
Changes in Hydrological Systems	5	yes			5
B Biodiversity and Ecosystem Functions					
Biogeography and Global Ecology	5	yes		5	
Disturbance Ecology and Resilience	5	yes	5	5	5
Ecosystem Services	5	yes		5	5
Rhizosphere Biogeochemistry	5	yes	5		
Population Ecology in Forest Ecosystems	5	yes		5	

Dynamic Vegetation Ecology	5	yes			
Biodiversity in the Tropics	5	yes	5		
C Global Policies, Economies, Civil Society and the Environment					
Globalization of Economies and the Environment	5	yes			5
Socio-Economic and Political Dimensions of Global Change	5	yes			5
Biodiversity Policies, Governance and Economics	5	yes		5	5
Climate Policies and Economics	5	yes	5		
Land Use Policies, Markets and Ecosystems	5	yes			5
Biodiversity, Climate Change and Health	5	yes	5	5	
Sport Ecology	5	yes		5	
M Methods	15		16	18	15
Here you can freely chose 15 ECTS.					
Statistics, Data Sciences and Artificial Intelligence					
Introduction to R – Basics and Data Handling	2				2
Statistical Data Analysis with R	3			3	
Spatial Statistics and Visualization with R	3				
Time Series Analysis	5				
AI in Environmental and Ecological Research	3				
Advanced Multivariate Statistical Methods in Climate Research	3		3		
Ecoinformatics and Biogeographical Modelling	5				
GIS and Remote Sensing					
Introduction to GIS	2				
Advanced GIS	2		2		
Remote Sensing	3				
Advanced Remote Sensing	3				
AI for Spatial Data Analysis	3				
Environmental Models and Simulation					
Introduction to Environmental and Ecological Modelling	2			2	
Climate Data Modelling	3		3		
Mathematical Modeling for Climate and Environment	8		8		
Modelling Soil Plant-Atmosphere Systems	5			5	
Ecosystem Services Assessment of Landscapes	2				2
Modeling Ecosystem Services	3				
Methods in Dynamic Vegetation Ecology	5				
Field Surveys and Experiments					
Vegetation Science	3			3	
Alpine Field Course in Vegetation Science	5				
Experimental Ecology, Biodiversity and Ecosystem Functioning	5			5	
Analysis of Environmental Solutions in Policies, Economies and the Civil Society					
Sustainable Finance and Corporate Nature Reporting	3				

Life Cycle Assessment of Products	2				
International Environmental and Sustainable Development Law	5				5
Global Environmental Negotiations: Observing, Engaging, and Reflecting	2				2
Methodology of Social Sciences	3				3
Research Management and Science Communication					
Science and Communication	3				
Project Management	2				
Research at the Natural and Social Science Interface	1				1
F Free Choice	5		5	5	5
All modules from the University of Bayreuth that are not already an integral part of the Master's program in Global Change Ecology can be selected.	5		5	5	5
I & S Internships & International Science Schools	15		15	15	15
In both area I and area S, at least 5 ECTS must be earned.					
I Internships					
Internship in Economy (6 weeks)	5				
Internship in Economy (12 weeks)	10			5	
Internship in Science (6 weeks)	5				
Internship in Science (12 weeks)	10		10		
Internship in Administration (6 weeks)	5				5
Internship in Administration (12 weeks)	10				
Internship in International Organization (6 weeks)	5				
Internship in International Organization (12 weeks)	10				
S International Science Schools / Field Camps					
Science School / Field Camps (1 week)	2				2
Science School / Field Camps (1 week including preparation and/or follow-up)	3				3
Science School / Field Camps (2 weeks)	5				
Disturbance Ecology Field Camp	5			5	
Science School / Expedition Biodiversity Research	10				
Quantitative (Paleo-)Ecology	5			5	
Science School for Ecosystem Analysis and Simulation	5				5
Experimental Micrometeorology	5		5		
RS Research Skills	5		5	5	5
Research Skills	5		5	5	5
T Master Thesis	30		30	30	30
Masterarbeit – Global Change Ecology	30	yes	30	30	30
Total	120		120	120	120

Contact persons and further information

Prof. Dr. Thomas Koellner

Dr. Stephanie Thomas

GCE Webpage: https://www.bayceer.uni-bayreuth.de/gce

GCE Blog: https://globalchangeecology.com

Instagram: https://www.instagram.com/gcebayreuth