

Humboldt-Universität zu Berlin
Faculty of Mathematics and Natural Sciences

Study and examination regulations for the masters programme

Global Change Geography (MSc)

**Including free elective modules for other masters
programmes (“Überfachlicher Wahlpflichtbereich”)**

English translation of the legally binding German version
“Fachspezifische Studien- und Prüfungsordnung für den
Masterstudiengang Global Change Geography”
(as published on 18th March 2016 in “Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin 19/2016”,
<https://gremien.hu-berlin.de/de/amb>)

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Study regulations

for the masters programme

Global Change Geography (MSc)

According to § 17 section 1 number 3 of the constitution of the Humboldt-Universität zu Berlin in the version from 24th October 2013 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 47/2013), the faculty council of the faculty of Mathematics and Natural Sciences issued* the following study regulations on 16th December 2015:

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§ 1 Field of application

These study regulations contain the subject-specific regulations of the masters programme Global Change Geography. It is valid in connection with the subject-specific examination regulations of the masters programme Global Change Geography and the "Fächerübergreifende Satzung zur Regelung von Zulassung, Studium und Prüfung" (ZSP-HU) in the valid version.

These examination regulations presents an English translation of the [legally binding German original published on 18th March 2016 in "Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin 19/2016"](#).

§ 2 Start of the programme

The programme can be commenced in the winter semester.

§ 3 Objectives of the programme

(1) The programme is targeted at interdisciplinary, research-orientated contents. It aspires to the following specialist competencies:

- Profound knowledge of current research approaches and findings of the interactions be-

tween society and environment in the context of Global Change

- Specialisation and application of scientific methods and findings from areas of the Physical Geography, in particular the subareas biogeography, climate geography, hydrology, remote sensing, sustainability sciences, processing of geo-information and geo-statistics
- Qualification for the integration of scientific theories, findings, and procedures to analyse and model human-environment-systems
- Practical and methodical abilities in the handling of problems related to current questions of sustainability (formulation of problems, theory formation and modelling, development of applied solutions, documentation)
- Ability to understand the state of research of a certain question and to develop own research questions
- Ability to assess alternative opportunities for action as well as the reflection of superordinate scientific, political and social references of the scientific discipline
- Advancement of scientific key skills such as scientific writing and presenting, the analysis of primary literature as well as of English special language skills

The attained knowledge and competences are provided in classroom teaching, virtual lessons and private study as well as in intense research seminars and project work in close contact with research.

(2) The masters programme Global Change Geography offers the opportunity to participate in research and development projects.

(3) The masters programme Global Change Geography promotes the internationality as modules and parts of modules can be completed abroad. A study visit abroad is explicitly recommended for the 3rd semester.

(4) The successful completion of the study programme qualifies for a wide range of possible occupations, amongst other things a professional employment in science, planning, consultancy, nature conservation, development cooperation or international organisations.

§ 4 Types of courses

(1) Beyond the types of courses specified in the ZSP-HU, types of courses are also the "field practice" (German: Geländepraktikum).

* The university presidential board has confirmed this study regulation on 23rd February 2015.

(2) Field practice (Geländepraktikum (GP)): Within the field practice, which can be accomplished as a block or along with the studies, the students gain insight into different fields of activity, e.g. installation of measuring equipment, mapping and mobile measurements in the field and they test the application of learned study contents.

(3) All modules within the study programme are offered in English. Tasks within the modules have to be performed in English.

§ 5 Modules of the programme

The masters programme Global Change Geography includes the following modules with a total of 120 LP:

(a) Compulsory part (70 LP¹)

Module MSc1: Quantitative Methods for Geographers (10 LP)

Module MSc2: Climate and Earth System Dynamics (10 LP)

Module MSc3: Global Land Use Dynamics (10 LP)

Module MSc4: Ecosystem Dynamics and Global Change (10 LP)

Module MSc9: Scientific Writing (5 LP)

Master Thesis (25 LP)

(b) Subject-specific elective part (40 LP)

From the following 4 areas one module each (10 LP) has to be selected:

Acquisition and Analysis of Environmental Data

Module MSc5.1: Field Observation in Climatology and Hydrology (10 LP)

Module MSc5.2: Earth Observation (10 LP)

Environmental Modelling

Module MSc6.1: Spatial modelling of human-environment systems (10 LP)

Module MSc6.2: Systemic sustainability assessments of urban areas (10 LP)

Specialisation 1

Module MSc7: Specialisation 1 (10 LP)

Specialisation 2

Module MSc8: Specialisation 2 (10 LP)

As alternative to the modules MSc7 and MSc8 students can select remaining modules in the fields MSc5.1/5.2, MSc6.1/6.2 or modules 8.0a-c of the MA programme "Geographie der Großstadt - Humangeographie" (Urban Geography).

¹ LP = Leistungspunkte (ECTS credits)

(c) Free elective part (10 LP)

In the free elective part ("überfachlicher Wahlpflichtbereich") a free choice of modules from the module catalogues of other subjects or central facilities has to be completed, with a total of 10 LP.

§ 6 Modules for the free elective part of other masters programmes

For the free elective part ("überfachlicher Wahlpflichtbereich") of other masters programmes the following modules are offered:

Module MSc2: Climate and Earth System Dynamics (10 LP)

Module MSc3: Global Land Use Dynamics (10 LP)

Module MSc4: Ecosystem Dynamics and Global Change (10 LP)

Module MSc5.1: Field Observation in Climatology and Hydrology (10 LP)

Module MSc5.2: Earth Observation (10 LP)

Module MSc6.1: Spatial modelling of human-environment systems (10 LP)

Module MSc6.2: Systemic sustainability assessments of urban areas (10 LP)

Module MSc7: Specialisation 1 (10 LP)

§ 7 Entry into force

(1) These study regulations come into force on the day after their publication in the "Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin" (official information bulletin).

(2) These study regulations are valid for all students who start their study after these study regulations have entered into force or who continue their study after a change of university, subject or programme.

(3) For students who have started their study before these study regulations have entered into force or who have continued their study after a change in university, subject or programme, the study regulations from 21st May 2014 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 23/2014) stay valid on a transitional basis. Alternatively they can choose these study regulations including the corresponding examination regulations. The choice must be explained to the "Prüfungsbüro" (examination office) in written form and is irrevocable. With expiry of 30th September 2018 the study regulations of 21st May 2014 becomes invalid. Thereafter the study programme is continued according to these study regulations also by the students designated in sentence 1. Previous achievements are considered according to § 110 ZSP-HU.

Appendix 1: Module descriptions

Module MSc1 Quantitative Methods for Geographers (Compulsory)		ECTS credits: 10	
<u>Educational and qualification objectives:</u> The students can describe, explain and systematise different advanced statistical and mathematical approaches to the quantitative analysis of geo- and environmental data and the modelling of human-environment systems, e.g. methods of applied and multivariate statistics, mathematical modelling and time series analysis. On the basis of the acquired theoretical and exemplified knowledge, the students can apply existing approaches independently and adapt them to specific problems where necessary. They can develop scientific research questions in the fields of data analysis and modelling and, using the acquired applied programming skills, plan and implement their own analyses.			
Prerequisites for participation in the module or specific courses within the module: None			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
SE (seminar)	<u>3 SWS²</u> <u>120 hours</u> 35 hours attendance, 85 hours pre- and post-processing of the course	4 LP, participation	Advanced topics of the quantitative methods of Geography and human-environment systems analysis, e.g.: - Models in Geography (typology) - Mathematical preliminaries - Spatial autocorrelation - Spatial interpolation, variogram, kriging - Spatial cluster analysis - The linear model (multiple linear regression, ANOVA) - Generalised Linear Models (logistic & log-linear) - Model validation, statistical tests - Autocorrelation - Principal Component Analysis - MANOVA, Discriminant Function Analysis - Cluster analysis - Time series analysis
SE (computer seminar with application of special software)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course and special tasks	4 LP, participation, exercise with about 4 hours per week	The participants deepen the methods acquired in the SE through practical application to case studies and learning of a programming language (e.g. R) or specialist software.
Module exam	<u>60 hours</u> Term paper (10 pages (ca. 15.000 to 20.000 ZoL oM ³))	2 LP, pass	Project work with programming elements connected to current research at the institute. The project report will be written in form of a scientific article and handed in together with the programming code.
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input type="checkbox"/> Summer semester		

² SWS = Semesterwochenstunden (hours of attendance per semester week)³ „ZoL oM“ = Zeichen ohne Leerzeichen und ohne Materialanhang (characters without space and without appendix)

Module MSc2 Climate and Earth System Dynamics (Compulsory)		ECTS credits: 10	
<p><u>Educational and qualification objectives:</u> Students have gained both an overview as well as in-depth insights into the dynamics of regional and global climate, and earth as a complex system. They have acquired extensive competence for understanding and discussing dynamic systems and their underlying principles. They understand the empirical foundations as well as current scientific and political discourses and are able to evaluate these critically. They have the ability to educate themselves about complex phenomena of the geosystem from primary scientific literature, to lecture on these phenomena and to develop personal research perspectives in the field. The module consists of a lecture and two alternatively selectable seminars with either an atmospheric (climatic) or a terrestrial (hydrological) focus.</p>			
Prerequisites for participation in the module or specific courses within the module: None			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
Lecture	<u>2 SWS</u> <u>90 hours</u> 25 hours attendance, 65 hours pre- and post-processing of the course	3 LP, participation	The lecture „Earth as a Complex System“ includes among others the following topics: - Complexity and nonlinearity in the earth system related to global change - Selected principles from earth history, i.a. geo-cybernetic feedbacks, destabilisation, system transitions, tipping points, path dependency - Dynamic of the anthropocene: noetic dynamics, co-evolution, earth system analysis, socio-ecological metabolism, sustainability science, control theory
SE (main seminar)	<u>2 SWS</u> <u>150 hours</u> 25 hours attendance, 125 hours pre- and post-processing of the course and special tasks	5 LP, participation, preparation and presentation (ca. 30 min.) of a selected topic	Seminar with selected foci on atmosphere, climate, cryosphere, hydrosphere and terrestrial biosphere. Topics may be: - Variability of sea level and glacier change - Teleconnections and variability within the climate system - Extreme weather, urban climate effects and climate impacts of land system change - Global water cycle and human impacts on it, water scarcity and droughts - Interactions of vegetation and water - Teleconnections in the water system - Water management, water culture and water ethics
Module exam	<u>60 hours</u> Written (90 min.) or oral (30 min.) exam and preparations or term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input type="checkbox"/> Summer semester		

Module MSc3		ECTS credits: 10	
Global Land Use Dynamics (Compulsory)			
<u>Educational and qualification objectives:</u> Students have acquired a sound understanding of the role of land use in the earth system and as a driver and outcome of global change, as well as the close link between land use and key current sustainability challenges. Students are familiar with the theoretical foundation and methodological tools to analyze land systems and their dynamics across scales in an integrated approach. Students have deepened their skills to assess, summarize and discuss primary literature (e.g. on typical examples), and to apply learned methodical concepts. The course participants are able to develop their own research questions and to develop and present concepts to assess these questions.			
Prerequisites for participation in the module or specific courses within the module: None			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
SE (seminar)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course and special tasks	4 LP, participation, presentation (ca. 20 min.)	Course participants will attain deepened knowledge on: - The history of land use change and possible future land use trajectories - Underlying drivers and determinants of land use change - The importance of land use for human societies, especially in the context of security of foods and resources - Impacts of land use change from global to local scales - Systemic changes in the global land system: rising urbanization, increasing decoupling of places of consumption and production, rising land competition, land grabbing - Theoretical foundation of and knowledge generation in Land System Science
SE (main seminar, in parts computer seminar with application of special software)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course and special tasks	4 LP, participation, exercise (ca. 4 hours per week), 2-3 presentations (a total of 20 min.)	Course participants delve deeper into the topics discussed in the SE, using case studies on aspects of global to local land-use change that students will work on independently and reflect on critically. A focus will be on assessing alternative methodological approaches to analyze land systems across scales and in different regional and thematic contexts.
Module exam	<u>60 hours</u> Written (90 min.) or oral (30 min.) exam and preparations or term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input type="checkbox"/> Summer semester		

Module MSc4		ECTS credits: 10	
Ecosystem Dynamics and Global Change (Compulsory)			
<u>Educational and qualification objectives:</u> Students have attained profound knowledge on theory and concepts related to ecosystem ecology, and a deep understanding of complex human-environment systems. Students know methods and tools to analyze and model the feedbacks between biotic and abiotic components of such systems, and to explore the spatio-temporal dynamics, stability, and resilience of human-environment systems with a focus on ecological processes. In particular, students attained a methodological basis to apply tools for (eco-)system-modelling, to quantify and assess ecosystem services, and to analyze trade-offs and synergies between in human-environment systems across scales. Course participants have deepened their skills in critically evaluating, summarizing, and discussing primary research literature.			
Prerequisites for participation in the module or specific courses within the module: None			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
SE (seminar)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	Topics include: - Foundations of ecosystem ecology: abiotic and biotic components of ecosystems, ecosystem functioning, energy, water, and nutrient cycling, trophic dynamics - Spatial and temporal dynamics in ecosystems across scales - Non-linearity, thresholds and tipping points, resilience in human-environment systems - Ecosystem services (concepts, quantification, evaluation) - Trade-offs and synergies - Ecosystem management (conservation planning, landscape design, restoration ecology, prioritization and optimization)
SE (computer seminar with application of special software)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	Training in and application of analytical, computer-based tools to, e.g.: - Analyze and model spatiotemporal dynamics in coupled human-natural systems (e.g., habitat models, population models, nutrient cycling, vegetation modelling) - Quantifying, mapping, and assessing ecosystem services - Scoring algorithms, optimization and prioritization procedures to analyze synergies and trade-offs between multiple goals - Analyze model uncertainties Teaching will primarily carried out via project- and problem-oriented learning in small groups.
Module exam	<u>60 hours</u> Written (90 min.) or oral (30 min.) exam and preparations or term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input type="checkbox"/> Winter semester <input checked="" type="checkbox"/> Summer semester		

Module MSc5.1 Field Observation in Climatology and Hydrology (Elective)		ECTS credits: 10	
<p><u>Educational and qualification objectives:</u> Students have acquired both an overview on theories and concepts as well as in-depth competences of experimental methods of landscape climatology and eco-hydrology related to local impacts of global change. They have gained the capability to carry out experiments in the field and to operate measurement systems within landscape climatology and eco-hydrology. Students are able to develop own research questions within landscape climatology and drainage basin hydrology in the context of global change. They can carry out, analyse and present associated measurement procedures.</p>			
Prerequisites for participation in the module or specific courses within the module: Successful participation in MSc1 and MSc2			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
Lecture	<u>1 SWS</u> <u>60 hours</u> 15 hours attendance, 45 hours pre- and post-processing of the course and special tasks	2 LP, participation, 5 exercises (ca. 2 pages)	The lecture „The climate near the ground“ communicates in-depth insights regarding the concepts and approaches of landscape climatology to students. This includes spatial and temporal typification, capture and investigation of the boundary layer, basic micro-meteorological principles and experimental methods and approaches. The impact of urban systems on the atmosphere near the ground related to urban climate and air quality is discussed.
Lecture	<u>1 SWS</u> <u>60 hours</u> 15 hours attendance, 45 hours pre- and post-processing of the course and special tasks	2 LP, participation, 5 exercises (ca. 2 pages)	Within the lecture „Experimental Ecohydrology“ students receive in-depth insight to concepts, measurement techniques and approaches in applied eco-hydrology, in particular, to exchanges between ground water and surface waters, mapping of cross-profiles of water bodies, runoff measurements, acquisition and analysis of temperature profiles in fluvial sediments, tracer tests, the investigation of hyporeic exchange as well as principles of hydrological modelling. The impact of urban systems on ground and surface water is discussed.
Field practice (Geländepraktikum)	<u>150 hours</u> 50 hours attendance as single days resp. block course in the field (ca. 7 days), 100 hours pre- and post-processing of the course and special tasks	5 LP, participation (ca. 7 days), report about a selected research question of the field practice (max. 25 pages including figures)	Students learn measurement techniques of landscape hydrology, mapping of climate relevant features of landscape and vegetation as well as techniques to study evapotranspiration and runoff. They autonomously carry out and analyse own experimental work. They discuss theories and experiments and present the results in the form of scientific publications. Selected topics include, for example: Field mapping and water body mapping; discharge measurement; balancing of hyporeic rivers; energy and radiation balance; Eddy-Covariance technique; topo-climatic profile measurements
Module exam	<u>30 hours</u> oral (20 min.) or written (90 min.) exam and preparation	1 LP, pass	
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input type="checkbox"/> Winter semester <input checked="" type="checkbox"/> Summer semester		

Module MSc5.2 Earth Observation (Elective)		ECTS credits: 10	
<p><u>Educational and qualification objectives:</u> Students have acquired advanced knowledge on remote sensing methods. They are familiar with theory, concepts and methods from environmental monitoring and the analysis of land use systems. They can independently perform PC-based analyses targeting advanced research questions. Students have been involved in ongoing research and are capable of embedding remote sensing approaches in both applied and problem-oriented work as well as scientific analyses.</p>			
Prerequisites for participation in the module or specific courses within the module: Successful participation in MSc1 and MSc3			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
SE (seminar)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course and special tasks	4 LP, participation, presentation (ca. 20 min.)	Participants acquire in-depth knowledge on mapping and monitoring terrestrial ecosystems and land use systems. Primary focus will be the process-related methodology to conceptualize solution-oriented approaches, practical conceptualization will be implemented within the computer-seminar.
SE (computer seminar with application of special software)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course and special tasks	4 LP, participation, exercises and project work (ca. 4 hours per week)	Participants deepen their knowledge on remote sensing theory, concepts, and methods through the PC-based analysis of case studies. These case studies focus on three core research areas in geography: <ul style="list-style-type: none"> - urban and periurban areas - agricultural landscapes - forests. The regional focus will regularly (while not exclusively) be on Central and Eastern European, Central Asian or Latin American regions.
Module exam	<u>60 hours</u> Written (90 min.) or oral (30 min.) exam and preparations or term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input type="checkbox"/> Summer semester		

Module MSc6.1 Spatial modelling of the human-environment systems (Elective)		ECTS credits: 10	
<p><u>Educational and qualification objectives:</u> Students receive in-depth knowledge on concepts and methods of spatial modelling of the human environment system for empirical analysis of geographic challenges from the field of land science system (e.g. sustainable use of environmental resources in the context of environmental justice). They have theoretical knowledge of the principles and applications of different spatially explicit modelling approaches to spatio-temporal data, such as geostatistical methods, machine learning approaches, agent-based modelling, approaches to assess and interpret model goodness and uncertainties, as well as spatial and temporal scales in the modelling process. They have deepened their theoretical knowledge based on regional / local case studies in group work, for example, through the analysis of land use changes and the development of decision support scenarios. Students have consistently advanced methodological knowledge in the modelling of spatial and temporal data. They possess the skills to formulate own research questions with an empirical research design, to implement the design in an empirical project, to critically reflect on empirical results and to present results in scientific form.</p>			
Prerequisites for participation in the module or specific courses within the module: None			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
SE (seminar)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	Topics include e.g.: - Representation of human environment systems and land systems in models - Systematics of models: conceptual, mathematical, statistical and computer-based - Introduction to different spatial modelling approaches (geostatistical, rule-based, agent-based modelling, machine learning, etc.) - Modelling process: quality, uncertainty, spatial and temporal scales, interpretation of modelling results - Application possibilities of spatio-temporal modelling in geography, especially in Land System Science, for example, for statistical analysis of drivers of land use change scenarios and modelling
SE (computer seminar with application of special software)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course and special tasks	4 LP, participation, presentation of the project work (ca. 20 min.)	Problem-oriented project work on case studies: - Application of the learned spatial and statistical modelling techniques, e.g. Identification of drivers, patterns and processes of land use, land use modelling for a case study analysis of distribution of land and environmental resources, developing storylines and scenarios - Development of scientific research questions and an empirical methods designs - Implementation, interpretation and discussion of the modelling results
Module exam	<u>60 hours</u> Term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	The term paper is written in the form of a scientific article on the topic of the project work.
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input type="checkbox"/> Winter semester <input checked="" type="checkbox"/> Summer semester		

Module MSc6.2 Systemic sustainability assessments of urban areas (Elective)		ECTS credits: 10	
<p><u>Educational and qualification objectives:</u> The participants will get introduced into concepts, models and methods of urban sustainability research and debates based on a broad range of international literature and its discussion. One focus will be on the application of integrated modelling approaches including system dynamics (SD), impact assessment (IA), life cycle assessment (LCA), ecosystem services supply and demand (ESS), and the ecological footprint of cities and urban areas. The students will learn to conceptually structure complex/wicked problems, to develop parameters and indicators to describe and to analyse them as well as to apply these concepts and indicators in models. Using case studies the participants of the course will apply their knowledge to study (calculate and model) socio-environmental effects of e.g. urbanization, urban land teleconnections, surface sealing, rural-urban migration or land grabbing.</p>			
Prerequisites for participation in the module or specific courses within the module: Successful participation in MSc1			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
SE (seminar)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	<ul style="list-style-type: none"> - Study of international literature in the topic area of the module; own analysis of single papers - Joint elaboration of concepts for socio-environmental concepts and problem settings in cities/urban regions - Indicator development - Models to calculate and assess ESS, ecological footprint, LCA, consumer profiles and land use activities - Studies of the linkages between urban life style(s), teleconnections, land grabbing, economics/trade of natural resources (management) - Introduction into international governance schemes on individual and regional/international sustainability and their relation to the state of ecosystems and resource use
SE (computer seminar with application of special software)	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course and special tasks	4 LP, participation presentation of project work (ca. 20 min.)	Individual project work in case studies including: <ul style="list-style-type: none"> - the application of an elaborated indicator set and modelling techniques in a local/regional case study - the advanced interpretation and discussion of the modelling results
Module exam	<u>60 hours</u> Term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	The term paper is written in the form of a scientific article on the topic of the project work.
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input type="checkbox"/> Summer semester		

Module MSc7 Specialisation 1 (Elective)		ECTS credits: 10	
<u>Educational and qualification objectives:</u> The students have deepening theoretical and experimental skills in a subject of the Physical Geography. They gain special knowledge in the area of climatology, hydrology, biogeography, landscape ecology or geomatics.			
Prerequisites for participation in the module or specific courses within the module: Depending on selected module			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
Lecture and/or seminar	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	Contents correspond to the courses designated for module MSc7 ⁴
Seminar and/or computer seminar	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	Contents correspond to the courses designated for module MSc7 ⁴
Module exam	<u>60 hours</u> Written (90 min.) or oral (30 min.) exam and preparations or term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	
Duration of module	<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input checked="" type="checkbox"/> Summer semester		

⁴ The current course offers for MSc7 und MSc8 will be announced timely each semester on the platform AGNES.

Module MSc8 Specialisation 2 (Elective)		ECTS credits: 10	
<u>Educational and qualification objectives:</u> The students have deepening theoretical and experimental skills in a subject of the Physical Geography. They gain special knowledge in the area of climatology, hydrology, biogeography, landscape ecology or geomatics.			
Prerequisites for participation in the module or specific courses within the module: Depending on selected module			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
Lecture and/or seminar	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	Contents correspond to the courses designated for module MSc8 ⁴
Seminar and/or computer seminar	<u>2 SWS</u> <u>120 hours</u> 25 hours attendance, 95 hours pre- and post-processing of the course	4 LP, participation	Contents correspond to the courses designated for module MSc8 ⁴
Module exam	<u>60 hours</u> Written (90 min.) or oral (30 min.) exam and preparations or term paper (10 pages (ca. 15.000 to 20.000 ZoL oM))	2 LP, pass	
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input checked="" type="checkbox"/> Summer semester		

Module MSc9 Scientific Writing (Compulsory)		ECTS credits: 5	
<u>Educational and qualification objectives:</u> The students are deepening their knowledge on writing scientific texts. Furthermore, by visiting colloquiums, they get insights into the approach of handling and writing final theses and their presentation and discussion.			
Prerequisites for participation in the module or specific courses within the module: None			
Type of course	Time of attendance, workload in hours	ECTS credits (LP) and requirements for their issuance	Topics, content
K (course)	<u>2 SWS</u> <u>90 hours</u> 25 hours attendance, 65 hours pre- and post-processing of the course and special tasks	3 LP, participation, preparation of 3 scientific texts (ca. 25 pages)	The writing of scientific texts is deepened using practical examples.
CO (Colloquium)	<u>2 SWS</u> <u>60 hours</u> 25 hours attendance, 35 hours pre- and post-processing of the course and special tasks	2 LP, participation, presentation and discussion of a master thesis topic in a talk (ca. 15 min.)	Within the colloquium skills are gained to conceptualise master theses. Within the presentation problems, concepts, methods of data acquisition and collection of materials, and its processing resp. analysis are presented and reflected critically. Depending on the colloquium, different topics of geography are discussed.
Duration of module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Begin of module	<input checked="" type="checkbox"/> Winter semester <input checked="" type="checkbox"/> Summer semester		

Appendix 2: Ideal-typical course schedule⁵

Here you find a module allocation to the semesters presenting an ideal-typical but not compulsory course schedule.

No. of module	Name of the modules	1st semester	2nd semester	3rd semester	4th semester
MSc1	Quantitative Methods for Geographers	5 SWS, 10 LP			
MSc2	Climate and Earth System Dynamics	4 SWS, 10 LP			
MSc3	Global Land Use Dynamics	4 SWS, 10 LP			
MSc4	Ecosystem Dynamics and Global Change		4 SWS, 10 LP		
MSc5	Acquisition and Analysis of Environmental Data		4 SWS, 10 LP		
MSc6	Environmental Modelling		4 SWS, 10 LP		
MSc7	Specialisation 1			10 LP	
MSc8	Specialisation 2			10 LP	
MSc9	Scientific Writing			5 LP	
	Free elective part			5 LP	5 LP
	Master Thesis				25 LP
SWS and LP per semester		13 SWS 30 LP	12 SWS 30 LP	14-15 SWS 30 LP	2-3 SWS 30 LP

⁵ The 3rd semester is especially suitable for a study at a university abroad. To simplify the crediting of study achievements and examinations at the foreign university it is recommended that a Learning Agreement is completed previously.

Examination regulations for the masters programme „Global Change Geography“

According to § 17 section 1 number 3 of the constitution of the Humboldt-Universität zu Berlin in the version from 24th October 2013 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 47/2013), the faculty council of the faculty of Mathematics and Natural Sciences issued* these examination regulations at 16th December 2015:

- § 1 Field of application
- § 2 Standard period of study
- § 3 Examination board
- § 4 Module exam
- § 5 Master thesis
- § 6 Final grade
- § 7 Academic degree
- § 8 Entry into force

Appendix: Overview of exams

§ 1 Field of application

These examination regulations contain the subject-specific regulations of the masters programme Global Change Geography. It is valid in connection with the subject-specific study regulations of the masters programme Global Change Geography and the "Fächerübergreifende Satzung zur Regelung von Zulassung, Studium und Prüfung" (ZSP-HU) in the valid version.

The present study regulations presents an English translation of the [legally binding German original as published on 18th March 2016 in "Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin 19/2016"](#).

§ 2 Standard period of study

The masters programme Global Change Geography has a standard period of study of 4 semesters.

§ 3 Examination board

The examination board of the Geographical Institute is responsible for examination matters of the masters programme Global Change Geography.

§ 4 Module exams

(1) Oral exams are conducted in the presence of a competent assessor if, according to ZSP-HU, two examiners are not appointed. The assessor watches and minutes the exam. She or he is not involved in the oral examination and the grading.

(2) Written exams and term papers have to be composed in English. Oral exams can be taken in German or English.

§ 5 Master thesis

(1) Passed master theses have to be defended.

(2) For the calculation of the grade of the master thesis, the grade of the written part and the grade of the defence are weighted 9:1.

§ 6 Final grade

(1) The final grade of the masters programme Global Change Geography is calculated from the grades of the module exams and the grade of the master thesis, weighted according to the ECTS credits which are shown in the appendix for the modules and the master thesis.

(2) Module exams, that are not graded or that are marked as "passed" due to an incomparable grading system, and the ECTS credits of these modules are not considered in the calculation according to section/paragraph 1.

§ 7 Academic degree

The students who successfully completed the masters programme Global Change Geography, acquire the academic degree "Master of Science" ("M.Sc.").

§ 8 Entry into force

(1) These examination regulations come into force on the day after their publication in the "Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin."

(2) These examination regulations are valid for all students who start their study after these examination regulations have entered into force or who continue their study after a change of university, subject or programme.

(3) For students who have started their study before these examination regulations have entered into force or who have continued their study after a change in university, subject or programme, the examination regulations from 21st May 2014 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 23/2014) stay valid on a transitional basis. Alternatively they can choose these examination regulations including the corresponding study regulations. The choice must be explained to the "Prüfungsbüro" (examination office) in written form and is irrevocable. With expiry of 30th September 2018 the examination regulations of 21st May 2014 become invalid. Thereafter the study programme is continued according to these examination regulations also by the students designated in sentence 1. Previous achievements are considered according to § 110 ZSP-HU.

* The university presidential board has confirmed this examination regulation on 23rd February 2015.

Appendix: Overview of exams**Masters programme**

No. of module	Name of module	Credits of module	Subject-specific admission requirements for the exam	Type, duration/processing time/extent, possibly language of exam according to § 108 section 2 ZSP-HU	Grading
Compulsory part⁶					
MSc1	Quantitative Methods for Geographers	10	none	Term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc2	Climate and Earth System Dynamics	10	none	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	Yes
MSc3	Global Land Use Dynamics	10	none	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	Yes
MSc4	Ecosystem Dynamics and Global Change	10	none	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	Yes
MSc9	Scientific Writing	5	The module is completed without exam.		
	Master Thesis	25	Completion of modules MSc1-6 and MSc9	Writing of a scientific thesis with an extent of 90.000 to 110.000 characters (without space and without appendix), defence of thesis (presentation of ca. 30 minutes) with subsequent discussion (ca. 15 minutes)	yes
Subject-specific elective part⁷					
MSc5.1	Field Observation in Climatology and Hydrology	10	Completion of modules MSc1 and MSc2	Oral exam, 20 minutes or written exam, 90 minutes	yes

⁶ In the compulsory part all modules have to be completed.

⁷ In the subject-specific elective part modules with altogether 40 ECTS credits have to be completed.

MSc5.2	Earth Observation	10	Completion of modules MSc1 and MSc3	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc6.1	Spatial modelling of the human-environment systems	10	Completion of module MSc1	Term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc6.2	Systemic sustainability assessments of urban areas	10	Completion of module MSc1	Term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc7	Specialisation 1	10	Depending on selected module	Depending on selected module / module part	no
MSc8	Specialisation 2	10	Depending on selected module	Depending on selected module / module part	no
Free elective part (überfachlicher Wahlpflichtbereich)					
	In the free elective part a free choice of modules from the module catalogues of other subjects or central facilities have to be completed.	Altogether 10	The modules are completed according to the regulations of the other subjects resp. central facilities. The examination board of the Geographical Institute decides whether the achievements are considered.		The modules are considered without grade.

Free elective part (überfachlicher Wahlpflichtbereich) for other masters programmes

No. of module	Name of module	Credits of module	Subject-specific admission requirements for the exam	Type, duration/processing time/extent, possibly language of exam according to § 108 section 2 ZSP-HU	Grading
MSc2	Climate and Earth System Dynamics	10	none	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc3	Land System Dynamics	10	none	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc4	Ecosystem Dynamics and Global Change	10	none	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes

MSc5.1	Field Observation in Climatology and Hydrology	10	Completion of modules MSc1 and MSc2	Oral exam, 20 minutes or written exam, 90 minutes	yes
MSc5.2	Earth Observation	10	Completion of modules MSc1 and MSc3	Written exam, 90 minutes or oral exam, 30 minutes or term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc6.1	Spatial modelling of the human-environment systems	10	Completion of module MSc1	Term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc6.2	Systemic sustainability assessments of urban areas	10	Completion of module MSc1	Term paper, ca. 10 pages (ca. 15.000 to 20.000 characters without space and without appendix)	yes
MSc7	Specialisation 1	10	Depending on selected module	Depending on selected module / module part	no