Curriculum for the Master's Degree Programme Environmental Systems Sciences / Climate Change and Transformation Science

Please note: The English version of this document is a courtesy translation. Only the German version is legally binding.

The legal basis of the natural science Master's Degree Programme in "Environmental Systems Sciences / Climate Change and Transformation Sciences" is the Universities Act (in German: Universitätsgesetz, UG) and the statutes of the University of Graz. Only the curriculum written in German is legally valid.

On the 27th of April 2022, the Senate enacted the 1st amendment to the curriculum for the now renamed Master's Degree Programme in "Environmental Systems Sciences / Climate Change and Transformation Science" pursuant to § 25, para. 1, line 10 of the UG.

Table of Contents

§ 1 Subject matter, qualification profile and relevance of the degree programme

(1) Subject of the degree programme

The Master's Degree programme in „Environmental Systems Sciences / Climate Change and Transformation Science“ (ESS/CCTS) provides students with a research-based qualification that enables them to deal with natural and social science aspects of climate change and the transformation towards a sustainable, climate neutral and resilient society. This specialised qualification is supplemented by interdisciplinary and systems sciences competences, whereby a special emphasis is placed on the application of research-based methods. This education is complemented by an independently designed environmental module, which enables the student to establish an individual focus.

(2) Qualification profile and competences

Upon completing the Master's Degree Programme in „Environmental Systems Sciences / Climate Change and Transformation Science“ (ESS/CCTS), graduates are able to:

- apply the acquired relevant expertise in the subject areas of climate science, social science and economics, as well as to apply their advanced methodological competences in both relevant research projects and in practice, and to generate new knowledge;
- apply systems science methods to conceptualize and establish parameters for problem situations, as well as evaluate results and derive options for processing or action in relevant subject areas from these results;
- communicate at a high level in interdisciplinary teams together with representatives from other disciplines, work on projects related to climate, climate impacts and societal transformation and to jointly find possible solutions to complex problems;
- combine knowledge from different disciplines and, based on this, make competent decisions in complex and uncertain problem situations;
- discuss sustainability-related issues using well-founded arguments with affected target groups, employees and upstream agencies;
- apply the acquired skills in companies and enterprises as well as in the public sector or in NGOs and to either newly establish or further develop functional areas and strategies that will address both current and future challenges;
- independently deal with complex, unpredictable situations in a responsible managerial position, employing adequate sustainability-oriented strategies and measures, as well as to lead the process of applying strategic decisions.

(3) Demand for and relevance of the degree programme regarding science and the labour market

Climate change is one of the most relevant and timely societal challenges with potentially dramatic impacts on future generations. The need for a transformation towards an emission-free and climate-resilient society is becoming ever more evident. The solution of related problems requires, on one hand, understanding the climate system and, on the other hand, knowledge about economic and social relationships, processes and dynamics. An interdisciplinary collaboration of the involved disciplines is indispensable.
Owing to the combination of their in-depth knowledge in the fields of climate and transformation sciences, their repertoire of systems science and theoretical methods, and their ability to work in interdisciplinary teams, graduates of the Master's Degree Programme in „Environmental Systems Sciences / Climate Change and Transformation Science“ (ESS/CCTS) are perfectly qualified to contribute to the solution of these problems across a wide range of professional contexts.
Graduates of the programme typically find employment in academic, private, public and semi-public sectors:

- teaching and research at university level
- development of climate services in the public sector at municipality, state, national and international level, in international organisations, NGOs and in the private sector
- development of strategies and measures for climate change mitigation and adaptation, and for coping with loss and damage due to climate change and its impacts
- development and implementation of sustainability-related strategies and measures in the public sector
- development and implementation of strategies in the public and private sector on the path towards a greenhouse gas emission free economy and society

- environmental consulting and supervision of environmental protection facilities
- The Master's Degree in „Environmental Systems Sciences / Climate Change and Transformation Science“ entitles graduates to pursue PhD studies.

§ 2 General provisions

(1) Admission requirements

1 Graduates of the following previous degree programmes are eligible for admission to the Master's Degree Programme in „Environmental Systems Sciences / Climate Change and Transformation Science“ (ESS/CCTS):

a.
- Bachelor's Degree in Environmental Systems Sciences with specialisation in Natural Science/Technology within NAWI Graz
- Bachelor's Degree in Environmental Systems Sciences with specialisation in economics at the University of Graz
- Bachelor's Degree in Environmental Systems Sciences with specialisation in geography at the University of Graz

b.
- Programmes at a recognized domestic or foreign higher education institution amounting to at least 180 ECTS credits are generally considered equivalent to the relevant previous degree programmes if at least 90 ECTS credits have been earned from environmental systems sciences with a specialisation in either natural sciences/technology, economy or geography, including 6 ECTS credits in systems sciences.

2 Programmes other than those listed in paragraph 1 as well as programmes at recognized national or international higher education institutions amounting to at least 180 ECTS credits are in principle considered equivalent to the relevant previous degree programmes if at least 60 ECTS credits have been earned from one of the following areas:
- natural science programmes related to dynamical systems and physical climate science
- economics
- social sciences
- geography

Full equivalence with a relevant previous degree programme can be established by additional requirements from the programmes listed in paragraph 1, if these requirements do not exceed 30 ECTS credits.

3 Degree programmes that are not described in paragraph 2, or for which requirements would have to be granted equivalent to more than 30 ECTS credits in order to establish the equivalence with the degree programme in question are considered as not equivalent to the degree programme in question.

4 As a prerequisite for admission to the degree programme, evidence of proficiency in the English language must be provided, as this enables the student to successfully progress in the degree programme. The form of the evidence is specified in a regulation issued by the Rectorate.

(2) Duration and structure of the degree programme

The master's degree programme with a workload of 120 ECTS credits comprises four semesters and is structured in modules. The module descriptions can be found in Annex I.

Module Abbreviation and Module	ECTS
Module A: Interdisciplinary Practice	10
Module B: Systems Sciences	10
Module C: Onboarding	6
Module D: Climate Science *or* Module E: Transformation Science	30

Module F: Interdisciplinary Climate Science	9
Module G: Environmentally-oriented Elective Subject	18
Master Thesis	30
Master Exam	1
Free Electives	6
Total	**120**

(3) Academic Degree

Graduates of the Master's Degree Programme are awarded the academic degree of "Master of Science", abbreviated as "MSc".

(4) Number of possible participants in courses and ranking criteria

1 For educational-didactic and spatial reasons, which are influenced by considerations of the number of devices/equipment or safety, the number of participants in the individual course types may be limited:

Course type	Number of participants
Lecture (in German: Vorlesung, VO)	no restriction
Course (in German: Kurs, KS)	40
Working group (in German: Arbeitsgemeinschaft, AG)	20
Seminar (in German: Seminar, SE)	20
Lecture with Exercises (in German: Vorlesung mit Übung, VU)	60
Project (in German: Projekt, PT)	30

2 If the specified maximum number of participants is exceeded, students shall be admitted to the courses in accordance with the criteria of the URBI faculty's ranking procedure set out in the Senate Directive on the Allocation of Course Places in Courses with a Limited Number of Participants.

§ 3 Structure and outline of the degree programme

(1) Modules and exams

The modules and examinations are listed below with the module title, course title, course type, ECTS credits, contact hours and the recommended semester assignment. The module descriptions can be found in Annex I.

	Modules and exams	Course type	ECTS	Course hours	Rec. Sem.
Modul A	**Interdisciplinary Practice**		**10**	**6**	
A.1	IP – Interdisciplinary Practical Training	AG	10	6	3
Modul B	**Systems Sciences**		**10**	**6**	
B.1	Data in Systems Sciences	VO	3	2	1
B.2	Systems Modelling and Systems Analysis	VO	3	2	2
	One course has to be chosen from the courses B.3, B.4:				
B.3	Data in Systems Sciences	SE	(4)	(2)	(3)
B.4	Systems Modelling and Systems Analysis	SE	(4)	(2)	(3)

Modul C	**Onboarding**		**6**	**4**	
	Two courses have to be chosen from the following three courses:				
C.1	Introduction to the Climate System	VO	(3)	(2)	(1)
C.2	Introduction to Social Sciences	VO	(3)	(2)	(1)
C.3	Introduction to Economics	VO	(3)	(2)	(1)
	The specialisation of 30 ETCS credit points is possible either in module D Climate Science (D.1-D.3) or in module E Transformation Science (E.1-E.3).				
Module D	**Climate Science**		**30**		
Module D.1	**Theoretical Climate Science**		**9**	**6**	
D.1.1	Climate Dynamics	VO	3	2	1
D.1.2	Atmospheric Dynamics	VO	3	2	2
	One course has to be chosen from the courses D.1.3 and D.1.4.				
D.1.3	Physical Oceanography, Hydrology and Climate	VO	(3)	(2)	(2)
D.1.4	Paleoclimatology	VO	(3)	(2)	(2)
Module D.2	**Atmosphere and Climate Observations**		**6**	**4**	
D.2.1	Atmosphere and Climate Measurement Methods: In situ	VO	3	2	1
D.2.2	Atmosphere and Climate Measurement Methods: Remote Sensing	VO	3	2	2
Module D.3	**Methods for Climate Science**		**15**	8	
D.3.1	Mathematics for Climate Science	KS	2	1	1
D.3.2	Statistics and Time Series Analysis	VO	3	2	1
D.3.3	Special Topics in Climate Science Methods: Data Handling and Programming	KS	3	2	1
D.3.4	Analysis Methods in Climate Science	KS	4	3	2
D.3.5	Climate Modelling	VO	3	2	2
Module E	**Transformation Science**		**30**		
Module E.1	**Concepts in Transformation Science**		**9-12**	**6-8**	
E.1.1	Human Behaviour and Human-Nature Interactions	KS	3	2	1
E.1.2	Social-Ecological Systems Analysis	KS	3	2	1
	Either one or both of the courses E.1.3 and E.1.4 have to be chosen.				
E.1.3	Special Topics in Transformation Science: Climate and Energy Management	KS	(3)	(2)	(2)
E.1.4	Climate Change Economics	KS	(3)	(2)	(3)
Module E.2	**Methods in Transformation Science**		**9-12**	**4-6**	
	At least 9 ECTS credit points have to be chosen from the courses E.2.1 – E.2.5.				
E.2.1	Mathematics for Social-Ecological Systems Science	KS	(3)	(2)	(1)
E.2.2	Qualitative Research Methods and Transdisciplinarity	KS	(6)	(2)	(2)
E.2.3	Quantitative Research Methods: Computable General Equilibrium Modelling	KS	(6)	(3)	(1)
E.2.4	Quantitative Research Methods: Spatial Analysis	KS	(6)	(3)	(2)
E.2.5	Quantitative Research Methods: Complex Systems Modelling	KS	(6)	(3)	(2)

Module E.3	**Applications in Transformation Science**		**9**	**5**	
E.3.1	Research Project in Climate Resilience & Transformation Management	PT	6	3	3
E.3.2	Advanced Environmental and Climate Policy	KS	3	2	3
Module F	**Interdisciplinary Climate Science**		**9**	**6**	
F.1	Climate Risks	VU	4	2	2
F.2	Special Topics in Interdisciplinary Climate Science	SE	3	2	3
F.3	Master Seminar	SE	2	2	4
Module G	**Environmentally-oriented Elective Subject**		**18**		
	Module G – see § 3 para. 2				
	Master Thesis		**30**		**3-4**
	Master Exam		**1**		**4**
	Free Electives		**6**		
Total			**120**		

(2) Environmentally-oriented Elective Subject

To complete Module F, courses to the extent of 20 ECTS credits need to be attended and passed according to the following criteria

1. The module comprises an area of environment-relevant subjects with coordinated content. The module can be used to focus on the chosen specialisation (module D or E), to get deeper insight into the other specialisation, or to gain broader knowledge beyond both specialisations.
2. This environment-relevant subject area is taught in one or more courses, enabling students to examine the subject matter in detail.
3. These courses can be taken at any recognised domestic or foreign university, depending on the subject area.
4. The Environmentally-oriented Elective Subject must be assigned a unique title, which is to be stated on the master's degree certificate.
5. The chairperson of the Curricula Commission for Environmental Systems Sciences decides in advance whether the environmentally-oriented elective subject is admissible (title and courses) upon the student's request. The completed application form for the environmental elective subject should be submitted to the Coordination Office for Environmental Systems Science.

(3) Cross Faculty Master Module

Instead of modules G and 6 ECTS credits from the free electives, a cross-faculty module („Überfakultäres Modul“) can be chosen.

(4) Master Thesis

1. The topic of the master's thesis must be taken from one of the modules B, D, E, F or G or must be meaningfully related to one of these modules. The chairperson of the Curricula Commission for Environmental Systems Sciences decides about exceptions.
2. The master's thesis has to be registered in advance at the office of the URBI faculty's dean of studies, announcing the topic, the related module, and the supervisor.
3. The topic of the master's thesis cannot be taken from a cross-faculty module.

(5) Free Electives

1. It is recommended that the free electives be chosen from the following areas: courses on women's and gender studies, foreign languages, from the „Timegate“ portfolio, courses from the Center for Social Competence and the Center for Digital Teaching and Learning, as well as courses about leadership and philosophy of science.

2. Students are encouraged to gain practical employment experience as part of the free electives, where one week of full-time employment corresponds to 1.5 ECTS credits.

(6) Student mobility

Students are encouraged to study abroad during the master's degree programme period. An individual focus within module G 'Environmentally-oriented Elective Subject' is particularly suitable for this.

§ 4 Teaching and learning methods

(1) Teaching and learning methods

The master's degree programme „Environmental Systems Sciences / Climate Change and Transformation Science“ aims to be accessible for international students and to allow for a flexible daily schedule. To this end, a large fraction of online or hybrid teaching is incorporated. Here, different forms of working with online teaching platforms will be utilised including, e.g., assignments, reading with feedback options, short videos, recordings of lectures and block courses. The lecturer for each course is responsible for choosing a specific approach.

(2) Language

All courses and exams in the master’s degree programme „Environmental Systems Sciences / Climate Change and Transformation Science“ are held in English, and all assessments have to be conducted or written in English. Free electives can also be taken in languages other than English.

§ 5 Master Exam

The Master exam is an oral examination by committee, worth one ECTS credit point.

The examination committee consists of three persons, two of whom act as examiners and one as chair.

The Master exam consists of a public presentation of the Master thesis (max. 20 min.), the defence of the Master thesis (max. 20 min.) and an oral exam on topics from one of the following modules (max. 20 min.):

- Module B: Systems Sciences
- Module D.1: Theoretical Climate Science
- Module D.2: Atmosphere and Climate Observations
- Module D.3: Methods for Climate Science
- Module E.1: Concepts in Transformation Science
- Module E.2: Methods in Transformation Science
- Module E.3: Application in Transformation Science
- Module F: Interdisciplinary Climate Science
- Module G: Environmentally-oriented Elective Subject

A uniform grade should be awarded for the master's examination, which also takes into account the overall impression made by the student during the examination.

§ 6 Entry into force of the curriculum and transitional provisions

This Curriculum shall enter into force on 1 October 2022 (Curriculum 2022).

Annex I: Module descriptions

Module A	Interdisciplinary Practice
ECTS credits	**10 ECTS**
Contents	• Advanced concepts of analysis, modelling and assessment of human-environment systems • Inter- and transdisciplinary methods • Practical course based on an inter- or transdisciplinary • problem in the field of applied environmental research
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • analyse inter- and transdisciplinary problems relevant to the environment and solve them by applying suitable methods • present approaches to solutions/results that have been worked out understand and classify other disciplinary approaches and perspectives • review and assess specialised literature • critically question ideas and models, evaluate them and develop new ones • independently plan the continuing education process • communicate and work in interdisciplinary teams • analyse problems holistically.
Teaching and learning methods	Theoretical input from teachers as well as guest lectures, group work, collaboration, detailed analysis of selected literature, computer demonstrations, explanation of concepts using specific examples, individual and joint writing projects to produce an academic report or paper.
Frequency of the course	Every semester

Module B	Systems Sciences
ECTS credits	**10 ECTS**
Contents	• Conceptual, mathematical and computer-based system modelling • Understand scenarios and concepts that enable them to integrate natural and social sciences and apply them to case studies • Evaluate systems from a sustainability perspective • Review and summarize technical literature • Present findings clearly, both verbally and in writing • Work in an interdisciplinary way • Critically question ideas and models, evaluate them and develop new ones and • Independently plan the continuing education process.
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • model systems • understand scenarios and concepts that enable them to integrate natural and social sciences and apply them to case studies • evaluate systems from a sustainability perspective • review and summarize technical literature • present findings clearly, both verbally and in writing • work in an interdisciplinary way • critically question ideas and models, evaluate them and develop new ones and • independently plan the continuing education process.
Teaching and learning methods	Lectures, ongoing homework, collaboration, detailed analysis of selected literature, computer demonstrations, writing papers,

	explanation of concepts using specific examples.
Frequency of the course	Every semester

Module C	**Onboarding**
ECTS credits	**6 ECTS**
Contents	• Introduction to the scientific fundamentals of the specialisation which has not been chosen. • Introduction to meteorology and climatology • Introduction to social sciences • Introduction to economics
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • explain content, research questions and fundamental methodological approaches of the specialisation that they did not choose, and to explain other disciplinary aspects and perspectives and to put them into context, • explain and qualitatively describe fundamental meteorological and climatological phenomena, relationships and changes • describe central concepts, qualitative and quantitative methods of social sciences, and the relationships between established fields of social science and system sciences • describe fundamental economic and socio-economic concepts, relationships and metrics • review and assess specialised literature.
Teaching and learning methods	Lecture, discussion
Frequency of the course	Every year

Module D.1	**Theoretical Climate Science**
ECTS credits	**9 ECTS**
Contents	• Introduction to the dynamical processes in the atmosphere and their physical-mathematical description • Introduction to the components and processes of the climate system and their interactions, as well as their physical-mathematical description • Introduction to climate variabilities on time scales of months to millions of years and their drivers.
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • explain the theoretical physical-mathematical foundations of atmospheric and climate dynamics • identify, explain and mathematically describe specific dynamical processes in the atmosphere • explain interactions and feedbacks in the climate system, and mathematically describe their foundations • explain cycles and radiative and energy balance in the climate system, and mathematically describe their foundations • interpret climate variabilities on different time scales, and attribute these to internal or external drivers • review and assess specialised literature.
Teaching and learning methods	Lecture, discussion, individual and group assignments, example calculations, exercises, literature research
Frequency of the course	Every year

Module D.2	Atmosphere and Climate Observations
ECTS credits	**6 ECTS**
Contents	• Introduction to the theoretical and physical fundamentals of measurements and instruments • Treatment of measurement uncertainties and calibration theory • Overview of in-situ and remote sensing methods and their applications in atmospheric and climate research • Overview of sensor- and instrument types, measurement principles and measurement geometries • Overview of global and regional observational networks
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • to name, classify, explain and discriminate between important atmospheric measurement methods • relate measurement principles to fundamental physical and chemical processes • discuss advantages and disadvantages of individual methods • select suitable observing systems for practical applications • estimate and interpret measurement uncertainties
Teaching and learning methods	Lecture, discussion
Frequency of the course	Every year

Module D.3	Methods for Climate Science
ECTS credits	**15 ECTS**
Contents	• Applied vector analysis and partial differential equations • Fundamentals of probability theory, inferential statistics, stochastics and statistical time series analysis • Practical application of analysis methods from climate research, handling of big datasets • Hands-on sessions on programming • Principles of climate modelling • Overview of different climate models, their performance and application in different contexts
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • mathematically describe spatial-temporal dynamical problems, • formulate, assess and formally address statistical problems • analyse large climate datasets with complex statistical methods, and interpret the results • assess the performance and uncertainties of climate simulations
Teaching and learning methods	Lecture, discussion, individual and group assignments, example calculations, exercises, literature research, computer exercises
Frequency of the course	Every year

Module E.1	Concepts in Transformation Science
ECTS credits	**9-12 ECTS**
Contents	• Current theories of human behaviour as they relate to sustainability. • Socio-ecological systems as complex adaptive systems. • Issues of inequality, distribution, and equity, including gender perspectives • Theory of resilience and critical transitions in social-ecological systems • Introduction to societal metabolism: energetic and material foundations of society • Relationships between societal metabolism, human development, and environmental change • Key concepts in climate economics: externalities, public goods, social cost of carbon, valuation of instruments and policies • Central models of climate economics: integrated assessment models, structural models, empirical models • Aspects of inequality, distribution and equity issues, incl. gender aspects
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • distinguish between systems thinking and reductionism and analyse socio-ecological systems using systems thinking. • describe the relationships between sustainability requirements and issues of inequality, distribution, and equity. • assess the resilience of systems and apply resilience principles • explain key concepts in socio-metabolic analysis • explain basic concepts of climate economics, including the added value of a macroeconomic perspective • discuss the advantages and disadvantages of different climate economics models • identify the limitations of available concepts and theories • explain possible implications of the concepts and theories learned for successful policy implementation
Teaching and learning methods	(Instructional) lecture, individual work, presentation, group work, discussion, exercise
Frequency of the course	Every year

Module E.2	Methods in Transformation Science
ECTS credits	**9-12 ECTS**
Contents	• Methods of optimization • Differential equations and dynamical systems • Applied general equilibrium modelling • Spatial analysis and econometrics • Qualitative Methods • Modelling of complex networks • Computer modelling methods • Transdisciplinary methods
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • apply specific quantitative and/or qualitative research methods • describe problems mathematically • choose the most appropriate methods to answer a given research question • acquire relevant data • identify the weaknesses and limitations of the methods learned • explain research results in a generally understandable way

Teaching and learning methods	(Instructional) lecture, individual work, presentation, group work, discussion, calculation examples, exercise, programming
Frequency of the course	Every year

Module E.3	**Applications in Transformation Science**
ECTS credits	**9 ECTS**
Contents	• Empirical problems in environmental governance and policy. • Case studies of socio-technical transition • Introduction to environmental policy: instruments, measures, policy mixes, application to case studies • Applications of concepts and research methods to solve empirical problems in natural resource management • Linking theory and empirics • Empirical data analysis • Organization and management of the scientific process • Scientific writing • Inter- and transdisciplinarity
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • explain selected concepts and methods • link theory and empiricism and select appropriate research methods • develop empirical research • organize and manage the scientific research process • write up and present empirical research findings • to work with different stakeholder groups
Teaching and learning methods	(Instructional) lecture, independent work, presentation, group work, discussion.
Frequency of the course	Every year

Module F	**Interdisciplinary Climate Science**
ECTS credits	**9 ECTS**
Contents	• Climate change risks • Climate change adaptation • Climate change mitigation • Timely questions of interdisciplinary climate research • Aspects of inequality, distributional and justice issues, including gender aspects
Objective (expected results of the degree programme and acquired competences)	After completing this module, students will be able to: • assess climate risks • formulate and assess climate change adaptation measurements • discuss interdisciplinary questions of climate research • work in interdisciplinary teams of physical climate scientists and social scientists
Teaching and learning methods	Lecture, discussion, individual and group assignments, presentations, exercises, literature research, writing a report or paper
Frequency of the course	Every year

Annex II: Sample degree programmes structured by semester

Possible curriculum with specialisation in module D:

Semester	Course title / exams	ECTS
1		**30**
B.1	Data in Systems Sciences	3
C.2	Introduction to Social Sciences	3
C.3	Introduction to Economics	3
D.1.1	Climate Dynamics	3
D.2.1	Atmosphere and Climate Measurement Methods: in situ	3
D.3.1	Mathematics for Climate Science	2
D.3.2	Statistics and Time Series Analysis	3
D.3.3	Special Topics in Climate Science Methods: Data Handling and Programming	3
G	Environmentally-oriented Elective Subject	4
H	Free Electives	3
2		**30**
B.2	Systems-Modelling and Systems-Analysis	3
D.1.2	Atmospheric Dynamics	3
D.2.2	Atmosphere and Climate Measurement Methods: Remote Sensing	3
D.1.3 D.1.4	Physical Oceanography, Hydrology and Climate *or* Paleoclimatology	3
D.3.4	Analysis Methods in Climate Science	4
D.3.5	Climate Modelling	3
F.1	Climate Risks	4
G	Environmentally-oriented Elective Subject	7
3		**30**
A.1	IP - Interdisciplinary Practical Training	10
B.3 B.4	Data in Systems Sciences *or* Systems Modelling and Systems-Analysis	4
F.2	Special Topics in Interdisciplinary Climate Science	3
G	Environmentally-oriented elective subject	7
H	Free Electives	3
	Master Thesis	3
4		**30**
F.3	Master Seminar	2
	Master Thesis	27
	Master Exam	1

Possible curriculum with specialisation in module E:

Semester	Course title / exams	ECTS
1		**30**
B.1	Data in Systems Sciences	3
C.1	Introduction to the Climate System	3
C.2	Introduction to Social Sciences	3
E.1.1	Human Behaviour and Human-Nature Interactions	3
E.1.2	Social-Ecological Systems Analysis	3
E.2.3	Quantitative Research Methods: Computable General Equilibrium Modelling	6
G	Environmentally-oriented Elective Subject	6
H	Free Electives	3
2		**30**
B.2	Systems Modelling and Systems-Analysis	3
E.1.3	Special Topics in Transformation Science: Climate and Energy Management	3
E.2.2	Qualitative Research Methods and Transdisciplinarity	6
F.1	Climate Risks	4
G	Environmentally-oriented Elective Subject	11
H	Free Electives	3
3		**30**
A.1	IP - Interdisciplinary Practical Training	10
B.3 *or* B.4	Data in Systems Sciences *or* Systems Modelling and Systems-Analysis	4
E.3.1	Research Project in Climate Resilience & Transformation Management	6
E.3.2	Advanced Environmental and Climate Policy	3
F.2	Special Topics in Interdisciplinary Climate Science	3
G	Environmentally-oriented Elective Subject	1
	Master Thesis	3
4		**30**
F.3	Master Seminar	2
	Master Thesis	27
	Master Exam	1