A Begründung

- *Integration der bisherigen Module "Ecosystem and Model development"(Theorieteil) und "Global Change: Modelling and Advanced Techniques" (Praxisteil).*
- *Einführung eines neuen Pflichtmoduls „Research in Ecology" zum wissenschaftlichen Arbeiten.*
- *neues Optionsmodul zu Global Change-Forschungsmethoden (Feldübung).*
- *Neue Optionsmodule*

B Änderungsbeschluss

***Fünfter* Beschluss**
zur Änderung der Speziellen Ordnung für den Master-Studiengang „Global Change: Ecosystem Science and Policy" des Fachbereichs 08 – Biologie und Chemie und der School of Biology and Environmental Science des University College Dublin

Aufgrund von § 44 Abs. 1 Nr. 1 des Hessischen Hochschulgesetzes vom 14. Dezember 2009 hat der Fachbereichsrat des Fachbereichs 08 – Biologie und Chemie am 25.01.2017 die nachstehenden Änderungen beschlossen:

Art. 1
Änderungen

Die Spezielle Ordnung für den Masterstudiengang „Global Change: Ecosystem Science and Policy" vom 27.07.2012, zuletzt geändert durch Beschluss vom 27.01.2016, wird wie folgt geändert:

I. In der Anlage 2 (Modulbeschreibungen) erhält die Modulübersicht folgende Fassung:

UCD	**Core modules**	**Code**	**Credits**
	Quantitative Methods for Engineers	STAT40690	5
	Plant-Atmosphere Climate Interaction	BOTN40180	5
	Global Change – Introduction	ENVB40130	5
	Science and Policy	BIOL40140	5
	Environmental Impact Assessment	ENVB40040	5
	Environmental Law and Policy	LAW30440	5
	Optional modules		**5**
	a) Biodiversity	ZOOL40010	5
	b) Peatland and Environmental Change	ENVB40040	5
	Total CP in UCD for taught modules		**35**
JLU	**Core modules**	**Code**	**Credits**
	Global Change: Modelling and Advanced Techniques	M-GC-GCM	5
	Research in Ecology	M-GC-RIE	3
	Policy Consultancy	M-GC-PBR	6
	Resource Economics and Environmental Management	M-GC-REM	6
	Biodiversity Informatics	M-GC-BDI	3
	Man in Past Climates and Climate Change Impacts	M-GC-MPC	6
	Optional modules		**6**

	a) Scientific Presentations in Ecology	M-GC-SEM	3
	b)Methods in Global Change Research	M-GC-MGC	3
	c) Human Health Impacts of Climate Change: the International Dimension	M-GC-CCH	6
	d) Adaptation to Global Change	M-GC-AGC	3
	e) Stress Ecology	M-GC-STE	3
	f) Team Work	M-GC-TEA	3
	g) Political Consulting – Environmental Policy and Development Cooperation	M-GC-PCE	6
	Total CP in JLU for taught modules		**35**
	Module 'Work Placement'	UCD	20
	Module 'Research Project/Thesis'	UCD	30
	Total Number of CP		**120**

II. In der Anlage 2 (Modulbeschreibungen) werden folgende Module neu hinzugefügt:

MS-GC-GCM	**Global Change**	**2. Sem.**	**5 CP**
Module title	**Global Change: Modelling and Advanced Techniques**		
Module code	MS-GC-GCM		
Start semester	Summer semester 2018 V1		
Faculty / Subject / Department	*08/Biology/Institute of Plant Ecology*		
Associated with degree course(s) / Semester taken	*MSc. Global Change: Ecosystem Science and Policy / 2nd semester* *MSc. Biology / 2nd semester*		
Module coordinator	Prof. Christoph Müller, PhD		
Prerequisites	-		
Learning outcomes	Students • Have knowledge of current global change issues • Have the ability to plan ecological experiments, to interpret results and evaluate, discuss and present them adequately • Understand scientific problems and know how to structure and analyse them • Are able to construct mathematical models in ecology • Are able to use techniques for programming mathematical models. • Are able to apply models for the analysis of biological systems. • Have the ability to organize their own current scientific literature.		
Module contents	• Structure of ecological systems and its mathematical development • Measure and analyse data of ecological experiments • Programming of models • Illustration and validation of model results • Current state-of-the-art scientific knowledge on Global Change Science • Quantification of global nutrient cycles using stable isotope. • Numerical methods to describe mathematical models in ecosystem science		
Class format	lecture (25 %), seminar (15 %), practical (60 %)		
Methods of assessment	Final module examination		
Workload: Total workload, credit points	150 h, 5 CP		
Workload: consisting of A Courses	lecture	seminar	practical
Workload: Aa Contact hours	10	7	30
Workload: Ab Preparation / revision	15	8	30

	B Autonomous work	30
	C Examination with preparation	20
Examination	Examination prerequisites	
	Methods of assessment	Report, seminar presentation
	Module retake examination	Report (100 %)
	Final module mark	Report (60%), seminar presentation (40%)
Frequency, duration in semesters		Annual 4 weeks summer semester
Intake capacity		16
Language of instruction		English
Comments		

MS-GC-RIE	**Research in Ecology**	**2. Sem.**	**3 CP**
Module title	**Research in Ecology**		
Module code	MS-GC-RIE		
Start semester	Summer semester 2018, V1		
Faculty / Subject / Department	*08/Biology/Institute of Plant Ecology*		
Associated with degree course(s) / Semester taken	*MSc. Global Change: Ecosystem Science and Policy / 2nd semester* *MSc. Biology / 1st-4th semester*		
Module coordinator	Prof. Christoph Müller		
Prerequisites	-		

Learning	Students • Are able to use literature databases • Have the ability to have a scientific conversation in English • Know the structure of theses and scientific papers • Know how to present scientific results at international conferences in form of a poster/oral presentation
Module contents	• Efficient organization of scientific literature in literature databases • Methods to present scientific results (oral and written presentations) • Typical feature of presentations in English • Structure of scientific papers (peer-reviewed journals) and theses • Presentation and practice of scientific results at international scientific conferences (poster and oral presentations)

Class format		Seminar		
Methods of assessment		Final module examination		
Workload	Total workload, credit points	90 h, 3 CP		
	consisting of A Courses	seminar		
	Aa Contact hours	30		
	Ab Preparation / revision			
	B Autonomous work	40		
	C Examination with preparation	20		
Examina	Examination prerequisites			
	Methods of assessment	Presentation in form of an oral conference presentation Report in form of a scientific paper		

	Module retake examination	Presentation in form of an oral conference presentation (50%) Report in form of a scientific paper (50%)
	Final module mark	Presentation in form of an oral conference presentation (50%) Report in form of a scientific paper (50%)
Frequency, duration in semesters		annual 1 semester Summer semester
Intake capacity		16
Language of instruction		English
Comments		

MS-GC-MGC		**Methods in Global Change**	**2. Sem.**	**3 CP**
Module title		**Methods in Global Change Research**		
Module code		MS-GC-MGC		
Start semester		Summer semester 2018		
Faculty / Subject / Department		*08/Biology/Department of Plant Ecology*		
Associated with degree course(s) / Semester taken		*MSc. Global change: Ecosystem Science and Policy / 2nd semester* *MSc. Biology / 2nd – 3rd semester*		
Module coordinator		Prof. Christoph Müller, PhD		
Prerequisites		-		
Learning outcomes		Students - have good knowledge of ecophysiology, system ecology and microbial ecology, - know the most important methods in autecology and synecology, - know matter of transformation processes and nutrient cycles on community and ecosystem level, - have the ability to organize on their own current scientific literature, - have the ability to plan ecological experiments, to interpret results and evaluate, discuss and present them adequately.		
Module contents		- Photosynthesis of plants and communities in relationship to abiotic factors and climate change (e.g. increasing CO_2 concentrations and air temperature). - C and N transformations in terrestrial ecosystem (e.g. permanent grassland). - Energy and matter fluxes in permanent grassland. - Interactions between vegetation and soil. - Statistical method in aut- and synecology.		
Class format		Lecture, practical		
Methods of assessment		Final module examination		
Workload	Total workload, credit points	90 h, 3 CP		
	consisting of A Courses	Lecture	Practical	
	Aa Contact hours	10	20	
	Ab Preparation / revision	10	10	
	B Autonomous work	20		
	C Examination with preparation	20		
Examination	Examination prerequisites	-		
	Methods of assessment	Report		
	Module retake examination	Report 100 %		
	Final module mark	100 % report		
Frequency, duration in semesters		Each year 2 weeks Summer semester		
Intake capacity		16		

Language of instruction	English
Comments	

MS-GC-TEA	**Team Work**	**2. Sem.**	**3 CP**
Module title	**Team Work**		
Module code	MS-GC-TEA		
Start semester	Summer semester 2018		
Faculty / Subject / Department	*08/Biology*		
Associated with degree course(s) / Semester taken	*MSc. Global change: Ecosystem Science and Policy / 2nd semester* *MSc Biology / 3rd -4th semester*		
Module coordinator	Examination board MSc Global Change		
Prerequisites	-		
Learning	Students will - be able to handle questions in the team - be able present a question properly and credibly in the team - be able to integrate results from different disciplines in the team - acquire social skills.		
Module contents	- Handling of integrative question in the team - Combination of results from individual disciplines - Division of labour within the team - Training in modern media techniques - Demonstration of training to a third party		
Class format	Practical work in small groups (50%), seminars (50%)		
Methods of assessment	Final module examination		
Workload: Total workload, credit points	90 h, 3 CP		
Workload: consisting of A Courses	Practical	Seminars	
Workload: Aa Contact hours	45	5	
Workload: Ab Preparation / revision		20	
Workload: B Autonomous work			
Workload: C Examination with preparation	20		
Examination: Examination prerequisites	-		
Examination: Methods of assessment	Presentation		
Examination: Module retake examination	Presentation 100 %		
Examination: Final module mark	100 % Presentation		
Frequency, duration in semesters	Each year 2 weeks Summer semester		
Intake capacity	16		
Language of instruction	English		
Comments			

MS-GC-AGC	**Adaptation to Global Change**	**2. Sem.**	**3 CP**
Module title	**Adaptation to Global Change**		
Module code	MS-GC-AGC		

Start semester		Summer semester 2018		
Faculty / Subject / Department		*08/Biologie/Institute of Plant Ecology*		
Associated with degree course(s) / Semester taken		*MSc. Global Change: Ecosystem Science and Policy / 2nd semester* *MSc Biology / 2nd semester*		
Module coordinator		Prof. Christoph Müller, PhD		
Prerequisites		-		
Learning outcomes		The Students • Have fundamental understanding of plant environment interactions • Know the influence of global change on plant growth and health in terrestrial ecosystems • Gain insights into the effects of global change on plants, populations and ecosystems • Learn how global change (global warming, elevated CO_2 concentration, land use change) interacts with different stress factors • Are able to design simple experiments to study global change impacts on plants and ecosystems • Acquire skills in the interpretation of scientific literature about global change impacts and plant and ecosystem adaptations • Are able to present and discuss actual scientific research results on the impact of global change and the adaptation of plants and ecosystems		
Module contents		• Insemination of the actual state of research on the subject ecological global change impact, mitigation and adaptation • Change of stress factors related to global change: i) abiotic factors: water availability, temperature, frequency of extreme events, shift of climate zones; ii) biotic factors: competition, shift of vegetation zones, • Adaptation potions to global change for plants and ecosystems: Interaction of bio- and functional diversity and vulnerability of plants and ecosystems (stress escape, tolerance and avoidance, e.g. species shift), conservation aspects		
Class format		Lecture, Practical		
Methods of assessment		Final module examination		
Workload	Total workload, credit points	90 h, 3 CP		
	consisting of A Courses	Lecture	Practical	
	Aa Contact hours	10	14	
	Ab Preparation / revision	20	26	
	B Autonomous work			
	C Examination with preparation	Report 8 h, Seminar presentation 12 h		
Examination	Examination prerequisites	-		
	Methods of assessment	Report, presentation		
	Module retake examination	Report (100%)		
	Final module mark	Report (50%), presentation (50%),		
Frequency, duration in semesters		Annual 2 weeks block Summer Semester		
Intake capacity		16		
Language of instruction		English		
Comments				

MS-GC-STE	**Stress Ecology**	**2. Sem.**	**3 CP**
Module title	**Stress Ecology**		
Module code	MS-GC-STE		
Start semester	Summer semester 2018		
Faculty / Subject / Department	*08/Biologie/Institute of Plant Ecology*		

Associated with degree course(s) / Semester taken		*MSc. Global Change: Ecosystem Science and Policy / 2nd semester* *MSc Biology / 2nd semester*		
Module coordinator		Prof. Christoph Müller		
Prerequisites		-		
Learning outcomes		*The students* - *have basic understanding for the relations of plant with its environment* - *know the influence of abiotic and biotic stress factors on the biocoenosis and biotope* - *understand the intermezzo between biotic und abiotic factors during the adjustment of plants to stressful conditions* - *learn the strategies of plants to adjust at stressful conditions: Escape and Resistance (Avoidance and Tolerance)* - *are able to design simple experiments to validate the impact of abiotic and biotic stress factors on single plants populations, communities and ecosystems* - *acquire skills in the autonomous dealing with actual research literature about Soil-Plant-Atmosphere Continuum (SPAC)* - *are able to present and discuss results of modern academic research on the impact of stress on single plants, populations, communities and ecosystems*		
Module contents		insemination of the actual state of research on the subject stress ecology Stressors in the environment: biotic and abiotic stressors radiation, temperature, water, pollution (salinity, heavy metals, gaseous noxa), competition Strategies of plants to adjust on different levels of organization: Escape (ephemerals), Avoidance (homeostasis) and Tolerance (truly resistant)		
Class format		Lecture, practical		
Methods of assessment		Final module examination		
Workload	Total workload, credit points	90 h / 3 CP		
	consisting of A Courses	A lecture	B practical	
	Aa Contact hours	10	14	
	Ab Preparation / revision	20	26	
	B Autonomous work			
	C Examination with preparation	report 8 h, presentation 12 h		
Examination	Examination prerequisites	-		
	Methods of assessment	Report and presentation		
	Module retake examination	Report (100%)		
	Final module mark	Report (50%) and presentation (50%)		
Frequency, duration in semesters		Annual Two weeks block Summer semester		
Intake capacity		16		
Language of instruction		English		
Comments				

STAT40690	**Quantitative Methods for Engineers**	**1. Sem.**	**5 CP**
Module title	Quantitative Methods for Engineers		
Module code	STAT40690		
Start semester	winter semester 2017		
Faculty / Subject / Department	UCD, School of Mathematics and Statistics		
Associated with degree course(s) / Semester taken	MSc. Global change: Ecosystem Science and Policy / 1st semester		

Module coordinator		Dr Damien McParland		
Prerequisites		This module is aimed at all students who are studying for Masters programmes. Students may or may not have prior exposure to Statistics and Research Methods.		
Learning	Students will be able to critically assess studies in the literature and will be able to compute relevant descriptive statistics, conduct hypothesis tests and apply basic regression models to data. They will also be required to conduct a study of their own during the course. The course will also have a lab component where students will become familiar with the use of statistical software. Finally they will gain experience in writing a research report.			
Module contents	The module will introduce students to the fundamental principles of probability and statistics including data collection with an emphasis on Engineering. The main content of the module will be: - Descriptive statistics and data collection - Review of Probability Laws and Basic Distributions - Estimation methods - Sampling distributions and assessing uncertainty in estimates - Hypothesis testing - Regression - Design of experiments and analysis of variance - Statistical methods for quality control Weeks 6-12 will be more applied in nature and will provide students with the skills required to complete basic statistical analyses.			
Class format		Lectures/Computer Lab		
Methods of assessment		Final module examination		
Workload	Total workload, credit points	125 h, 5 CP		
	consisting of A Courses	Lectures/Computer Lab		
	Aa Contact hours	24		
	Ab Preparation / revision	101		
	B Autonomous work			
	C Examination with preparation			
Examination	Examination prerequisites			
	Methods of assessment	Continuous Assessment: Experimental design and analysis, Examination: Final examination (2 hour End of Semester Exam)		
	Module retake examination	According to UCD module retake regulations		
	Final module mark	Continuous Assessment: Experimental design and analysis (30 %), Examination: Final examination (70%)		
Frequency, duration in semesters		Each year	1 semester	Winter semester
Intake capacity		16		
Language of instruction		English		
Comments				

III. Die Module „Ecosystem and model development“, “Global Change: advanced techniques”, “Plant-Soil-Atmosphere Interactions” und “Core Skills for Research” werden gestrichen.

IV. § 32 wird wie folgt neu gefasst:

„§ 32 (zu § 40 AllB) Inkrafttreten und Übergangsbestimmungen

Diese Ordnung in der Fassung des 5. Änderungsbeschlusses vom 25.01.2017 gilt für alle Studierenden, die den Studiengang ab dem Wintersemester 2017/18 beginnen.“

Art. 2
Inkrafttreten

Dieser Beschluss tritt am Tage nach seiner Verkündung in Kraft. Der neue Wortlaut der geänderten Ordnung wird in den Mitteilungen der Universität Gießen bekannt gemacht.