

Spezielle Ordnung für den Master-Studiengang Global Change: Ecosystem Science and Policy Anlage 2: Modulbeschreibungen In der Fassung des 3. Beschlusses vom 04.02.2015	01.10.2012	7.36.08 Nr.4	S. 1
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Overview

UCD	Core modules	Code	Credits
	Core Skills for Research	BIOL40010	5
	Plant-Atmosphere Climate Interaction	BOTN40180	5
	Global Change – Introduction	ENVB40130	5
	Science and Policy	BIOL40140	5
	Environmental Impact Assessment	ENVB40040	5
	European Environmental Policy	PEP40560	5
	Optional modules		5
	a) Biodiversity	ZOOL40010	5
	b) Peatland and Environmental Change	ENVB40040	5
	c) Global Change and Green Issues	BIOL40110	5
	Total CP in UCD for taught modules		35

JLU	Core modules	Code	Credits
	Plant-Soil-Atmosphere Interactions	M-GC-PSA	5
	Ecosystem and Model development	M-GC-ÖUM	3
	Policy Consultancy	M-GC-PBR	6
	Resource Economics and Environmental Management	M-GC-REM	6
	Biodiversity Informatics	M-GC-BDI	3
	Reconstructiong Palaeoenvironments and Paleoclimates	M-GC-PAL	6
	Optional modules		6
	a) Scientific Presentations in Ecology	M-GC-SEM	3
	b) Evolutionary Biology	M-GC-EVO	3
	c) Human Health Impacts of Climate Change: the International Dimension	M-GC-CCH	6
	d) Global Change – Advanced Techniques	M-GC-GCE	3
	Total CP in JLU for taught modules		35

Module 'Work Placement'	UCD	20
Module 'Research Project/Thesis'	UCD	30

Total Number of CP **120**

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UCD - Core modules:

ENVB40130	Global Change Ecology – Introduction		Winter	5 CP	
Title of module	Global Change Ecology – Introduction				
Code of module	ENVB40130				
Faculty / study program / Institution	UCD, Environmental Biology				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Prof. Thomas Bolger				
Prerequisites	None				
Course aims	Introduction to global change as a many-faceted process arising from human and natural activities. Topics covered include elevated concentrations of atmospheric CO ₂ , enhanced levels of nitrogen deposition, changes in land use, biodiversity loss and global warming. The background is set through descriptions of the diversity of terrestrial systems, the differences between terrestrial and aquatic systems and the importance of climate in determining the distribution and functioning of terrestrial systems.				
Course content	<p>What will the student learn?</p> <p>On completion of this module students should:</p> <ul style="list-style-type: none"> - Understand the ecosystem concept; - Appreciate the differences between terrestrial and aquatic ecosystems; - Understand the drivers of global change; - Understand the consequences of global change. 				
Class format	Lecture and practice				
Workload	112 h			Credit-Points: 5 CP	
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post-processing, LN			
	Lecture	18			
	Practical	9			
	Field Trip	5			
	Total	32	80		112
Examination format	Essay on aspects of global change (25%); end of course examination (50%) and report from fieldtrip (25%)				
Grading					
Repetition					
Availability	Winter, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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BIOL40010	Core Skills for Research		Winter	5 CP	
Title of module	Core Skills for Research				
Code of module	BIOL40010				
Faculty / study program / Institution	UCD, Biology				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Dr Jonathan Yearsley				
Prerequisites	None				
Course aims	This module aims to equip MSc students with the skills required for completion of a research project, including critical review of primary literature in the field of biology and environmental science and design and analysis of biological and environmental experiments. Instruction will also be provided in the key skills required to succeed in job applications.				
Course content	<p>What will the student learn?</p> <p>The student will learn to</p> <ul style="list-style-type: none"> - critically review an article of primary scientific literature in the field of biology and environmental science, - design a biological / environmental experiment, taking due account of independence, allocation of replicates and controls, - select and undertake basic univariate analyses using a widely available software package, - select multivariate analyses appropriate for analysis of a range of data sets and objectives, - construct an effective job application (CV and cover letter) and approach an interview in a professional manner. 				
Class format	Lecture and practice				
Workload	111 h		Credit-Points: 5 CP		
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post processing, LN			
	Lecture	20			
	Practical	12			
	Computer Aided Lab	4			
	Specified Learning Activities	12			
	Total	48	63		111
Examination format	Experimental design and analysis (30%), written exam (70%)				
Grading					
Repetition					
Availability	Winter, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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BOTN40180	Plant-Atmosphere Climate Interaction		Winter	5 CP	
Title of module	Plant-Atmosphere Climate Interaction				
Code of module	BOTN40180				
Faculty / study program / Institution	UCD, Botany				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Dr Jennifer McElwain				
Prerequisites	None				
Course aims	<p>We are currently experiencing major changes in our climatic and atmospheric environment. Conservative estimates project that the concentration of greenhouse gas carbon dioxide will double by the end of this century and global temperatures are expected to rise by 1 to 4 °C. A major issue facing the scientific and political community is how these projected changes will influence natural ecosystems, plant and animal ecology and biodiversity. This course will explore examples of plant-atmosphere and plant-climate interactions in the geological past, in the more recent past of Quaternary glacial-interglacial cycles and from experimental studies of the present day. The course will provide a framework for understanding the nature and scale of evolution, adaptation and eco-physiological responses of plants to their atmospheric and climatic environment.</p>				
Course content	<p>The learning objectives of this course are:</p> <ul style="list-style-type: none"> - to understand plant evolution over the past 3700 million years (with specific emphasis on land plant evolution over the past 500 million years). - to understand fossil plant responses to environmental extremes associated with mass extinction events in Earth history. - to understand global, regional, local and individual level responses to past, present and likely future atmospheric CO₂ concentrations. 				
Class format	Lecture and practice				
Workload	106 h		Credit-Points: 5 CP		
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post processing, LN			
	Lecture	12			
	Conversation Class	4			
	Specified Learning Activities	40			
	Total	56	50		106
Examination format Grading Repetition	Short in class presentation on research paper 30%; end of semester essay style examination (70%)				
Availability Duration	Winter, each year one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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PEP40560	European Environmental Policy		Winter	5 CP	
Title of module	European Environmental Policy				
Code of module	PEP40560				
Faculty / study program / Institution	UCD, Geog, Planning & Env Policy				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Dr Finbarr Brereton				
Prerequisites	None				
Course aims	<p>On successful completion of the course, students will be able to:</p> <ul style="list-style-type: none"> • Demonstrate advanced knowledge of the origin of EU Environmental Policy, • Demonstrate an advanced understanding of current EU Environmental Legislation , • Demonstrate knowledge of policy instruments that can be employed in relation to EU Environmental Policy, • Demonstrate knowledge of policy dilemmas caused by Climate Change and formulate policy responses to these problems, • Develop self-directed learning skills. 				
Course content	<p>This module will comprehensively address European Union Environmental Policy under the following headings:</p> <p>i) The need for EU environmental Policy It will examine the background and context to EU Environmental Policy and determine when the environment became an EU concern and examine the influence of issues such as acid rain, Climate Change and CFCs in Ozone layer depletion as a precursor to Environmental Policy. Trans-Boundary issues will be examined where relevant (e.g. air pollution).</p> <p>ii) Environmental Legislation The module will then focus on legal basis for EU Environmental Policy, such as Treaties and the structure of DG Environment. It will also cover some of the specific environmental legislation that covers the following areas: Air Quality; Noise; Land use; Nature and biodiversity; energy; waste; water and how these policies fit with national policies.</p> <p>iii) Policy Instruments It will examine the types of policy instruments that can be employed in relation to EU Environmental Policy such as market based instruments (e.g. EU Emissions Trading Scheme, Environmental Tax Reform etc.)</p> <p>iv) EU Environmental Policy in a global context Finally, there will be a discussion of EU Environmental Policy in a global context and outline where the EU is leading the way in global terms in relation to Green Policy initiatives. This includes commitments under treaties such as the Kyoto protocol.</p>				
Class format	Lecture and practice				
Workload	Credit-Points: 5 CP				
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post processing, LN			
Lecture Specified Learning Activities	24 12				
Total	36		64		100
Examination format Grading Repetition	Assignment (25%), examination (75%)				
Availability Duration	Winter, each year one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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BIOL40140	Science and Policy		Winter	5 CP	
Title of module	Science and Policy				
Code of module	BIOL40140				
Faculty / study program / Institution	UCD, Biology				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Dr Tamara Hochstrasser				
Prerequisites	None				
Course aims	The role of science and scientists in Western societies is rapidly changing. New technologies in particular the World Wide Web make information available in much faster time and to a wider audience than was traditionally the case. In the first half of this course, student participants should become familiar with the history of science in society as well as with the social structure and functioning of the scientific community over time through a series of readings and discussion groups. In the second half of the course, the students will explore the interface with the wider society by running a project where citizens are involved in the scientific process.				
Course content	<p>What will the student learn?</p> <p>On completion of this module students should be able to:</p> <ul style="list-style-type: none"> - give an outline of how the role of science in society evolved over time - clearly explain the difference between scientific knowledge and other kinds of knowledge – priorities, normative and positive claims - be able to lead a citizen group in a discussion of a scientific topic - have a clear understanding and a working knowledge of methods to bridge the gap between scientists and society. 				
Class format	Lecture and practice				
Workload	110 h		Credit-Points: 5 CP		
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post processing, LN			
	Lectures	20			
	Small group	10			
	Practical	20			
	Specified Learning Activities	20			
	Total	70	40		110
Examination format Grading Repetition	Essay (40%) and oral examination (60%)				
Availability Duration	Winter, each year one semester				
Acceptance capacity	20				
Language of instruction	English				
Literature					
Notes					

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ENVB40040	Environmental Impact Assessment		Winter	5 CP																									
Title of module	Environmental Impact Assessment																												
Code of module	ENVB40040																												
Faculty / study program / Institution	UCD, School of Biology and Environmental Science																												
used in StG / Sem.	1 Sem., MSc Global Change																												
Person in charge	Dr Tasman Crowe																												
Prerequisites	None																												
Course aims	This module outlines the development and philosophy of the EIA framework in Ireland and Europe. We then focus on the practicalities of preparing an Environmental Impact Statement, including scoping and the collection, synthesis and dissemination of relevant information. Emphasis is placed on biological sampling and coastal examples. We compare EIA processes in a range of countries and discuss the pros and cons of different approaches. The course includes a mock EIA exercise and guest lectures from practising environmental consultants and decision makers.																												
Course content	<p>What will the student learn?</p> <p>Describe the philosophy, background and development of the Environmental Impact Assessment (EIA) process in Europe and Ireland and place it in a broader framework of approaches to environmental management;</p> <ul style="list-style-type: none"> - Summarise the general legal framework for EIA in Ireland, including the different categories of impact that must be addressed; - Discuss some of the difficulties of assessing 'significance' of impacts; - Work as part of a team to prepare a scoping report (part of EIA), based on practical experience of doing so; - Take a critical view of the design and interpretation of biological surveys for EIA; - Critically appraise the relative merits and flaws of EIA systems in different countries; - Consider the different careers available in the field of EIA and their spheres of influence. 																												
Class format	Lecture and practice																												
Workload	102h		Credit-Points: 5 CP																										
containing:	<table border="1"> <thead> <tr> <th></th> <th>A Course</th> <th>B Self-study</th> <th>C examination</th> <th>total</th> </tr> <tr> <th></th> <th>A presence</th> <th>b preparation/post processing, LN</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>9</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Specified Learning Activities</td> <td>30</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>39</td> <td></td> <td>63</td> <td>102</td> </tr> </tbody> </table>			A Course	B Self-study	C examination	total		A presence	b preparation/post processing, LN			Lectures	9				Specified Learning Activities	30				Total	39		63	102		
	A Course	B Self-study	C examination	total																									
	A presence	b preparation/post processing, LN																											
Lectures	9																												
Specified Learning Activities	30																												
Total	39		63	102																									
Examination format	Simulation exercise (30 %) and exam (70 %)																												
Grading																													
Repetition	In-semester assessment																												
Availability	Winter, each year																												
Duration	one semester																												
Acceptance capacity	None																												
Language of instruction	English																												
Literature																													
Notes																													

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UCD – Optional modules:

The student will choose one module from the following list:

ZOOL40010	Biodiversity	Winter	5 CP		
Title of module	Biodiversity				
Code of module	ZOOL40010				
Faculty / study program / Institution	UCD, Zoology				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Prof. Thomas Bolger				
Prerequisites	None				
Course aims	Biodiversity loss due to human activities is currently more rapid than at any time in human history. To achieve progress towards biodiversity conservation it is necessary to respond with actions that recognise the conservation and sustainable use of biodiversity. These responses need to recognise the indirect and direct drivers of change as well as mechanisms of coexistence and community assembly. In this course the definition, measurement, maintenance and value of biodiversity are discussed taking into account the constant change which is characteristic of ecological systems. While the value of biodiversity will be discussed primarily on ecological grounds; economic, aesthetic and ethical issues will also be discussed. Issues arising from the Millennium Ecosystem Assessment and the EU Strategy for Sustainable Development will be used to structure discussion.				
Course content	<p>What will the student learn?</p> <p>On completion of this module, students should be able to:</p> <ul style="list-style-type: none"> - evaluate techniques of biodiversity enumeration; - demonstrate knowledge of mechanisms of coexistence and assembly of communities; - examine and determine the functional, aesthetic, ethical and economic values of biodiversity; - understand the difficulties with the identification of keystone species. 				
Class format	Lecture and practice				
Workload	Credit-Points: 5 CP				
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post processing, LN			
Lecture	12				
Tutorial	8				
Total	20		80		100
Examination format	Written exam (1 hour) (65%), presentation in class (35%)				
Grading					
Repetition					
Availability	Winter, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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ENVB40040	Peatland and Environmental Change		Winter	5 CP	
Title of module	Peatland and Environmental Change				
Code of module	ENVB40040				
Faculty / study program / Institution	UCD, Biology				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Dr Florence Renou-Wilson				
Prerequisites	None				
Course aims	<p>Aim:</p> <p>This module should provide the students with a comprehensive summary of peatland science. Human activity, climatic variability as well as other natural processes shape peatlands which are dynamic ecosystems, constantly evolving. From microbial diversity to entire landscape, students will develop an understanding peatlands especially Irish ones but also around the world.</p>				
Course content	<p>What will the student learn?</p> <p>On completion of this module, students should be able to:</p> <ul style="list-style-type: none"> - recognise peatland types and understand their natural history (their origin and development and how they got to their current status), - understand processes within these ecosystems (ecology, hydrology and peat accumulation), - understand peatland-environment feedback, especially with regards to global climate - recognise the different ecosystem services they provide and appraise the consequence of these values, - evaluate resource management options. 				
Class format	Lecture and practice				
Workload				Credit-Points: 5 CP	
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post processing, LN			
Lecture	16				
In class conversation	4				
Field trip	6				
Total	26		80		106
Examination format	In class presentation on research paper (30%), written examination (2hours)(70%)				
Grading					
Repetition					
Availability	Winter, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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BIOL40110	Global Challenges and Green Issues			Winter	5 CP
Title of module	Global Challenges and Green Issues				
Code of module	BIOL40110				
Faculty / study program / Institution	UCD, Biology & Environmental Science				
used in StG / Sem.	1 Sem., MSc Global Change				
Person in charge	Dr Jonathan Yearsley				
Prerequisites	None				
Course aims	On successful completion of the course, students will have a broad understanding of the contemporary Earth Science issues relating to energy, the environment, climate change and policy.				
Course content	A module that overviews global challenges, green issues, policy and the multidisciplinary research themes associated with the Structured PhD Programmes of UCD's Earth Institute (http://www.ucd.ie/earth). This module consists of a seminar series (roughly 15 seminars), given by leading figures from academia and the private sector. Each seminar will have associated reading material.				
Class format	Seminar				
Workload	Credit-Points: 5 CP				
containing:	A Course		B Self-study	C examination	total
	a presence	b preparation/post processing, LN			
Seminar	14				
Total	14		70		84
Examination format Grading Repetition	Multiple Choice Questionnaire: Multiple choice (100 %)				
Availability Duration	Winter This module will only run if numbers exceed 20. This will be confirmed in early October. The seminars will take place over 3 consecutive days at the end of the first semester (typically the 1st week in December).				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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JLU - Core modules:

M-GC-PSA	Plant-Soil-Atmosphere Interactions			Summer	5 CP
Title of module	Plant-Soil-Atmosphere Interactions				
Code of module	M-GC-PSA				
Faculty / study program / Institution	08/ Biology/ Department of Plant Ecology				
used in StG / Sem.	2 Sem., MSc Global Change, MSc Biology				
Person in charge	Prof. Christoph Müller, PhD.				
Lecturers	Müller, Grünhage, Koyro				
Prerequisites	None				
Course aims	<p>Students</p> <ul style="list-style-type: none"> - 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. 				
Course content	<ul style="list-style-type: none"> - Photosynthesis of plants and communities in relationship to abiotic factors and climate change (e.g. increasing CO₂ concentrations). - C and N transformations in terrestrial ecosystem (e.g. permanent grassland). - Energy fluxes in permanent grassland. - Interactions between vegetation and soil. - Statistical method in aut- and synecology. 				
Class format	lectures (25%), seminar (12.5 %), practical (62.5%)				
Workload	150 h			Credit-Points: 5	
containing:	A Course		B self-study	C examination	total
	a presence	b preparation/post processing, LN			
	Lecture	20	20		
	Seminar	4	3		
	Practice	40	63		
	Total	64	86		150
Examination format	report (100%)				
Grading					
Repetition					
Availability	Summer, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes	Information concerning modules and literature: see board of information / Date: see university calendar				

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M-GC-ÖUM	Ecosystem and model development		Summer	3 CP																																					
Title of module	Ecosystem and model development																																								
Code of module	M-GC-ÖUM																																								
Faculty / study program / Institution	08/ Biology/ Department of Plant Ecology																																								
used in StG / Sem.	2 Sem., MSc Global Change, MSc Biology																																								
Person in charge	Prof. Christoph Müller, PhD.																																								
Lecturers	Müller, Grünhage																																								
Prerequisites	None																																								
Course aims	<p>Students</p> <ul style="list-style-type: none"> - understand scientific problems and know how to structure and analyse them, - have a good overview of current topics in functional biodiversity, - have the ability to organize on their own current scientific literature relevant botanical databases, - are able to construct mathematical models, - are able to use the most important techniques and programming of mathematical models, - understand to adequately handle results of models and critically reflect results and validate them. 																																								
Course content	<ul style="list-style-type: none"> - System and its components, - Structure of ecological systems and its mathematical development, - Measure and analyse data of ecological experiments, - Meta-Analysis of selected features of selected datasets, - Programming of models, - Illustration and validation of model results. 																																								
Class format	lecture (27%), seminar (13%), practical (60%)																																								
Workload	90 h	Credit-Points: 3																																							
containing:	<table border="1"> <thead> <tr> <th></th> <th colspan="2">A Course</th> <th>B self-study</th> <th>C examination</th> <th>total</th> </tr> <tr> <th></th> <th>a presence</th> <th>b preparation/post processing, LN</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Lecture</td> <td>8</td> <td>16</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Seminar</td> <td>4</td> <td>8</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Practice</td> <td>18</td> <td>36</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>30</td> <td>60</td> <td></td> <td></td> <td>90</td> </tr> </tbody> </table>			A Course		B self-study	C examination	total		a presence	b preparation/post processing, LN				Lecture	8	16				Seminar	4	8				Practice	18	36				Total	30	60			90			
	A Course		B self-study	C examination	total																																				
	a presence	b preparation/post processing, LN																																							
Lecture	8	16																																							
Seminar	4	8																																							
Practice	18	36																																							
Total	30	60			90																																				
Examination format	Oral presentation (30%), report (70%)																																								
Grading																																									
Repetition																																									
Availability	Summer, each year																																								
Duration	one semester																																								
Acceptance capacity	None																																								
Language of instruction	English																																								
Literature																																									
Notes	Information concerning modules and literature: see board of information / Date: see university calendar																																								

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Gültig ab WiSe 2015/16

M-GC-PBR	Policy Consultancy		Summer	6 CP		
Title of module	Policy Consultancy					
Code of module	M-GC-PBR AfK-Nr. 336					
Faculty / study program / Institution	ZEU (Center for international Development and Environmental Research)					
used in StG / Sem.	2 Sem., MSc Global Change					
Person in charge	Prof. Dr. Thilo Marauhn					
Lecturers	Prof. Dr. Thilo Marauhn					
Prerequisites	None					
Course aims	Additional to academic qualifications, students have to acquire more skills in order to carry out socially relevant functions as managers and leaders in their home country and abroad. They need specific skills which exceed the simple transfer of knowledge in order to communicate relevant information and findings to decision makers in politics, economy and society. That includes interpersonal skills like a convincing appearance, confident association with stakeholders and skills in debating, consulting and communicating. The aim of the lecture is on the one hand, to make students aware of different political processes and the possible ways for actors to influence decision-making processes, and on the other hand, to demonstrate how advisers themselves analyse the area and way they might be able to influence the political process. The knowledge of the practical side of governance will be integrated into different theoretical approaches. Apart from the knowledge of different analytical models, the students are able to convey them on the political practice in a professional and methodical way. Additionally, the students get the possibility to be individually coached. Within this training students can improve rhetorical, social and personal skills.					
Course content	<ul style="list-style-type: none"> - The lecture deepens the students' knowledge of the basic principles in regional, national and international politics and policy consulting. The basics of policy consulting, governance and communication will be analysed and discussed methodical and with regard to contents. - The lecture will be accompanied by JLU teaching staff, external experts and practitioners of the policy consulting practice (particularly of consulting companies). - The interdisciplinary approach allows the students to gain a broad knowledge of theoretical and practical research on governance, policy management and public affairs. Additionally, this knowledge will be deepened in practical exercises. - The contents will be deepened in a topic-oriented study-trip to the "Gesellschaft für Internationale Zusammenarbeit" (GIZ) GmbH. The participants will be confronted with a specific task of the political, social or economic practice which they have to solve in team work. Afterwards, the groups will present their results. 					
Class format	Lecture, practice					
Workload	180 h		Credit-Points: 6			
containing:	A Course		B self-study	C examination	total	
	a presence	b preparation /post processing, LN				
	Lecture	30	25			
	Practice	30	25			
	Total	60	50	40	30	180
Examination format Grading, Repetition	Written test (40%), oral test (40%), presentation (20%)					
Availability, Duration	Summer, each year, one semester					
Acceptance capacity	None					
Language of instruction	English					
Literature						
Notes	Information: see http://www.uni-giessen.de/cms/fbz/zentren/zeu/news/politikberatung					

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Gültig ab WiSe 2015/16

M-GC-REM	Resource Economics and Environmental Management		Summer	6 CP	
Title of module	Resource Economics and Environmental Management				
Code of module	M-GC-REM				
Faculty / study program / Institution	09/ Agricultural Sciences, Nutritional Sciences and Environmental Management				
used in StG / Sem.	2 Sem., MSc Global Change				
Person in charge	Prof. Dr. Ernst-August Nuppenau				
Lecturers	Prof. Dr. Ernst-August Nuppenau				
Prerequisites	None				
Course aims	<p>Students will</p> <ul style="list-style-type: none"> - have foundational knowledge modelling intertemporal optimization of agricultural resource utilization, - understand the basics of management concepts towards the resolution of resource use conflicts, - be able to simultaneously model ecological and economic material cycles, - be able to depict dynamic processes of resource regeneration, - be able to construct computer simulation models, - be able to derive economically and ecologically justifiable extraction rates from soil, water, and biotic resources, - be able to draw knowledge of such concepts as sustainability, the introduction of save minimum standards, etc. to aid efforts in resource management. 				
Course content	<ul style="list-style-type: none"> - intertemporal optimization and resource usage, - economics of non-renewable resources, - economics of renewable resources, - open access property and extinction of species as biotic resources, - nature conservation as common property management, - introduction to the economics of sustainable cultivation, - mathematical formulation of resource management models, - programming of optimization models, - management of cultivated landscapes, - trade and the environment, - political questions about the implementation of environmental policies, - international questions of resource protection, - resource evaluation, - property rights and institutions 				
Class format	Lecture (67%), seminar (20%), practice (13%)				
Workload	180 h			Credit-Points: 6	
containing:	A Course		B self-study	C examination	total
	a presence	b preparation/post processing, LN			
	Lecture	40	50		
	Seminar	12			
	Practical	8			
	Total	60	50	30	40
Examination format	Oral presentation (30%), written examination (70%)				
Grading Repetition					
Availability	Summer, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes	Information: see http://www.uni-giessen.de/cms/fbz/fb09/institute/iam/pau				

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Gültig ab WiSe 2015/16

M-GC-BDI	Biodiversity Informatics		Summer	3 CP	
Title of module	Biodiversity informatics				
Code of module	M-GC-BDI				
Faculty / study program / Institution	08/ Biology/ Institute of Animal Ecology and Systematics				
used in StG / Sem.	2 Sem., MSc Global Change, MSc Biology				
Person in charge	Prof. Dr. T. Wilke				
Lecturers	Albrecht, Wilke				
Prerequisites	None				
Course aims	<p>Students</p> <ul style="list-style-type: none"> - receive an overview of important methods in biodiversity informatics and can critically judge their individual performances, - are familiar with the digital acquisition, management and processing of biodiversity data, - are able to plan complex field studies, - are familiar with important aspects of biodiversity modeling, - can critically assess changes in biodiversity over time, - understand human impact on biodiversity, - possess a high level of cognitive competence. 				
Course content	<ul style="list-style-type: none"> - acquisition, management and processing of biodiversity data, - biological databases and collections, - geo-referencing/GPS, - biodiversity indices, - visualization of spatially-explicit statistical data, - species range dynamics under global change scenarios, - human impact and invasion biology 				
Class format	Lecture (40%), Seminar (20%), Tutorial (40%)				
Workload	180 h		Credit-Points: 6		
containing:	A Course		B self-study	C examination	total
	a presence	b preparation/post processing, LN			
	Lecture	14	20		
	Seminar	7	7		
	Tutorial	14	28		
	Total	35	55		90
Examination format Grading Repetition	Exercises (50%), oral presentation (50%)				
Availability Duration	Summer, each year one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes	Information concerning modules and literature: see board of information / Date: see university calendar				

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M-GC-PAL	Reconstructing Paleoenvironments and Paleoclimates		Summer	6 CP	
Title of module	Reconstructing Paleoenvironments and Paleoclimates				
Code of module	M-GC-PAL				
Faculty / study program / Institution	07/ Geography				
used in StG / Sem.	2 Sem., MSc Global Change				
Person in charge	Prof. Jürg Luterbacher, PhD, Prof. Dr. Markus Fuchs				
Lecturers	Prof. Jürg Luterbacher, PhD, Prof. Dr. Markus Fuchs				
Prerequisites	None				
Course aims	<p>The students will</p> <ul style="list-style-type: none"> - learn about climate proxies (including from biological archives) from different areas of the world learn how statistical reconstructions are performed using different proxies and estimate uncertainties of past climate, - study and understand past climate variations in different areas of the world, - study and understand the role of different forcings (anthropogenic, sun, volcanoes) responsible for past climate variations, - discuss relevance of palaeoclimatology in the context of current and future climate, - understand the importance of chronologies and time series, - discuss open issues in palaeoclimatology, - learn palaeoclimatological field work, - practise and work on various sediment archives and proxies, - overview of luminisence dating techniques. 				
Course content	<p>Paleoclimatology is the study of climate and environmental processes in the geologically recent past prior to the existence of instrumental records. Instrumental records span only a tiny fraction of the Earth's climate history and so provide a totally inadequate perspective on climatic variation and the evolution of climate today. Studies of past climates must begin with an understanding of the types of proxy data available and the methods used in their analysis. The palaeorecord (derived from marine and lake sediments, ice cores, tree rings, corals, cave deposits, biological archives, historical documents, etc.) in concert with modelling of past scenarios provides a quantitative understanding of past Earth System variability and the underlying processes. In order to better understand current global changes and to project future scenarios, knowledge of what has happened in the past is imperative. Nowadays questions in palaeoclimatology relate increasingly to the regional climatic and environmental responses to global change, as these affect societies and form the basis for efficient adaptation measures. The course will also include 2 to 3 days field course in the vicinity of Giessen where information from tree rings is gathered which is used to derive palaeo temperature and precipitation covering the past millennium.</p>				
Class format	Lectures and 2 to 3 days field course				
Workload	180 h		Credit-Points: 6		
containing:	A Course		B self-study	C examination	Total
	a presence	b preparation/post processing, LN			
	Lecture	80	25		
	Seminar	20	20		
	Practice	24	11		
	Total	124	56		180
Examination format	Oral presentation (30%), report (70%)				
Grading					
Repetition					
Availability	Summer, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature	Will be distributed and announced				

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JLU – Optional modules:

The student will choose modules up to 6 CP in total from the following list:

M-GC-SEM	Scientific Presentations in Ecology		Summer	3 CP	
Title of module	Scientific Presentations in Ecology				
Code of module	M-GC-SEM				
Faculty / study program / Institution	08/ Biology/ Department of Plant Ecology				
used in StG / Sem.	2 Sem., MSc Global Change, MSc Biology				
Person in charge	Prof. Christoph Müller, PhD.				
Lecturers	Müller, Grünhage, Koyro				
Prerequisites	None				
Course aims	Students <ul style="list-style-type: none"> - are able to use English literature, - have the ability to have a scientific conversation in English, - know how to present scientific projects and results, - are able to discuss scientific work, - know the current methods in ecology and their problems, - are familiar with the scientific studies in the Department of Plant Ecology. 				
Course content	<ul style="list-style-type: none"> - Methods to present scientific results (oral and written presentations), - Typical feature of English presentations and structure of scientific papers in English (peer-reviewed journals), - Prepare content and presentation of current topics in ecology, - Presentation of scientific methods results at scientific conferences (oral, written) 				
Class format	Seminar (100 %)				
Workload	90 h		Credit-Points: 3		
containing:		A Course	B self-study	C examination	total
		a presence	b preparation/post processing, LN		
	Seminar	30	45		
	Presentation		15		
	Total	30	60		90
Examination format	Presentations (100 %)				
Grading					
Repetition					
Availability	Summer, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes	Information concerning modules and literature: see board of information / Date: see university calendar				

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M-GC-EVO	Evolutionary Biology		Summer	3 CP	
Title of module	Evolutionary Biology				
Code of module	M-GC-EVO				
Faculty / study program / Institution	08/ Biology/ Institute of Animal Ecology and Systematics				
used in StG / Sem.	2 Sem., MSc Global Change				
Person in charge	Prof. T. Wilke				
Lecturers	Wilke, Albrecht				
Prerequisites	None				
Course aims	<p>Students</p> <ul style="list-style-type: none"> - receive an overview of important evolutionary mechanisms in the animal and plant kingdoms, - acknowledge evolution as a complex and differentiated process, - understand both spatial and temporal components of evolutionary changes, - are able to establish evolutionary hypotheses, - possess a high level of cognitive competence, - have respect for life and develop ethical judgment, - develop a critical judgment relative to animal-human-comparisons. 				
Course content	<ul style="list-style-type: none"> - "Synthetic theory" of biological evolution, - Palaeobiology and evolutionary times scale, - Evolutionary mechanisms of plants and animals, - Macroevolution, - Biogeography, - Invasive species and biotic interchange, - Creationism and evolution critique. 				
Class format	Lecture (100%)				
Workload	90 h		Credit-Points: 3		
containing:	A Course		B self-study	C examination	total
	a presence	b preparation/post processing, LN			
	Lecture	24	36		
	Written final	2	28		
	Total	26	64		90
Examination format	Written final (100%)				
Grading					
Repetition					
Availability	Summer, each year				
Duration	one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes					

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M-GC-CCH	Human Health Impacts of Climate Change: the International Dimension		Summer	6 CP																																				
Title of module	Human Health Impacts of Climate Change: the International Dimension																																							
Code of module	M-GC-CCH																																							
Faculty / study program / Institution	07/ Geography																																							
used in StG / Sem.	2 Sem., MSc Global Change																																							
Person in charge	Dr. E. Xoplaki																																							
Lecturers	Dr. E. Xoplaki																																							
Prerequisites	Basic knowledge in statistics and familiarity with computer use																																							
Course aims	<p>The students will</p> <ul style="list-style-type: none"> - learn about the links between climate and health issues - learn how to deal with human health and climate data - learn how statistical methods are applied and results interpreted - study and understand climate variations in different areas of the world, - discuss relevance of human health issues in a climatological context - discuss open issues in climate change and health issues - detect linkages between mortality rate of vector born diseases (west Nile virus, malaria, etc.) and temperature time-series in a selected region and time. 																																							
Course content	<p>Human beings are exposed to climate change through changing weather patterns (temperature, precipitation, sea-level rise and more frequent extreme events) and indirectly through changes in water, air and food quality and changes in ecosystems, agriculture, industry and settlements and the economy. There are concerns that in the future changes in climate might increase the spread of diseases and threaten human health. However, detecting these changes is challenging because climate is only one of several factors which affect the prevalence of disease at the present day. For instance, changes in frequency and intensity of extreme weather and climate events could pose a serious threat to human health. These threats may either be direct, such as heat waves and flooding, or indirect, for example by the spread of tick-borne diseases. The course also deals with Malaria, Dengue fever, West Nile Fever, Leishmaniasis, and Chikungunya fever and their potential relationship to climate change. The course will also cover the following topics: Climate, a modern health determinant, links between climate change and health, Impact modeling: analysis approaches, Climate Change and Disease Hazards, Extreme temperature impacts on human mortality, Drought and pollution impacts (heat-compounded) detect linkages between mortality rate of vector born diseases (west Nile virus, malaria, etc.) and temperature time-series in a selected region and time.</p>																																							
Class format	Lectures, Seminar, and Practice																																							
Workload	180 h		Credit-Points: 6																																					
containing:	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th colspan="2">A Course</th> <th>B self-study</th> <th>C examination</th> <th>Total</th> </tr> <tr> <th></th> <th>a presence</th> <th>b preparation/post processing, LN</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Lecture</td> <td style="text-align: center;">80</td> <td style="text-align: center;">20</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Seminar</td> <td style="text-align: center;">30</td> <td style="text-align: center;">24</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Practice</td> <td style="text-align: center;">16</td> <td style="text-align: center;">10</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td style="text-align: center;">126</td> <td style="text-align: center;">54</td> <td></td> <td></td> <td style="text-align: center;">180</td> </tr> </tbody> </table>					A Course		B self-study	C examination	Total		a presence	b preparation/post processing, LN				Lecture	80	20				Seminar	30	24				Practice	16	10				Total	126	54			180
	A Course		B self-study	C examination	Total																																			
	a presence	b preparation/post processing, LN																																						
Lecture	80	20																																						
Seminar	30	24																																						
Practice	16	10																																						
Total	126	54			180																																			
Examination format Grading Repetition	Oral presentation (40%), report (60%)																																							
Availability Duration	summer, each year one semester																																							
Acceptance capacity	None																																							
Language of instruction	English																																							
Literature	Will be distributed and announced																																							
Notes	Information concerning modules and literature: see board of information / Date: see university calendar																																							

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Gültig ab WiSe 2015/16

M-GC-GCE	Global Change: advanced techniques		Summer	3 CP	
Title of module	Global change ecology: stable isotopes and other advanced techniques				
Code of module	M-GC-GCE				
Faculty / study program / Institution	08/ Biology/ Department of Plant Ecology				
used in StG / Sem.	2 Sem., MSc Global Change				
Person in charge	Prof. Christoph Müller, PhD.				
Lecturers	Müller, Grünhage				
Prerequisites	None				
Course aims	<p>Students will</p> <ul style="list-style-type: none"> - have knowledge of current global change issues, - know the current methods for the investigation of global change effects on ecosystems, - 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. 				
Course content	<ul style="list-style-type: none"> - Current state-of-the-art scientific knowledge on Global Change Science (e.g. Paleoclimatology, Indicator-Proxies, current Trends, Intergovernmental Panel on Climate Change). - Quantification of global matter cycles using stable isotope based on the example of a permanent grassland. - Automated methods to quantify gas fluxes and the abiotic factors and their interactions that influence processes in permanent grassland. - Positive feedback effect of global change on biosphere processes (e.g. phenology). 				
Class format	lecture (25%), seminar (12.5%), practical (62.5%)				
Workload	90 h		Credit-Points: 3		
containing:	A Course		B self-study	C examination	Total
	a presence	b preparation/post processing, LN			
	Lecture	10	16		
	Seminar	2	4		
	Practice	20	38		
	Total	32	58		90
Examination format Grading, Repetition	Oral presentation (30%), report (70%)				
Availability Duration	Summer, each year one semester				
Acceptance capacity	None				
Language of instruction	English				
Literature					
Notes	Information concerning modules and literature: see board of information / Date: see university calendar				

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Gültig ab WiSe 2015/16

BIOL40120	Work Placement		Summer	20 CP																														
Title of module	Work Placement																																	
Code of module	BIOL40120																																	
Faculty / study program / Institution	UCD, Biology																																	
used in StG / Sem.	1 Sem., MSc Global Change																																	
Person in charge	Dr Florence Renou-Wilson																																	
Prerequisites	None																																	
Course aims	<p>This Masters programme offers students the opportunity to spend 6 weeks in a real-life employment. The student will work in a setting that reflects his/her interests as an Environmental professional. Placements may vary considerably but in general terms the students will be placed in industrial, government, non-government or research environment where they will obtain a breadth of practical experience to complement their degree programme. Employers welcome 'transferable skills' acquired during a work placement such as communication, numeracy, use of IT, group work and time management to name but a few. The students will experience workplace culture making them more effective employee following graduation. The work experience is defined as a learning experience incorporating mentoring, professional supervision in which work is viewed from critical and evaluative perspectives much in contrast to the notion of routine or regular work.</p>																																	
Course content	<p>What will the student learn? In terms of broad learning outcome, at the end of this module, the students will:</p> <ul style="list-style-type: none"> -have increased their ability to relate academic theory to the work environment -have developed identified work related skills -be able to critically evaluate their learning from the placement -have enhanced their career knowledge -have planned, carried out, evaluated and reported on a project. <p>In particular they should have acquired skills to be able to:</p> <ul style="list-style-type: none"> -Evaluate the interaction between policies and the quality of the environment in its multiple biotic, abiotic and cultural-economic dimensions. -Describe some aspect of the environment which is impacted by global change and understand the implications and possible mitigation and adaptation measures. -Demonstrate an understanding of professional practice in some of the following areas: scientific analyst, policy adviser, researcher, environmental management industries. <p>How will the student learn? Pre placement submission: This involves 1) writing a CV and covering letters; 2) reflection on each application in terms of academic knowledge and related work skills; 3) analysis of skills to be gained while on placement (general knowledge and understanding; cognitive skills, subject specific skills, transferable skills) On placement: A 6 weeks contact time with employers is required. This involves 1) a log book or diary to be sent to the module co-ordinator weekly and should be based on activities and what the student has learnt from the activities (most important focus); 2) a short report on the profile of the host (to get to know an employer). Post placement: This involves 1) a final portfolio/report (whereby students should show how they have met the aforementioned learning outcomes) and 2) an oral presentation (15min with 5 min questions). The format of the final portfolio/report will be flexible depending on the skills a student may wish to develop but should incorporate observations, critical thinking, evaluation and research. It could be a typical report on a particular issue or on an aspect of the placement host (theme) or a draft paper (for publication).</p>																																	
Class format	Work placement																																	
Workload	400 h / 6 weeks <u>contact time with employer</u>		Credit-Points: 20																															
containing:	<table border="1"> <thead> <tr> <th></th> <th colspan="2">A Course</th> <th>B self-study</th> <th>C examination</th> <th>total</th> </tr> <tr> <th></th> <th>a presence</th> <th>b preparation/post processing, LN</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>work placement</td> <td>270</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Report</td> <td></td> <td></td> <td></td> <td>90</td> <td></td> </tr> <tr> <td>Total</td> <td>270</td> <td></td> <td>40</td> <td>90</td> <td>400</td> </tr> </tbody> </table>					A Course		B self-study	C examination	total		a presence	b preparation/post processing, LN				work placement	270					Report				90		Total	270		40	90	400
	A Course		B self-study	C examination	total																													
	a presence	b preparation/post processing, LN																																
work placement	270																																	
Report				90																														
Total	270		40	90	400																													
Examination format	Log book (10%), Report/final portfolio (50%), seminar/presentation (40%)																																	
Grading, Repetition	no grade: fail or pass																																	

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Availability	
Duration	6 weeks contact time with employer
Acceptance capacity	20
Language of instruction	English
Notes	

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Gültig ab WiSe 2015/16

BIOL40130	Research Project Thesis		Summer	30 CP	
Title of module	Research Project Thesis				
Code of module	BIOL40130				
Faculty / study program / Institution	UCD, Biology				
used in StG / Sem.	3 Sem., MSc Global Change				
Person in charge	Dr Florence Renou-Wilson				
Prerequisites	None				
Course aims	The research project is an important element of the Masters in Global Change as it involves the planning, execution and communication of a research question that the student wishes to investigate in depth. Students select individual projects from a list provided by the module co-ordinator, following consultation with the selected supervisor. During the third semester, a period of 16 weeks will be devoted entirely to the project work. Students will maintain regular contact with their supervisor, who will assist by guiding the project, reading and commenting on written work, and providing advice as necessary.				
Course content	<p>What will the student learn?</p> <p>During the course of the research project, the student will:</p> <ul style="list-style-type: none"> - develop independent research and organisational skills; - develop technical competence in the specific research area and learn to synthesise information and write a scientific report. 				
Class format	Research thesis				
Workload	600 h		Credit-Points: 30		
containing:	A Course		B self-study	C examination	Total
	a presence	b preparation/post processing, LN			
Autonomous student learning		600			
Total		600			600
Examination format Grading Repetition	<p>On completion of the research project the student will produce a mini-thesis in the format of a scientific paper, which will be graded by a supervisor and a second assessor. The format for grading will be as follows:</p> <p>Statement of problem & literature review (20%) Statement of aims and objectives (10%) Methodology (20%) Treatment of results (15%) Discussion (15%) Referencing/Bibliography (10%) Other (layout/formatting/proof-reading) (10%)</p>				
Availability Duration	each year				
Acceptance capacity					
Language of instruction	English				
Literature					
Notes					