

Semester	Status	Module	Module coordinator	Module components (if existing)	Goal of module (component)	Lecturers	SWH	Credits	Teaching form	Teaching language	Examination form
1	M	Human and nature wellbeing	Welp		Students are enabled to understand and analyse the social and ecological basis of human wellbeing. They acquire skills to detect and document human-nature interactions in space and time, both on the local and the global level. Students learn to conceptualize and critically assess different ways of measuring human wellbeing within planetary boundaries.	Welp, Ibisch, Ihne, Ott	4	6	L, S, P	E	PP
1	M	Fundamentals of systems functionality and change	Ibisch		Students are enabled to understand the ecosystems and social systems relevant to human wellbeing. This includes understanding the functioning of both ecosystems and social systems, structures and processes that are crucial for their maintenance (functions), and the services derived from them for humans. Furthermore, students shall understand the inherently indeterminate dynamics of ecological or social systems. This enables students to critically discuss the weaknesses and strengths of the approach of social-ecological systems. They are able to derive requirements and limits for the management of complex systems.	Ibisch, Welp, Stock NN [PIK], et al.	6	9	L, S, P	E	PP
1	M	Drivers of stress to systems functionality and root causes	Ibisch	Drivers of stress to systems functionality  Root causes of system dysfunctionality	Students will be enabled to systemically understand and analyse human activities ("drivers of stress") that directly lead to stresses on biological and social systems. To this end, at the completion of this module component, students will have learned approaches to terminological classifications, taking the drivers of stress as an example. They have applied basic knowledge of risk management to the development of future scenarios and the identification of risks and blind spots. Finally, they have practiced prioritisation of problems by assessing the criticality and strategic relevance of drivers of stress.  Students are enabled to systemically understand and analyse those social framework characteristics which are the "root causes", indirectly leading to stresses on biological and social systems. To this end, at the completion of this module component, students will have further practiced approaches to terminological classifications, using the root causes of problems as an example. They have practiced identifying their systemic relationships. They have applied basic knowledge of risk management to the development of future scenarios and the identification of risks and blind spots. Finally, they have practiced prioritisation of problems by assessing the criticality and strategic relevance of root causes.	Ibisch, Welp, Stock NN [PIK], Linde, et al.  Ibisch, Welp, Stock NN [PIK], Mann, Ott, Nowicki, et al.	2  4	9	L, S, P	E	PP (50%) & PR (50%)

1 E	Carbon sequestration and accounting	Guericke		Students understand the carbon cycle with special reference to forests, soils and forest products. They are qualified to develop and critically reflect forest growth scenarios and have acquired basic knowledge of the purpose and the implementation of life cycle analysis (LCA), product carbon footprints (PCF) and corporate carbon footprints (CCF).	Guericke, Cremer, Riek	4	6	L, P	E	WR
1 E	Fundamentals of measurements and modelling	Miranda	Sensors for automated measurements	The students identify and describe the measuring principles behind sensor technologies used as data sources for environmental modelling. They know the principles of data quality assessment and further data processing procedures that guarantee a meaningful re-use of the measured data.	Miranda	2		L, PE	E	TD 20 (50%)
			Process modelling methodology	The students know about application areas of ecosystem models and are able to distinguish between different modelling concepts. They have a broad overview of different models and tools related to different focuses on environmental processes, e.g. carbon dynamics, water- and nutrient cycling, and biomass growth. Students learn the principles of modelling practice in terms of parameter estimation, model set-up, and model validation. They conceptualize and design mathematical models to be used in environmental science, forestry and ecology. The students define input and output variables as well as protocols for modelling exercises.	Wallor		6	2	L, PE	E
1 E	Earth System Analysis and Stewardship	Stock [PIK]	Earth System Analysis	To enable students to understand the theoretical fundamentals of global climate change and subsequent cross-scale impacts, and their regional manifestation in different environmental settings considering the interlinkages with human activities.	Stock NN et al. [PIK]	2	3	L, S, P	E	PP (50%)
1 E	Academic writing and presenting	Language Center NN	Academic writing and presenting	Students can understand and apply the principles of academic writing and presenting. They can communicate effectively in an academic context.	Language Center NN	4	6	S	E	OR
1 E	Specialisation module I	Head of study programme		Students deepen their professional knowledge and skills in a specific area, that is of special interest for them. Students can identify their personal interests in the field of global change management and expand their horizon to approaches in related study programmes.	NN	4	6	tbd	tbd	tbd

2 M	Strategies for change and transformation	Welp		Students are enabled to adopt relevant principles of proactive strategic thinking for complex systems management and understand past and present societal transitions, their underlying patterns and key actors. Furthermore, students can evaluate different strategies of transformation on different levels and know how to apply tools to identify high leverage points in different kinds of complex systems.	Welp, Ibisch, Nowicki, [Munich Re Foundation] et al.	7	9	L, S, P	E	TD (50%) & PP (50%)
2 M	Implementation of change management	Welp		Students are able to initiate and implement transitional changes by acquiring skills for global leadership aimed at a sustainability transition.	Welp, Nowicki, [Germanwatch], [NABU], et al.	7	9	L, S, P	E	OR (50%) & TP (50%)
2 E	Earth System Analysis and Stewardship	Stock [PIK]	Earth System Stewardship	To enable students, on the example of recent and ongoing projects, to understand and critically reflect different mitigation and adaptation solutions, strategies and management options, considering the relevance of stakeholders' uncertainty and risk perceptions and different decision-making contexts.	Stock NN et al. [PIK]	2	3	L, S, P	E	PP (50%)
2 E	Global Change and Development	Nowicki		The students gain the ability to critically reflect approaches to development and development cooperation as well as trends of change and challenges. They are able to formulate constructive proposals for effective project design and implementation, paying particular attention to the drivers and impacts of global change.	Nowicki, [GIZ]	4	6	L, S, P	E	PP
2 E	Natural Resource Management in Transformation Countries	Ibisch		Students acquire a critical understanding of the challenges for sustainable development in transformation countries and are able to propose strategic elements for addressing challenges identified in a concrete case-study region.	Ibisch, Welp	4	6	L, S, PE	E	PR (50%) PP (50%)
2 E	Systems leadership and societal transformations	Welp		To enable students to understand the theoretical and methodological fundamentals of systems leadership and to acquire leadership skills for large scale systems change.	Welp	4	6	L, S, P	E	PP
2 E	Transformation Pioneers	Walk		Students are able to apply competences in interdisciplinary scientific work and self-management in order to plan their own transformation project of moderate scope. The orientation of the project corresponds to the goals of the study programme and leads to an entrepreneurship that supports sustainability transformation.	Walk	4	6	L, S, P	E	PR
2 E	Specialisation module II	Head of study programme		Students deepen their professional knowledge and skills in an specific area relevant to global change management. Students identify their specific personal interests in the field of global change management and broaden their technical and scientific horizon.	NN	4	6	tbd	tbd	tbd

3 M	Research project	Welp	The students are enabled to plan and accomplish a research project of moderate size related to the study programme's content.	Welp, Nowicki	20	24	P	tbd	PR*
3 M	Internet Based Research Colloquium	Welp	Students are able to discuss and present current research topics, accompanying the research projects of the third semester students.	Welp	2	6	S	E	TP*
4 M	Master thesis colloquium	Welp	Students acquire further skills in interdisciplinary scientific work. They are able to evaluate research projects and to communicate results to expert and lay audience.	Welp, Nowicki	2	4	S	E	PP
4 M	Master thesis & defence	Welp	Students obtain own research results while solving and discussing a scientific problem. Students present the research results of their master thesis and are able to defend its underlying assumptions, methodologies, and robustness of the key findings.	Welp, Nowicki, et al.	20	26	P	E/G (tbd)	PR (70%) PP (30%)

\* exam not graded (evaluated as "passed" / "not passed")

Teaching language: E= English / G = German

<b>Mandatory module (M)</b>
<b>Elective module (E)</b>
<b>Research semester / Thesis</b>

Teaching form				Examination form								
Lecture	Seminar	Practical Exercise	Project	Technical discussion	Project presentation	Oral report	Written exam	Term paper	Protocol	Work report	Project report	Identification certificate
L	S	PE	P	ID	PP	OR	WE	TP	P	WR	PR	IC

SWH = Semester work hours; M = Mandatory module; E = Elective module