Semester	Status	Module	Module coordinator	Module components (if existing)	Goal of module component	Lecturer	SWH	Workload	Credits	Teaching form	Teaching language	Examination form
1	M	Rethinking environmental economics I	Mann	Introduction to resource uses and economic concepts	Students have a solid understanding of concepts and methods of environmental, ecological and natural resource economics. They are familiar with the dynamics of economic systems, functioning of markets, reasons for market failures and potential solutions. They are able to discuss the relevancy of these concepts for sustainable forest management and to optimise the use of forest resources, being aware of their respective chances and limitations.	Mann	2	3				
				Human wellbeing, ecosystem functions, services and valuation approaches	Students are enabled to understanding the ecosystem services concept, its background and rationales, as well as the current state of scientific research and policy. They are familiar with definitions, typologies, and frameworks that link ES to wellbeing, and with recent socio-political and scientific debates for mapping, indicators & valuation. Based on case study examples, they can analyse chances and challenges of the ES concept and distinct valuation approaches for political and economic decision-making, know about the challenges to communicate to the science-policy/practice interface, and are able to develop strategies for overcoming them.	Mann	2	3	6	L, S, PE	E	OR
1	M	Future management systems I	Guericke	Forest management systems for ecosystem services - silvicultural fundamentals	Students acquire or refresh the knowledge of basic silvicultural principles and management strategies for forest management and forest regeneration, which is available at different levels. They will have knowledge of different forest management systems and the respective, property-dependent objectives. They know existing and potential future social demands on forest systems and understand how these can change over time. They are able to analyse organisational, procedural and institutional structures and derive adaptation requirements and potentials.	Guericke, Spathelf, Cremer et al.	2	3				
				Silvicultural management based on growth modelling for decision support	Students are enabled to guide structured goal-setting processes and to define operational realizable and measurable goals. By means of selected case studies (forestry enterprises of different types of ownership) and self-defined target hierarchies the influence of different silvicultural strategies and management decisions can be quantified on the basis of forest growth model calculations. The students are able to apply growth models and to evaluate and map the results of different mid-term scenario simulations. Students are enabled to weight the results of different target and management strategies by applying decision support systems. They are able to identify potentials and processes for the optimization of target hierarchies and to implement silvicultural control processes in the sense of adaptive management.	Guericke et al.	2	3	6	L, PE, P	E	PR

Semester	Status	Module	Module coordinator	Module components (if existing)	Goal of module component	Lecturer	SWH	Workload	Credits	Teaching form	Teaching language	Examination form
1	M	Forest governance and policy I	Mann	Concepts, institutions and actors	Students understand, can explain and analyse environmental governance systems. Rooted in a new institutional economics and political sciences understanding, students can distinguish between governance structures, institutions, actors and organisations. In particular they are familiar with key policy and governance concepts relevant for sustainable natural resources management and use. Besides the deepening of dedicated governance systems, students are able to explain and handle multiple realities for collaboration, integrated and adaptive approaches, and conflict management.	Mann, Walk, Welp	2	3	6	L, S, P	E	PP[1] (50%), PR[1] (50%)
				Environmental policy and nature conservation	Students are familiar with the general objectives, tools and current debates of environmental-, nature- and biodiversity conservation policy on different levels. They know the basic environmental governance structures, and the different policy instruments at stake to manage environmental problems. They are able to discuss the chances and limitations of these policy approaches in a nuonced way. For dedicated environmental policy arenas, students can analyse central actors, inherent problem perceptions and ideas for policy solutions. They are able to analyze participatory governance in different policy fields.	Walk, Ibisch, Welp, Mann	2	3				
1	M	Fundamentals of measurements and modelling	Miranda	Sensors for autmated 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	3				TD[2] (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	2	3	6	L, PE	E	TP[2] (50%)
1	E	Carbon sequestration and accounting[I]	Guericke	Carbon sequestration and accounting	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, Riek, Cremer	4	6	6	L, P	E	WR
1	E	Assessment tools and methods: Forest 4.0 / Parametrization and spatial assessment of biomass[II]	Mund	Assessment tools and methods: Forest 4.0 / Parametrization and spatial assessment of biomass	Students are aware of the principal methods and innovative technical tools for estimating, quantifying, calculating and mapping the baseline of different carbon pools and to monitor carbon stock changes related to various forest and land management measures. After the course, students have a solid foundation of principal concepts of biomass and carbon quantification and their specific cycles. Students know about the advantages applying remote sensing and modelling techniques for the spatial assessment and modelling of forest biomass at different scales. Students will learn about different carbon parametrization, quantification or simulation models for forest biomass on a landscape level and discuss methods to quantify forest biomass and estimate the forest carbon stock and their uncertainty.	Mund	4	6	6	L, S, PE	E	PP[1] (50%), PR[1] (50%)
1	E	Specialisation module I	Head of study programme		Students deepen their professional knowledge and skills in an specific area relevant to forestry system transformation. Students identify their specific personal interests in the field of forestry system transformation and broaden their technical and scientific horizon.		4	6	6	tbd	tbd	tbd

Semester	Status	Module	Module coordinator	Module components (if existing)	Goal of module component	Lecturer	SWH	Workload	Credits	Teaching form	Teaching language	Examination form
2	M	Rethinking environmental economics II	Mann	Economy – ecology system interactions	Students aquire knowledge on economy - ecology system interactions conceptualized as 'social-ecological systems' (SES). They gain a system-based understanding of system dynamics, stability and change, and economy as an integral part of the environment that needs to be understood in its uncertainties and limitations. Students are introduced to SES analysis frameworks, and will be able to apply them. The crucial role of institutions that mediate system interactions is highlighted. Alternative concepts for economic growth and human well-being are introduced and related critical issues such as ethics, fairness and equity debated.	Mann	2	3				
				Bioeconomy strategies	Students have a good understanding of the Bioeconomy concept in general. They understand the aims of different concepts and strategies related to Bioeconomy and how an efficient and resource-friendly use of natural resources such as plants, animals, and microorganisms shall be achieved. They can identify bioeconomy potentials of a range of various institutional, economic and biophysical settings with a special focus on forestry and analyze in how far these play a crucial role for shaping the countries bioeconomy strategies. Further, students are able to derive implications for a sustainable forest resource management.	Cremer, Mann	2	3	6	L, S, P	E	PP
2	M	Future management systems II	Sass-Klaassen	Strategic silvicultural planning & management	In this module basic and new concepts of forest ecology, management and restoration in a changing world are presented and discussed. Implication for multiple forest functions are evaluated with special emphasis to the resource wood. Students gain basic knowledge on actual approaches and tools to assess forest-area changes, forest productivity, and availability of forest resources (tree growth, dendrochronology, wood quality, sustainable biomass production, forest restoration, climate-smart forestry).	Sass-Klaassen, Spathelf	4	6	6	L, S, PE	E	WE120 (70%) & PR (30%)
2	M	Forest governance and policy II	Mann	Conflicts, cases and conflict management	Students gain a basic theoretical and practice-oriented understanding of conflicts in the realm of natural resource use and forest management. They are familiar with different types of (land-use) conflicts, conflict theory, distinct sets of conflict resolution strategies and underlying principles. They can analyse and derive conflict management strategies for sustainable land-uses and forest management that seem suitable for a range of distinct sitiuations.	Mann, Ibisch, Welp	2	3				
				Social science analysis of conflict cases	Students know about political institutions, actors and decision-making processes of climate policy. They are able to work on questions such as why do some interests groups have more influence in political processes than others? Students know about main empirical social science methods, types of data, and techniques for collecting social science data. They can decide for and apply different methods for different kinds of research questions (policy analysis, constellation analysis, network analysis). In addition, they can develop and discuss a variety of governance concepts.	Walk, Mann	2	3	6	L, S, P	E	PP
2	M	Socio-technical system transformation	Walk	Transformation governance	Students become acquainted with theories and concepts of transformation. They learn about actors, strategies and governance of transformation processes. Of special interest are civil society organizations and social movements. Students learn what a social movement is and about their part in transforming societies and stimulating rapid periods of cultural evolution. Students are enabled to reflect upon the role of civic, private and public sector institutions in transformation processes towards sustainable development.	Walk, Nölting	2	3				
				Innovation types, patterns and processes	Students gain a comprehensive understanding of-, and insights into, different innovation types as part of broader transformation strategies. Guided by a socio-ecological-technical system-based innovation understanding, they are able to differentiate between technology innovations, social innovations, governance and policy innovations as well as innovative forms of organisations related to natural resources provision and use. As such students gain a wide spectrum of conceptual and practice knowledge ranging from technical-production processes such as for bioenergy up to cooperative forms of organisation.	Mann	2	3	6	L, S, P	E	OR

Semester	Status	Module	Module coordinator	Module components (if existing)	Goal of module component	Lecturer	SWH	Workload	Credits	Teaching form	Teaching language	Examination form
2	E	Water- and Nutrientmanagement[I]	Schröder	Water management	Students are able to explore the close interrelations between forests and water. They can build on insights from forest site classification systems as well as forestry-related hydrological-meteorological findings, and understand the relevancy of forest management for water regulation in the light of global change problems. They can examine and debate the particular role of forests and its water regulation and adaptation abilities, its influence on water and heat systems, buffer functions and risks. The fundamental importance of water availability for ecosystem services will be highlighted together with management options for forests supporting their adaptive capacity. Students can recognise various context conditions, institutional frameworks and social demands for the use of water resources and elaborate sustainable water management strategies.	Schröder et al.	2	3	6	L, S, P	E	PP
				Nutrient management	Students get to know relevant nutrient cycles, their importance for functioning forest ecosystems stability, robustness and resilience, and possibilities of influencing them as part of forest and water management strategies.	Schröder et al.	2	3				
2	E	Transformation Pioneers[II]	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	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 forestry system transformation. Students identify their specific personal interests in the field of forestry system transformation and broaden their technical and scientific horizon.		4	6	6	tbd	tbd	tbd
3	M	Project management and communication	Mann	Project design and management	The seminar helps students to plan their own transformation project of moderate size related to the study programme's content. It takes them step by step from the first idea to a detailed project concept. Students acquire further skills in interdisciplinary scientific work and self-management. Students do not need any previous knowledge to take part in this course.	Mann	2	3	6	S, P	E	PR
				Communication and dissemination	Students get to know strategies for scientific communication, moderation and marketing. They are able to communicate results to expert and lay audience and get to know a range of dissemination strategies and media.	Mann	2	3				
3	M	Research project	Mann		The students accomplish a research project of moderate size related to the study programme's content. With the selected thematic orientation of the project, students can fullfill, in addition to the two complementary elective moduls, their study orientation.	Mann, Cremer	20	24	24	P	E	PR*

Semester	Status	Module	Module coordinator	Module components (if existing)	Goal of module component	Lecturer	SWH	Workload	Credits	Teaching form	Teaching language	Examination form
4	M	Master thesis colloquium	Mann	Master thesis colloquium	Students have to discuss and present their Master thesis topics, thesis design, conceptual orientation and expected results and challenges (in small groups and in plenum).	Mann, Cremer et al.	2	4	4	S	E	PP
4	M	Master thesis & defence	Mann	Master thesis & defence	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.	Mann, Cremer et al.	20	26	26	P	E/G (tbd)	PR (70%) PP (30%)

* exam not graded (evaluated as "passed" / "not passed")
[1] exams refer to all components of the module
[2] exams refer only to one module components, according to the location indicated in the curriculum

Field of specialisation:
I = Forest Management Strategies for Ecosystem Service Provision (FMS)
II = Transformation and Innovation (T&I)

Mandatory module (M)
Elective module (E)
Research semester / Thesis

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

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