Module code (1.)	Module description (2.)		Category (3.)
MBI 1550 Stand: 06.10.2021	Natural Resources – Depletion and Protection		Int. Master
	Degree program (4.)	Sustainable Engineering of Infrastructure	
	Faculty (5.)	Civil Engineering and Conservation / Restoration	

Module supervisor	(6.)	Prof. Dr. sc.agr. Kerstin Wydra
Type of module	(7.)	P (obligatory)
Frequency	(8.)	Annually
Standard semester of study	(9.)	1st semester
Credits (ECTS)	(10.)	5 ETCS
Assessment	(11.)	Coursework
Language of instruction	(12.)	English
Admission requirements	(13.)	-
Module is a requirement for	(14.)	-
Module duration	(15.)	1 semester
Mandatory registration	(16.)	
Applicability of module	(17.)	Civil Engineering, Master's in Renewable Energy Design

Course (18.)		Lecturer (19.)	Type (20.)	No. of students (max.) (21.)	No. of lessons per week (22.)	Contact hours per week (23.)	Workload	
							Face-to-face (24.)	Self-study (25.)
1	Natural Resources – Depletion and Protection	Prof. Dr. Wydra, N.N.	Lecture	25	1	2	30	40
2	Natural Resources – Depletion and Protection	Prof. Dr. Wydra, N.N.	Seminar	25	1	2	30	50
					Total	**4**	**60**	**90**
					Workload for the module (26.)			**150**

Learning objectives	(27.)	The students will learn about the state of the world's most important natural resources (especially those important for infrastructure needs), their management, value and protection, and economic issues (green economy, circular economy, waste and recycling) from a global perspective. They will acquire an interdisciplinary, holistic view of resource management, be able to devise research questions based on their specific professional background and develop interdisciplinary approaches towards solving the global resource problem. When developing specific projects, they will consider the lowest possible consumption of resources and impact on climate.

Course contents (28.)	Various issues relating to natural resources (land, vegetation, soil, water, raw materials/ minerals, sand), the status quo of the environment, planetary boundaries and resource protection (resource efficiency, waste management and recycling, green economy, cradle to cradle, etc.) are presented from a global perspective, using international examples: • the impact of climate change on natural resources in terms of human needs and infrastructure • the state of the world's forests • concept of planetary boundaries: biodiversity, excess nitrogen (N) & phosphorus (P) in the environment, ocean acidification, changes in land cover, etc. • the Anthropocene: concept of resilience, global megatrends, etc. • Living Planet Index • tipping point • waste and recycling • footprint: ecological, nitrogen, carbon dioxide, land, water • raw materials: global reserves, minerals and rare earth elements, sand • resource efficiency and productivity • decoupling and circular economy • bio-economy / green economy / postgrowth society • timber use as carbon sink • life cycle assessment of building materials and structures • design guidelines for green buildings • reuse of existing materials e.g. asphalt, brick, concrete, insulating materials, structural steel, wood, glass etc. • strategies and instruments for waste management plans on construction sites
Preliminary exam requirements and assessment (29.)	• Coursework and presentation
Literature (30.)	• Global Trends To 2030 – Challenges and Choices for Europe. https://www.iss.europa.eu/content/global-trends-2030-%E2%80%93-challenges-and-choices-europe • IPBES Assessment Report on Land Degradation and Restoration. 2019. https://www.ipbes.net/assessment-reports/ldr • Resource-Efficient Pathways towards Greenhouse-Gas-Neutrality – RESCUE. UBA 2019. https://www.umweltbundesamt.de/en/rescue/summary_report • Steffen et al. 2015: Planetary boundaries: Guiding human development on a changing planet. https://science.sciencemag.org/content/347/6223/1259855