

Module code (1.)	Module description (2.)	Category (3.)
MBI 2530 Stand: 07.10.2021	Urban Water Management	Int. Master
	Degree program (4.)	Sustainable Engineering of Infrastructure
	Faculty (5.)	Civil Engineering and Conservation / Restoration

Module supervisor (6.)	Prof. Dr.-Ing. Christian Springer
Type of module (7.)	P (obligatory)
Frequency (8.)	Annually
Standard semester of study (9.)	2nd semester
Credits (ECTS) (10.)	5 ETCS
Assessment (11.)	Written examination (90 minutes)
Language of instruction (12.)	English
Admission requirements (13.)	Fundamental knowledge of urban water management
Module is a requirement for (14.)	-
Module duration (15.)	1 semester
Mandatory registration (16.)	No
Applicability of module (17.)	Civil Engineering

Course (18.)	Lecturer (19.)	Type (20.)	No. of students (max.) (21.)	No. of courses per week (22.)	Contact hours per week (23.)	Workload		
						Face-to-face (24.)	Self-study (25.)	
1 Urban Water Management	Prof. Dr. Springer	Lecture	25	1	2	30	40	
2 Urban Water Management	Prof. Dr. Springer	Seminar	25	1	2	30	50	
Total					4	60	90	
Workload for the module (26.)							150	

Learning objectives (27.)	The social, economic and technical aspects of supply and disposal infrastructure will be taught. The students will learn about customized technical solutions for wastewater collection, wastewater treatment, urban sewage systems and waste management in countries with varying levels of economic development. They will also familiarize themselves with the various formal and informal stakeholders, acquire a general understanding of the legal and regulatory parameters and be able to relate economic pressures to social conditions and minimum environmental requirements.
Course contents (28.)	<ul style="list-style-type: none"> Technical infrastructure in/on road space (water supply, sewage disposal, overground heating pipes, gas,

	<p>electricity, waste collection/transport and communications), renewable energies</p> <ul style="list-style-type: none"> • Social, economic and technical parameters in developing and emerging countries • Types of businesses and organization of wastewater/waste collection and treatment, especially customized technical solutions • Cycle management in the water industry, innovative sanitation systems and eco-sanitation • Substance flow, treatment of black, yellow, brown and grey water • Low-cost toilet systems, decentralized sewage and rainwater treatment • Procedures for evaluating the quantitative and qualitative handling of rainwater • Link between waste - faeces - wastewater • Comparison of waste composition and quantities, customized approaches to waste management • Biological waste management, composting, fermentation • Landfills • Wastewater treatment (mechanical, biological, nitrogen and phosphorus elimination, sludge treatment) • Funding models
<p>Preliminary exam requirements and assessment (29.)</p>	<ul style="list-style-type: none"> • Final 90-minute examination • Assessed using grades 1-5 • Module grade is included in the overall grade in proportion to the number of credits earned
<p>Literature (30.)</p>	<ul style="list-style-type: none"> • Weiterbildendes Studium »Wasser und Umwelt« (Hg.) 2016: New Alternative Sanitation Systems (NASS) –, Bauhaus-Universitätsverlag, Weimar 2016 • Unhabitat, 2010 : Solid Waste Management in the Worlds Cities, Water and Sanitation in the Worlds Cities, earthscan, London, Washington 2010 • L.F. Diaz, W. Bidlingmaier, C. Springer, G.M. Savage 2020: Waste Management in Economically Developing Countries • E. Tilley, L. Ulrich, C. Lüthi, P. Reymond, R. Schertenleib C. Zurbrügg: Compendium of Sanitation Systems and Technologies 2nd Edition, • UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) 2019 Report - National systems to support drinking-water, sanitation and hygiene - Global status report 2019; WHO, UN-Water (2019)