Table 5.2 Specification of Course

Study Program: **International Material and Energy Flows Management**				
Type and level of study: Master Academic Degree				
Name of Course: ENGINEERING PRINCIPLES OF SUSTAINABLE WATER AND ENERGY MANAGEMENT				
Lecturer: Jelena Pavličević and Bojana Ikonić				
Status of Course: mandatory				
Credits (ECTS): 6				
Preconditions: none				
Aims of the Course The course is developed to meet the global importance, demands and challenges of sustainable water and energy management. The aim is to deliver qualified engineers who are equipped with an advanced understanding of essential principles and engineering aspects of integrated water resource and energy system design.				
Outcomes/Competences of the Course Students acquire necessary knowledge for better understanding of global importance and challenges in water and sanitation management, as well as global water cycle and global water problems. This course equips students with the skills needed in water science, aquatic ecology and the hydrological cycle, with understanding of the dynamic relationship between human and natural systems, water supply and wastewater, water pollutants and water quality parameters and standards. Students are also introduced with basic laws of (energy) physics, e.g. thermodynamics, electrodynamics and efficiencies. The course provides the basic engineering foundations in energy relevant issues and technical understanding on conventional energy power plant operations.				
Description of the Course Content Introduction to global water cycle and global water problems (hydrology); Impacts of pollution on ambient water quality: oxygen consumption, eutrophication, toxic impacts of waste water, bio-accumulation; Water quality parameters and standards: physical, chemical and biological characteristics; Industrial effluents and municipal wastewater: source and collection method; Advanced wastewater treatments; Water quality management strategies and international water-related policies; Seminar paper. Basics of energy (physics) and electricity; Technical analysis of the “Second Law of Thermodynamics”; Conversion of energy kinds; Cyclic processes for energy conversion and their technical outline; Technical principles of conventional power plants.				
Required Readings 1. D. Yogi Goswami, Frank Kreith, Energy Conversion, CRC Press, 2007. 2. D. Yogi Goswami, Frank Kreith, Energy management and conservation handbook, CRC Press, 2008. 3. Ondeo Degremont, Water Treatment Handbook, Lavoisier, 2002.				
Lessons				Other hours
Theory: 60	Practice:	Other:	Research work	
Teaching Methods Interactive lectures, group discussions, case studies, calculations, seminar paper				
Grade (maximal number of points: 100)				
Pre-exam duties	**Points**	**Final exam**		**Points**
Activity during the lectures	10	Oral exam		30
Test I and Test II	40			
Seminar paper	20			