Table 5.2 Specification of Course

Study Program: **Material and Energy Flows Management**				
Type and level of study: Master Academic Degree				
Name of Course: ECOSYSTEM MANAGEMENT				
Lecturer: Zoltan Zavargo and Aleksandar Jokić				
Status of Course: mandatory				
Credits (ECTS): 6				
Preconditions: none				
Aims of the Course The objectives of this course are: Understand the systemic interaction of ecosystems, Understand thermodynamic principles and its effect on ecosystems and man-made systems, Describe material flow and energy flow in ecosystems, Show the interaction between natural system and man-made systems, Analyze the global environmental issues and describe possible solutions				
Outcomes/Competences of the Course Students are trained to lead, create and develop new technological processes, and to have all the necessary knowledge and skills that enable applying original ideas and direct involvement in scientific-research work.				
Description of the Course Content Introduction to ecosystem theory (characteristics of ecosystems, ecosystem structure, functions and benefits, environment, species, predators, symbiosis, population, biosphere, biotope, ecosystem types, ecosystem products and services, human impacts on ecosystems), Introduction to ecosystem management (ecosystem-based management defining ecosystem management, definitions of ecosystem management, principles of ecosystem management, approaches to ecosystem management ecosystem management partners, tools and practice), Material flow in ecosystems (carbon cycle, phosphorous cycle, nitrogen cycle, water cycle, food chain: photoautotrophic, heterotrophic, decomposers), Waste and waste water in ecosystems (detritus recycling, waste water in ecosystems and relation to man-made systems, natural treatment of water pollution, bio indicators for water quality, BOD, COD) soil development bio char /terra preta/, Energy in ecosystems (energy supply of natural ecosystems, energy balance in ecosystems, energy in the food chain, thermodynamics and the environment, ecosystem thermodynamics, thermodynamic principles, energy, entropy and exergy, eco-exergy, simplified energy and entropy balances in an ecosystem, thermodynamic model of soil degradation), Global environmental issues (water /water pollution, water scarcity, flooding/; waste /industrial, household, farming and military waste/, energy /fossil and renewable sources/, agriculture /food security, renewable fuels, pollution, deforestation, soil degradation, etc./, global warming, ocean pollution, landscape degradation etc. Case studies with potential solution approaches				
Readings 1. Kristina A. Vogt et al.; "Ecosystems: Balancing Science with Management", Springer, 1997. 2. Ibrahim Dincer, Marc Rosen; "EXERGY: Energy, Environment and Sustainable Development", Elsevier 2007. 3. D. Yogi Goswami, Frank Kreith, Energy Conversion, CRC Press, 2007. 4. D. Yogi Goswami, Frank Kreith, Energy management and conservation handbook, CRC Press, 2008.				
Lessons				Other hours
Theory: 45	Practice: 30	Other :	Research work:	
Teaching Methods: Lectures, project (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 II	40			
Seminar paper	20			