

**Table 5.2** Specification of Course

<b>Study Program: Material and Energy Flows Management</b>			
<b>Type and level of study: Master Academic Degree</b>			
<b>Name of Course: INDUSTRIAL MATERIAL FLOW MANAGEMENT</b>			
<b>Lecturer: Zoltan Zavargo and Oskar Bera</b>			
<b>Status of Course:</b> mandatory			
<b>Credits (ECTS):</b> 8			
<b>Preconditions:</b> none			
<b>Aims of the Course</b> Students gain the necessary knowledge about principles of industrial material flow management, sustainability management and reporting, and industrial aspects of cleaner production. The aim of the course is students provide knowledge on how to develop strategies that lead to a reduction in material and energy demand in industry, to increase ecological efficiency as well as to increase economic competitiveness.			
<b>Outcomes/Competences of the Course</b> Students are able themselves to analysis and leading the industrial processes in local, regional and global level, by using the principles of industrial material flow management. Students are trained in evaluating and increasing the eco-efficiency of industrial companies by applying life-cycle-analysis and industrial MFM case studies experience. Sustainability management and reporting is supported by overview of sustainability management and reporting Initiatives and strategies in industry and by analysis of the global reporting initiative. Students use principle of ISO and EMAS and know their requirements and differences. Students are able to independently apply the principles of clean and economical production. Consumption of raw materials and energy are rationalized, toxic materials are replaced, and the emission of toxic substances is reduced.			
<b>Description of the Course Content</b> Principles of Industrial Material Flow Management; Definition of Industrial Material Flow Management (MFM) and related terms; Principles of Eco-Efficiency in Industry; Introduction to Life-Cycle Analysis and Environmental Management; Overview of Sustainability management, Reporting Initiatives and Strategies in Industry; Carbon Footprinting and other footprints; Principles and Analysis of the Global Reporting Initiative GRI (Definitions and Examples); The principles and key elements of Industrial Aspects of Cleaner Production. The concept of clean and cleaner production; System analysis of the technological process. Description of operations, processes and equipment. Process modeling: partial and overall balances; Systematization and classification of hazardous and harmful substances; Clean sources of energy. Solar, wind and water energy. Clean biomaterials and biofuels in production; Analysis and optimization of processes to reduce waste and energy consumption. Ecological processing of waste. Comparative analysis of energy efficiency. From the strategy and economics of clean production to the innovation technology; Case Studies. Students will work on case studies provided by the lecturer during the lessons.			
<b>Required Readings</b> 1. Bernd Wagner, Stefan Enzler, Material Flow Management: Improving Cost Efficiency and Environmental Performance Sustainability and Innovation, Springer Science & Business Media, 2005.			
<b>Lessons</b>			Other hours
Theory: 45	Practice:45	Other: Research work	
<b>Teaching Methods:</b> Lectures and students group work			
<b>Grade (maximal number of points: 100)</b>			
<b>Pre-exam duties</b>	<b>Points</b>	<b>Final exam</b>	<b>Points</b>
Activity during the lectures	10	Oral exam	30
Test I and Test II	40		
Seminar paper	20		