

Syllabus Format

Session Course as part of IMAT course “2.2 Regional Material Flow Management: Conceptual Approach and International Case Studies”

Instructor Name: Prof. Dr. Peter Heck

Item	Details
1 Recommended qualifications/ knowledge	None
2 Course Objectives	<p>The session course is part of the IMAT course 2.2 (Regional Material Flow Management) introducing the cutting edge research ideas and conceptual approaches of Zero Emission and Material Flow Management as suitable strategies to establish new economy forms on a regional level. The learning outcomes are:</p> <ul style="list-style-type: none"> ▪ Learn to analyse regions from cultural, economical, historical, political and administrative backgrounds (Material Flow Analysis) ▪ Understand the different forms of value (generations) in regions: Social, economical, ecological ▪ Understand how regions communicate internally and externally and how regions are governed ▪ Get a first overview on key Zero Emission technologies to implement regional Zero Emission strategies (extended in the Modules 5 to 8) ▪ Learn to use microeconomic tools to evaluate the regional added value potentials and calculate the business and development opportunities (extended in Module 9) <p>The major learning outcome and competence within 2.2 are:</p> <ul style="list-style-type: none"> ▪ Learn to use MFM tools to develop and implement MFM master plans in an international context ▪ Ability to design an own RMFM project in a non European region.
3 Standards for Course Completion	Participation of at least 60% and group presentation on assigned topics.
4 Teaching Methods	Lectures, discussions, case studies and student presentations.

5 Overview of Each Class

The course provides an holistic overview on the regional MFM tools and strategies applied by the Institute of Material Flow Management (IfaS) to develop Zero Emissions systems on a regional level. The course is structured alongside an regional MFM project approach:

1) Introduction: Strategic Aspects of regional MFM and Zero Emission

Global environmental and economic issues and the regional dimension

Zero Emission: new strategy for economic promotion and applied environmental/climate protection

Overview on regional MFM tool kit and strategies

2) Material Flow Management: Discover the potentials

Methods and ways to define the system boundary

Design target-oriented qualitative and quantitative assessments methods, e.g. regional GHG balance

Identification and modeling of current material and energy flows and future optimization potentials in the system (waste, water, wastewater, energy, agriculture, tourism, traffic, mobility etc.)

Analyse the relevant (inter-) national legal framework and environmental conditions

Analyse and predict the true (and hidden) system costs and expenditures

3) Key Person and Stakeholder Management

Analysing the key persons and main stakeholder: Ranking them according to their importance for change management in the region or according to the quantity and qualities of material flows under their (in-) direct influence

Evaluating the stakes of the key persons in the system and developing win-win strategies

4) Designing regional Zero Emission Technology Systems

Introduction of Key Zero Emission Technologies such as Biogas, Tri-Generation Technologies, District Heating and Cooling Grids, renewable Energies and Energy Storages, Nutrient recovery Technologies for waste water, Waste-to-energy-and-resources, etc.

Systemic design aspects of ZE technologies

Regional added value potentials and economic drivers for ZE technologies

5) Regional Added Value: Innovative Financing Tools and Financing for Innovations

Methods and tools to calculate Regional Added Value

New forms of financing: regional pension funds (social

6 Method of Grade Evaluation	The total score for the course is 100%: Exam: 60 minutes (50%) & Scientific paper: 20 pages (50%)
7 Requirements for Students	None
8 Required Reading (The student will need to purchase these textbooks when registering for this course.) (Max.3Books)	<p>Brunner, Paul H./ Rechberger, Helmut: <i>Practical Handbook of Material Flow Analysis</i>, Lewis Publications, 2004.</p> <p>Manuskript für das Buch von Heck, Peter: Applied Material flow Management, Springer, Heidelberg New York, to be published in 2007.</p> <p>Misc. Notes Project papers will be given to students during the lecture</p>
9 Further Reading (Max 15 Books for an Undergraduate school subject. Max 30 Books for a Graduate school subject.)	<p>BMU (2009), <i>Zero Emission: Recognising the potential , Optimising processes, creating added value</i></p> <p>(Free download at: https://www.mf.tu-berlin.de/fileadmin/fg267/veranstaltungen/gcsm/Case_St._Material/BMU_Bro_Null-Emissionen_ENG_07_RZ2_web1.pdf)</p>
10 Misc. Notes	
11 Office Phone No.	
12 E-mail Address	p.heck@umwelt-campus.de
13 Course-related links	

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