

Environmental and Recycling Technology (M. Eng.)

Module – Number	739	Obligatory in specialization Recycling Technology (RT)		
Module name	Urban Mining and Circular Economy			
Module coordinator	Prof. Dr. Ariane Ruff			
Title	Urban Mining and Circular Economy			
Title of examination	Urban Mining and Circular Economy			
Semester	2 nd			
Course type	Language	Lecture	English	
Credit hours/ ECTS/ Workload	4	5	150	
Formal Conditions	Bachelor of Engineering or Bachelor of Science degree			

1. Content and objectives

Content:

Basics Urban Mining

Urban mining - the city as a raw material store.

Identification of anthropogenic deposits and quantification of the secondary raw materials they contain.

Value chain in urban mining.

Economic feasibility studies against the background of the available technical recovery variants and the currently achievable and future forecast revenues. Economic processing and recovery of the identified recyclable materials as well as the integral management of anthropogenic deposits.

Building materials recycling

Materials cycles and material flow management in construction creation, processing (machine technology, plant types) and recycling of construction waste (asphalt, broken concrete, broken masonry, other types of construction waste) regulations for handling construction waste

Learning objectives:

In the further development of the circular economy, which focuses on the closure of material cycles, urban mining is a holistic approach that should be conveyed to the students.

There is a special focus on building materials.

Literature: For preparation and follow-up the following textbooks are recommended:

1. Lacy, P.; Long, J. Spinder, W.: The Circular economy Handbook: Realizing the Circular; Palgrave Macmillan, 2020; ISBN 1349959677
2. Worell, E.; Reuter, M. (ed.): Handbook of Recycling, Elsevier Inc., 2014.
3. Förtsch, G.; Meinholz, H.: Handbook of operational circular economy, 2015
4. Kurth, P.; Oexle, A.; Faulstich, M.: Handbook of Recycling and Raw Materials Management, 2013, ISBN 978-3-658-17045-5
5. GTOG: From production to recycling: a circular economy for the European Gypsum Industry with the demolition and recycling industry. Report on production process parameters, 2015.
6. McDonough, W.; Braungart, M.: Cradle to cradle: remaking the way we make things; London: Vintage Books, 2009; ISBN 978-0-09-953547-8
7. Kranert, M.: Einführung in die Kreislaufwirtschaft: Planung-Recht-Verfahren; 5. Auflage Wiesbaden, Springer Vieweg, 2017; ISBN 3-8348-1837-2 und 978-3-8348-1837-9
8. Oehlmann, C.: Vom Abfall als Problem zum Abfall als Ressource, Baden-Baden: Nomos Verlagsgesellschaft, 2017; Dissertation Uni Bremen 2016; 978-3-8452-8060-8
9. Hillebrandt, A.; Riegler-Floors; Rosen, A.; Seggewies, J.: Atlas Recycling: Gebäude als Materialressource; München: Detail Business Information GmbH, 2018; ISBN 3-95553-415-4

2. Method(s) of instruction

Lecture

3. Requirements for attendance

There are no formal requirements for participation.
4. Usability of this module
This module is obligatory in the specialization RT and a compulsory module in the other specialization ET.
5. Requirements for assessment
Students need to pass the module examination, which encompasses all contents of the lecture. Type of examination: written examination with a duration of 90 min. Alternative types of examination are possible.
6. ECTS Credits
Modules are assessed by a module examination, which is credited by 5 credit points according to the ECTS (European Credit Transfer and Accumulation System).
7. Frequency of offer
The module is scheduled for the first academic year.
8. Workload
Course participation = 50 h Preparation and follow-up (of the lecture) = 55 h Preparation for examination = 45 h The entire workload encompasses 150 hours, which equals 5 ECTS credit points.
9. Duration of module
The module is held within one semester.