



MISKOLCI EGYETEM

**MŰSZAKI FÖLD- ÉS
KÖRNYEZETTUDOMÁNYI
KAR**

Tantárgy neve: Treatment and processing of construction industrial- and glass wastes

**MŰSZAKI FÖLD- ÉS KÖRNYEZETTUDOMÁNYI KAR MSc KÉPZÉS
(nappali munkarendben)**

TANTÁRGYI KOMMUNIKÁCIÓS DOSSZIÉ

**MISKOLCI EGYETEM
MŰSZAKI FÖLD- ÉS KÖRNYEZETTUDOMÁNYI KAR
NYERSANYAGELŐKÉSZÍTÉS ÉS KÖRNYEZETTECHNOLÓGIA INTÉZET**

Ajánlott félév: 2. félév

Tartalomjegyzék

1. Tantárgyleírás, tárgyjegyző, óraszám, kreditérték
2. Tantárgytematika (óraóra lebontva)
3. Vizsgakérdések
4. Egyéb követelmények

1. TANTÁRGYLEÍRÁS

<p>Course Title: Treatment and processing of construction industrial- and glass wastes</p> <p>Instructor: Dr. Gábor Mucsi</p>	<p>Code: MFEET720017</p> <p>Responsible department/institute: Institute of Raw Material Preparation and Environmental Technologies</p>
<p>Position in curriculum (which semester): 2</p>	<p>Pre-requisites (if any): -</p>
<p>No. of contact hours per week (lecture): 2</p>	<p>Type of Assessment (examination/practical mark / other): examination</p>
<p>Credits: 3</p>	<p>Course: full time</p>
<p>The aim of the subject for students is to learn knowledge about the treatment and processing of construction industrial- and glass wastes.</p> <p>Construction industry wastes' types, their generation. Their fundamental process engineering and chemical properties, international experience of their utilization in the road construction. Process engineering technologies. General utilization possibilities.</p> <p>Main types, properties, generation of glass wastes. Types, composition and properties of glass, with special regards to the process engineering, mechanical and chemical characteristics. Utilization. Preparation technologies. Recovery of valuable components. Mechanical and thermal processes. Quality control methods.</p> <p>a) Knowledge Understands the processes described by the general and specific theories required for the practising of the fields of earth science engineering. Has a solid technical and scientific knowledge required for the high-level progress in earth sciences engineering disciplines, among others in numerical methods, technical physics and their contexts. Based on his/her knowledge, understands the structure of the raw material extraction sector, the technologies used for the extraction and preparation of mineral raw materials. Knows the problem-solving (research-planning and management) techniques of best available practices in earth sciences. Has a well-established knowledge of the legal, economic, administrative, safety, work and fire protection, information technology and environmental protection fields related to the fields of earth science engineering.</p> <p>b) Skills Able to apply general and specific basic and applied scientific theories within the technical earth sciences, able to systematize them, to solve independent engineering tasks (mainly complex prospecting, final report summarizing exploration results, geological-geophysical parts of environmental impact assessments). Able to convey knowledge authentically by preparing presentations and written documents in Hungarian or in a foreign language. Able to perform complex planning, construction, inspection and official licensing tasks with the innovative application of theories and terminology describing technical earth science knowledge. - Able to review legal and economic knowledge and activities related to technical earth science tasks, to optimize connections. Able to actively cooperate with, organize, manage, and supervise larger and more complex activities based on or incorporating technical earth science tasks (especially mining, environmental technology investments, operations). Able to solve technical problems requiring innovative skills in theory and practice (especially field, surface, underground data collection, measurements, and their processing and interpretation requiring innovative skills). Able to organize cooperation with related disciplines and manage the (working) group within the framework of larger and more complex activities based on or incorporating technical earth science tasks.</p> <p>c) Competence in terms of attitude Open and receptive to the knowledge and acceptance of professional and technological methodological developments in the fields of technical earth sciences, to the acquisition of their management, and to the participation in their development. Actively applies innovative skills and knowledge in solving professional problems. Commits and convincingly demonstrates to knowing and adhering to the professional and ethical values. Professionalism and professional solidarity have deepened. Respects and follows the ethical principles and written rules of work and professional culture in activities, and is able to follow them even when managing small workgroups. In the course of professional work, observes and adheres to the requirements of safety, health, environmental protection and quality assurance and control (SHE and QA / QC). Has a sufficient motivation to carry out activities in often changing working, geographical and cultural circumstances.</p> <p>(d) Competence in terms of autonomy and responsibility With the in-depth knowledge of the received strategic guidelines and external environmental requirements, is able to plan the work independently, and is also suitable to lead workgroups. Takes responsibility and is accountable for the work processes carried out under his / her control, for the employees working in them. Makes decisions carefully, in consultation with representatives of other disciplines (primarily legal, economic, and environmental), independently, takes responsibility for decisions. In addition to constructive teamwork, is</p>	

an autonomous specialist capable of making professional decisions in the field of operation entrusted to him/her. Committed to the practice of sustainable natural resource management, occupational health and safety

Assessment and grading: Students will be assessed with using the following elements.

Attendance: 5 %

Homework: 10 %

Short quizzes: 10 %

Midterm exam: 40 %

Final exam: 35 %

Total: 100%

Grading scale:

% value	Grade
90 -100%	5 (excellent)
80 – 89%	4 (good)
70 - 79%	3 (satisfactory)
60 - 69%	2 (pass)
0 - 59%	1 (failed)

Compulsory or recommended literature resources:

Jorge de Brito, Nabajyoti Saikia: Recycled Aggregate in Concrete: Use of Industrial, Construction and Demolition Waste (Green Energy and Technology) Springer 2013.

Csőke B.: Építési Hulladékok előkészítése és hasznosítása. Környezetvédelmi Füzetek. OMIKK (ISBN 963 593 414 9, ISSN 0866-6091), 1999./19

Gabor Mucsi, Barnabas Csőke, Mark Kertész, Laszlo Hoffmann: Physical Characteristics and Technology of Glass Foam from Waste Cathode Ray Tube Glass. JOURNAL OF MATERIALS 2013:pp. 1-11. (2013)

Gábor Mucsi, Barnabás Csőke: Power plant fly ash as a valuable raw material. Journal of Geosciences and Engineering Published by The Faculty of Earth Science and Engineering Miskolc University, Vol. 1.

Joseph Davidovits: Geopolymer Chemistry and Applications. Institut Geopolymer, 2008. (Second edition) ISBN: 9782951482012

2. TANTÁRGYTEMATIKA

Treatment and processing of construction industrial- and glass wastes

Tantárgytematika (ÜTEMTERV)
Aktuális tanév őszi félév
Környezetmérnök MSc, 2. félév, törzsanyagos tárgy

Oktatási hét (2023.II.fé)	Előadás
1.	Introduction. Requirement of the subject.
2.	Construction industry wastes' types, their generation.
3.	Construction and Demolition Waste (CDW) fundamental process engineering and chemical properties.
4.	International experience of their utilization in the road construction. Case studies.
5.	Process engineering technologies. General utilization possibilities.
6.	Holiday
7.	Main types, properties, generation of glass wastes.
8.	Types, composition and properties of glass, with special regards to the process engineering, mechanical and chemical characteristics.
9.	Utilization and preparation technologies. Recovery of valuable components.
10.	Mechanical and thermal processes of glass waste. Quality control methods.
11.	Holiday
12.	Plant visit
13.	Combined utilization of various waste types. Synergetic effect of different properties.
14.	Consultation

Date	Seminar topic	Instructor
27.02.	Health and safety instructions; Fire protection instructions; Crushing and grinding tests (jaw crusher) and determination of particle size distribution by sieving	NGAM-KT
06.03.	Lecture	MG
13.03.	Lecture	MG
20.03.	Lecture	MG
27.03.	Portable X-ray fluorescence (XRF); Determination of particle size distribution by sieving (cont.)	NGAM
03.04.	Lecture	MG
10.04.	Holiday	
17.04.	Density determination of solid matter by pycnometer Investigation of hydraulic activity of CDW (CaO adsorption test)	NGAM
24.04.	Lecture	MG
01.05.	Holiday	
08.05.	Measurement of particle size distribution by laser particle size analyser. Blaine method	FI-NGAM
15.05.	Geopolymer production from CDW	NGAM
22.05.	Glass foam production from waste glass	FI
29.05.	Holiday	

3. VIZSGAKÉRDÉSEK

Vizsgatételek Treatment and processing of construction industrial- and glass wastes

c. tantárgyból

1	Prepare a drawing about a general CDW processing technology with giving the main machines!
2	Please describe the types of Construction and Demolition Wastes (CDW)!
3	Please provide the main parameters of glass wastes and types!
4	Please describe a selected glass waste processing technology!
5	What kind of utilization possibilities of CDW do you know?
6	How to determine the main physical and chemical properties of CDW?
7	How to determine the main physical and chemical properties of glass waste?
8	What kind of contaminations of CDW do you know?
9	Please explain the working principle of jaw crusher! Provide drawing!
10	Please explain the working principle of impact crusher! Provide drawing!
11	Please explain the working principle of gyratory crusher! Provide drawing!
12.	Please describe examples for synergetic utilization of industrial by-products and wastes (glass, fly ash, fibers). Technology and product properties.

5. EGYÉB KÖVETELMÉNYEK

A vizsga zárthelyi dolgozat írása közben a mobiltelefon használata tilos!

Miskolc, 2023. január.10.

Dr. Nagy Sándor
Intézetigazgató egyetemi docens

Dr. Mucsi Gábor
egyetemi tanár