



# DAAD

Deutscher Akademischer Austausch Dienst  
German Academic Exchange Service



## Educational Project

### “EcoMining: Development of Integrated PhD Program for Sustainable Mining & Environmental Activities”

01.01.2019-31.12.2022

**The main purpose of the Project** is to design, implement, execute and evaluate the PhD program “EcoMining” performed in close cooperation between **TU Bergakademie Freiberg** (TU BAF) and **National Technical University “Dnipro Polytechnic”** (NTU DP). Modules with lectures, seminars and practical courses, Workshops and Summer Schools are developed by staff from both universities and associated partners from academia and industry in such a way that they will serve educational and scientific needs of NTU DP as well as other regional Universities.

**Partner Universities:** TU BAF (Germany) and NTU DP (Ukraine)

#### **Associated Universities in Ukraine:**

- Dnipro State Agrarian-Economic University
- Oles Honchar Dnipro National University / Botanical Garden
- Ukrainian State University of Chemical Technology

#### **Industrial partners:**

- Vilnohirsk Mining & Metallurgical Plant (Ukraine)
- Poltava Mining & Metallurgical Plant (Ukraine)
- DTEK Company (Ukraine)
- LMBV (Germany)
- Wismut (Germany)
- LEAG (Germany)

#### **Main activities**

- PhD courses in “Eco-Mining” trainings
- Workshop “Structure and requirements of a PhD study”
- Workshop “Case-studies and advanced research in the field of sustainable mining”
- Seminar course and practical training “Strategic planning in professional activities”
- Workshop “Scientific communication and project management”
- Field trip to Ordzhonikidze Open Pit Mine and Mineral Processing Plant (Ukraine)
- Field trip to Vilnohirsk Mine and Metallurgical Plant (Ukraine)
- Field trip to sunk open pits „Blue Lakes“ (Kamyanske, Dnipro region)
- Lab Research Internship at TU BAF
- Advanced Lab Research Internship at TU BAF on Geobiotechnology and Sustainable Mining
- Summer School “Eco-Mining” in Berdiansk
- International Conference “EcoMining: Sustainable Existing of Nature and Industry“ with Pre-symposium practical training on selected advanced Labmethods in Geobiotechnology and Sustainable Mining

### **PhD courses in “Eco-Mining” trainings**

<b>Discipline</b>	<b>Main modules description</b>
Environmental Technologies in Mining 1.5 ECTS	<ul style="list-style-type: none"><li>• Water and mass transport in soils</li><li>• Methods of system analysis of the quality of the environment and ecosystems based on the use of geographic information technology and systems</li></ul>
Innovative Technologies in Mining and Technical Reclamation 1.5 ECTS	<ul style="list-style-type: none"><li>• Geology and Minerals of the Ukrainian Shield</li><li>• High-gradient magnetic separation of feebly magnetic ores: Case Study</li><li>• Ash-and-slag components as valuable mineral raw materials</li><li>• Geomechanical Modeling of Mines and Dumps Using K-MINE to Minimize the Disturbed Lands Areas in Mining Operations</li></ul>
Biotechnology in Mining 4 ECTS	<ul style="list-style-type: none"><li>• Phytoremediation Technologies for Land Reclamation: best available practices on international and national level</li><li>• Trace Elements Bioleaching from Coal Mining Spoil Dumps in Ukraine: Case Study</li><li>• Optimization and simulation measures for energy accumulation and elements uptake with plant biomass as source for the novel goods production in the abandoned minelands</li><li>• Forest tree reclamation, phytostabilization and phytoremediation of coal mining heaps</li><li>• Forestry Remediation Systems on Mining Rock in Ukraine: Case Study</li><li>• Bioremediation and biomining with microalgae and cyanobacteria cultures</li><li>• Suitability of second generation biofuel grasses for post-mining land remediation and phytomining</li><li>• Extraction of rare and noble metals using plant extracts</li></ul>
Advanced Topics from Biomining 1.5 ECTS	<ul style="list-style-type: none"><li>• Plant-soil interactions in phytoextraction, rhizosphere processes</li><li>• Optimization of bioleaching processes</li></ul>
Responsible Mining Approach 1.5 ECTS	<ul style="list-style-type: none"><li>• Responsible Mining Approach</li><li>• Formation and Mining of Man Caused Deposits</li></ul>

#### ***Project Coordinators:***

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