VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MINING AND GEOLOGY

Waste Management and Mineral Processing

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Faculty	Faculty of Mining and Geology
Type of study	Bachelor
Language of instruction	English
Code of the programme	B0712A290002
Title of the programme	Waste Management and Mineral Processing
Regular period of the study	3 years
Coordinating department	Department of Environmental Engineering
Coordinator	doc. Ing. Iva Janáková, Ph.D.

About study programme

Waste and secondary raw materials – current and future problems for the humanity. The study focuses on beneficiation and processing of mineral resources and new European trends in waste management focusing on circular economy and zero waste programme. The study shall prepare graduates for the implementation of modern technologies in processing, recycling, and use of waste and secondary raw materials. The study programme prepares students also in the areas of information science and visualisations connected with process technologies, as well as emphases soft skills.After graduation students have a number of options to find jobs in the industry, in companies (technologist, waste manager), in research and development, in state administration related to environmental protection.

Professions

- Specialist in laboratory methods
- Waste Management Manager
- Head of the laboratory
- Secondary Raw Materials Manager
- Technical Specialist - Materials Engineer
- Project Manager in the Raw Materials Treatment Department
- Designer
- State Administration Officer
- Regional Waste Management Manager
- Sampling Technichan
- Environmental Program Manager, Global Waste Management
- Technologist
- Scientific, research and development worker at universities
- Environmental manager
- Laboratory assistant
- Process specialist
- Researcher

Hard skills

- Knowledge of raw materials and their use
- Knowledge of proposals for methods of smoothing out mining activities (remediation, reclamation)

- Knowledge of packaging technologies
- Knowledge of the use of waste material after mining (dumps, heaps)
- Knowledge of waste management issues
- Experience in the field of state administration in the field of environmental protection and autonomy
- Basic legislation in the field of environmental protection and packaging management
- Knowledge of law in the field of environment
- Laboratory work experience
- Knowledge of waste energy utilization
- Knowledge of informatics in waste management
- Knowledge of packaging legislation
- Knowledge of waste properties evaluation
- Orientation in the processing of materials and input raw materials
- Orientation in legislative regulations and internal operational-technological documentation
- Knowledge of chemical and waste management
- Knowledge of legal regulations and ISO standards
- Knowledge in the field of waste management
- Knowledge of basic microbiological analyzes
- Orientation in technical drawings
- Knowledge of legislation in the field of waste management
- Basic knowledge of mineralogy
- Knowledge of flotation methods
- Basics of microscopics analyses
- Knowledge of ISPOP
- Knowledge of waste management legislation (Waste Act, Administrative Procedure Code)
- Knowledge of waste disposal methods
- Knowledge of the relationship of packaging to the environment
- Knowledge of mineral biotechnologies
- Knowledge of raw material treatment technology
- Knowledge of recycling technologies
- Knowledge of environmental law
- Knowledge of sampling and sample preparation
- Knowledge of technical documentation
- Knowledge of legal regulations in the field of environmental protection
- Knowledge of thermic methods
- Knowledge of take-back and processing of batteries and accumulators, OH legislation
- Knowledge of ISO 9001, ISO 14001 standards
- Orientation in schemes
- Waste management, communication with the state administration, methodical guidance of managers in the field of environmental protection
- Knowledge of industrial technologies and their impact on the environment
- Orientation in drawings
- Knowledge of waste records including waste income control
- Knowledge of valid legal and normative regulations (especially laws, decrees, and government regulations)
- Knowledge of process optimization
- Knowledge of recycling and treatment technologies
- Knowledge of ISO 9001, ISO 14001, OHSAS 18001 standards
- Knowledge of technological process

Graduate's employment

The programme graduate may become a specialist "Waste Manager" as defined by § 15 of Act 185/2001 Coll., on waste. Thanks to the high-quality theoretical knowledge and university education of application-directed programme complemented with practical seminars and practice, the graduates are highly flexible as for the specific requirements in their future professions - they may find jobs in state administration, industry and agriculture, research and development, rescue services, customs authorities, project management, transport and media, where the jobs are connected with raw material and waste management.

The graduates may find jobs in the industry and municipal sphere related to waste management, companies dealing with collection, storing, transport, landfilling, processing, or disposal of waste, in control and supervision authorities and state administration bodies. The gained qualification enables graduates to run a business in the area of mining and processing of raw materials.

List of professions according to the ISCO classification, for which the graduates may apply:
13115 – Manager in environmental protection
13215 – Manager in the field of waste and redevelopment
21430 – Specialist in industrial ecology
2433 – Specialist in sale and purchase of products and services (apart from information and communication technologies)
31199 – Technician in other (herein unspecified) industrial fields
3141 – Technician and laboratory technician in biological and related fields (apart from medicine)
31414 – Technician in ecology
31321 – Operators of incineration plant control room

Study aims

The study programme is based on a general technical and natural-science background. It aims to prepare specialists for their professions, in which they apply the state-of-the-art knowledge and methods. The programme has a multidisciplinary character providing vital technology knowledge to introduce and operate the existing and modern technologies in the field of waste management and raw material processing. In the Bachelor study programme the focus is placed on gaining wide knowledge in mineral resources, waste management, basics in the assessment of waste and raw material properties, mineralogy, physics, chemistry, and fields related to raw material and waste management, waste disposal, valuable material recovery, waste recycling, and processing technology including the legislative frameworks. The instruction well combines basic and applied courses, and includes practical instruction in the laboratory and practice in the industry.

The aim of the study is to prepare graduates able to:
• find, classify, and interpret information in the area of mineral resource processing, and expert management of secondary raw materials and waste within circular economy;
• minimize environmental impacts of processing technologies;
• apply theoretical knowledge in practice;
• deal with simple technical problems in a responsible manner;
• communicate own expert opinions in a clear and persuasive manner to colleagues;
• make good use of knowledge in further studies.

Graduate's knowledge

• technical terminology and basic legislation in the field of mining and processing of mineral resources;
• basic knowledge in waste management, including the preparation for the assessment of waste properties, mineralogy, chemistry, instrumental methods, physics and technologies, including the legislation framework of waste management;
• technologies used in the processing of raw materials and waste - mechanical, chemical, physical-chemical and biotechnological all the way to special methods of thermal processing of materials;
• practical competencies for the work in the laboratory when determining the characteristics and properties of raw materials and waste, and carrying out a wide spectrum of activities related to processing;
• principles of modern technologies focused on the management of secondary raw materials and waste - starting with the extraction

of raw materials, their processing, via production, all the way to consumption of products.

Graduate's skills

• being well informed about the minimisation of environmental impacts of processing technologies and their risk assessment;
• being able to propose a suitable method for the processing of mineral resources and waste;
• being able to apply the theoretical knowledge in the operations dealing with the processing of raw materials and waste (preparation plants, crushing plants, and screening plants for mineral resources and secondary raw materials) in practice;
• being well informed about the legislation, particularly related to waste management;
• being able to use modern information technologies;
• making good use of communication skills in practice.

Graduates will be able to apply the gained knowledge and skills in the areas related to processing and use of primary raw materials, waste recycling, and wastewater treatment. Attention is also paid to the issues of environmental protection and subsequent care for the localities strained by post-mining and processing of mineral and secondary raw materials.

Graduate's general competence

Graduates are able to make responsible decisions in tasks, and based on their resources to coordinate team work, and bear responsibility for the results. They are able to include the dimensions of ethics into problem solutions, clearly and correctly communicate expert information with experts and the public, and propose solutions. The courses are built to develop everyday communication in students and desire for self-education.

Study curriculum

- form Full-time (en)