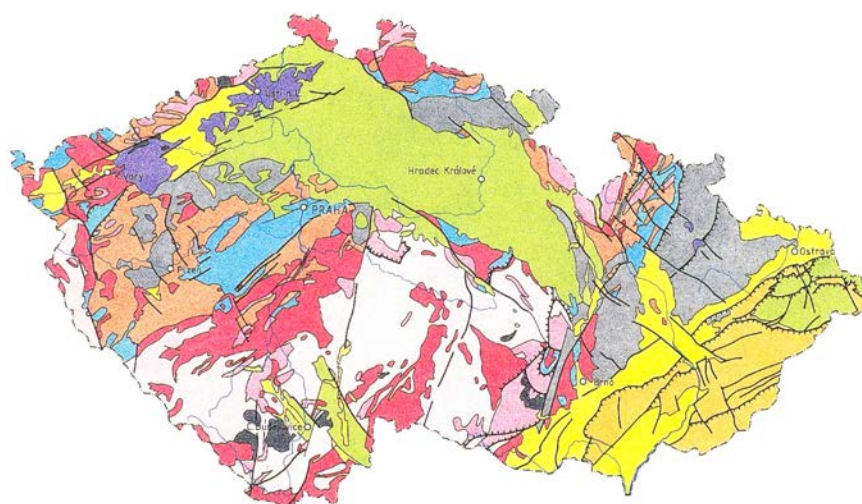


INTERMIN

Geological Study in the Czech Republic



Czech Geological Survey

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Czech Geological Survey INTERMIN activity

During the work on the INTERMIN project, within the Czech Geological Survey (address: Czech Geological Survey, Klárov 3, 118 21 Prague 1, Czech Republic; www.geology.cz), was the project INTERMIN personally presented on the Ministry of the Environment (with representative of the Ministry of Industry and Trade), which is the founder of the Czech Geological Survey. The project was also presented to the personnel management of the State Enterprise DIAMO in Stráž pod Ralskem and the management was asked to share experiences and views on the level of knowledge of new graduates entering the company to work. We received the information from the management of the educational program The World Nuclear University - School of Uranium Production (WNU SUP) which is organized by the State Enterprise DIAMO.

State enterprise DIAMO is an organisation dealing with elimination of consequences of mining activities after uranium, ore, and partially also coal mining in the Czech Republic. The company also ensures the production of uranium concentrate for the nuclear power industry.

State enterprise DIAMO mined in the past uranium in the Czech Republic – Stráž pod Ralskem and Rožná localities (termination of uranium mining in 2016). In the future, DIAMO is considered as a lithium mining manager in the Ore Mountains, where the Czech Republic has a large resource of this raw material. It can be assumed that in the near future a number of new engineers - geologists will be accepted into the Enterprise.

State enterprise DIAMO has established the training centre The World Nuclear University - School of Uranium Production (WNU SUP) international which was founded and is operated by the State Enterprise DIAMO under the auspices of the World Nuclear University in London and in collaboration with OECD/NEA and IAEA (see below).

The project INTERMIN was presented also to the management of the company Severočeské doly a.s. in Chomutov. The management was asked to share experiences and views on the level of knowledge of new graduates entering the company to work.

The Severočeské doly a.s. company's core business is the excavation, processing, and sale of brown coal and associated raw materials. The company's mining activities take place in two separate mine sites in the North Bohemian brown-coal basin, Tušimice and Bílina. The company annually produces approximately 23 million tonnes of coal, making it brown coal production leader in the Czech Republic and is „the number one“ in all mining activities in the Czech Republic.

Both organizations - the State enterprise DIAMO and the company Severočeské doly a.s. - need a large number of graduates of geological engineering from the Czech universities.

In addition, study management of VSB-Technical University of Ostrava (Faculty of Mining and Geology) (see below) and the Faculty of Natural Science of Charles University were contacted and the project INTERMIN there were presented - its objectives and aims, web info resources, the main personal project representatives. Qualification requirements for graduates from universities were discussed and asked. Representatives of the universities have promised to inform about study plans of geological sciences. On the basis of information from universities, a catalog of engineering and geological fields of study, which can be studied in the Czech Republic, was compiled.

Geological Sciences Study in the Czech Republic

In the Czech Republic there is possible to study geological sciences mainly at the VSB-Technical University of Ostrava (Faculty of Mining and Geology), at the Charles University (Faculty of Science) in Prague (Faculty of Science) and at the Masaryk University in Brno (Faculty of Science). The most important for the preparation of mining engineering is in the Czech Republic the VSB-Technical University of Ostrava in Ostrava.

1. International Training Centre

The World Nuclear University - School of Uranium Production in Stráž pod Ralskem

The World Nuclear University - School of Uranium Production (WNU SUP) international training centre in Stráž pod Ralskem was founded in 2006 and is operated by the State Enterprise DIAMO, under the auspices of the World Nuclear University in London and in collaboration with OECD/NEA and IAEA. Making use of knowledge and equipment of the State Enterprise DIAMO and the connections it has with universities, research institutions, supervisory authorities and other experts from the Czech Republic and abroad, the International Training Centre develops and presents schemes focused on professional training throughout the range of aspects of uranium production, be it deposit surveys and extraction using various means, treatment of uranium ores, environmental protection and protection of the health of workers, and even removal of the consequences of mining operations.

International Training Centre Courses

Each of the courses consists of a theoretical, lecture-based part and accompanying programmes that take the form of technical field trips to the State Enterprise DIAMO sites and premises, whose structure conveniently covers all aspects of the mining process. The high professional level and practical experience of specialized staff members of the enterprise is also leveraged with success. In addition to the State Enterprise DIAMO staff, teaching activities also involve lecturers from abroad, originating from mining institutions or freelance consultants active in diverse fields such as geology, hydrogeology, geomechanics, chemical technology, radiation protection, environmental protection, etc., with regard to the focus of the individual courses. The courses are designed for groups of 5 to 18 participants.

Examples of the The World Nuclear University - School of Uranium Production courses:

- Extraction using underground in situ leaching (ISL), both alkalic and acidic leaching
- Surveying uranium deposits and extraction in sandstone type deposits
- Remediation of consequences of uranium mining and processing
- Legal aspects of uranium mining
- Radiation protection in mining practice
- On-demand custom courses

Custom courses can be designed to meet your individual needs. The course date, scope and contents can be specified upon agreement based on what is required by the applicant.

School of Uranium Production in Stráž pod Ralskem - <https://www.wnusup.cz/en>

2. Charles University

Geology study programs

The University provides bachelor's, master's and Ph.D. study.

In the framework of the Geology study program, the Geology Institutes of Faculty of Science provides for teaching in a number of fields and areas in Bachelor's and Master's study programs.

Bachelor's study lasts 3 years and is completed by a Bachelor's examination. Teaching in Bachelor's study is mostly identical for the students of all the fields of geology. Only in the third year do students register for subjects that prepare them for Master's study in a selected field or specialization. After completion of Bachelor's study, the study program can be terminated and the student leaves the university with the degree of Bachelor (Bc.); on the other hand he can continue to study at the higher, Master's level of study with narrower specialization in one of the fields of geology or interdisciplinary study in a different section of the Faculty (for example study of protection of the environment, geobotany, etc.), or at a different university.

Master's study lasts 2 years and requires previous successful completion of a Bachelor's study program. The study consists of several compulsory courses in the particular field and a larger number of

optional subjects, selected by the student, not only within the selected field of study, but also in other fields of interest taught at the Faculty of Science or elsewhere. Master's study is completed by public defence of a thesis and a Master's state final examination. In work on their theses, students participate in actual scientific research projects and their results are presented at scientific conferences and in domestic and international professional journals. A successful graduate receives the degree of Master of Science (Mgr.).

Economic geology studies and searches for the mineral resources of the Earth. It combines knowledge of the fields of geology so as to ensure energy and raw materials for the development of society and establishment of principles for the protection and use of all the resources of the Earth. Employment of graduates – study and protection of mineral resources, mining of mineral resources.

Charles University - <https://cuni.cz/UKEN-1.html>

3. Masaryk University

Geology degree programme specification

The University provides bachelor's, master's and Ph.D. study.

The Bachelor's degree program Geology provides comprehensive higher education. It is intended for those who plan to work in geological exploration and research.

Its aim is to prepare graduates for further study and to allow them a qualified choice of their further profiling through some of the specializations of the follow-up master's program. Graduates are also prepared for basic work in geological institutions and companies.

The curriculum of the Bachelor's study programme covers the basics of geological disciplines (Mineralogy, Paleontology, Physical Geology, Applied geophysics, Petrology, Geochemistry, Historical Geology, Quaternary Geology, Regional Geology, Economic Geology, Hydrogeology, Geotechnics and Environmental Geology). Part of the study includes practical geological exercises and field practice.

An obligatory part of the study is a block Course of terrain work, field exercises and excursions, as well as practical exercises for compulsory and obligatory optional subjects.

The graduates can find employment in institutions and companies conducting geological surveys, and also in cultural and educational institutions or universities, environmental organizations, and public administration. They can work in basic and applied research and in all areas where both theoretical and practical knowledge of geology is required.

Further studies

After completing the Bachelor's degree programme in Geology the graduates can continue in the same Master's degree programme or in other geological study programs such as Applied and environmental geology or Geoenvironmental risk and remediations.

Study options: Single-subject studies in the form of Full-time studies in czech and in the form of Combined studies in czech language. Combined studies are the study Geology + English Language and Literatur (cooperation with Faculty of Arts) and the study Geology + Archaeology (cooperation with Faculty of Arts).

Masaryk University - <https://www.muni.cz/en>

4. VSB - Technical University of Ostrava

Geological Engineering study programs

VSB - Technical University of Ostrava has long tradition in high quality education and research in engineering, IT, and economics related fields. The University provides bachelor's, master's and Ph.D. study in technical and economic sciences across a wide range of study programmes.

Geological Engineering Bachelor's study

European standard 3-year programmes. Graduates are prepared to begin their career, or continue on to Master's study. A Bachelor's degree confers the academic title Bc.

Branch Profile

The study in this field is predominantly focused on the education of the specialists in engineering geology, applied mineralogy and petrography, hydrology, environmental geochemistry, economy geology and applied

geophysics. Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Key Learning Outcomes

Knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

General Competencies

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Occupational Profiles of Graduates

Bachelor's degree focuses on obtaining knowledge of the basics scientific disciplines of geology, ie. mineralogy, petrology, paleontology, historical geology and others. Theoretical knowledge is accompanied by an extensive practical training through exercises and excursions. In the higher years of the study are included the basic subjects of applied geology as hydrogeology, engineering geology, geophysics necessary for the application of geological aspects in practice. At the same time students take technical subjects such as drilling exploration and mining.

VSB - Technical University of Ostrava - <https://www.vsb.cz/en>

Master study

Branch Profile

The study in this field is predominantly focused on the education of the engineers in the applied geology (hydrology, engineering geology, technical mineralogy and petrography, environmental geochemistry, economy geology, drilling exploration and applied geophysics). Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Skills

Graduates are able to solve wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

General Competencies

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Occupational Profiles of Graduates

Master studies is designed first of all for graduates of bachelor studies of geology, mining and geography. The Master's level focuses on gaining a deeper knowledge of applied geology. The basic study is accompanied by a professional profiling enabled by selecting the relevant elective courses. Students are offered optional courses based on anticipated trends and needs of the national economy. Students can obtain a specialization in hydrogeology, engineering geology, applied mineralogy and petrography, environmental geochemistry, economic geology and applied geophysics.

Doctoral study

Branch Profile

The study for the doctoral degree in the field “Geological Engineering” ensures the preparation of researchers in the area of geological sciences and is highly technology- and application-oriented. Emphasis is put on obtaining the common theoretical base in connection with the area of Earth sciences. This study creates preconditions for familiarising with applied geological disciplines, especially with applied mineralogy and petrography, hydrogeology, deposit geology, engineering geology, drilling technologies and geophysics. Great emphasis is laid on the area of geological information science, planning and evaluation of results of geological operations, economics and management in exploration and industrial geology and problems of environmental protection.

Key Learning Outcomes

Knowledge

A graduate of the field of study for the doctoral degree “Geological Engineering” is able to connect scientific methods of work with the latest practical knowledge in the area of applied geology. A graduate is able to occupy positions in research and scientific institutions and organisations solving difficult problems in the areas of applied geological disciplines and also in the state administration.

Skills

A graduate propose and use procedures of original research to enriching the knowledge of the field. He/she is able to develop theories, concepts and methods of the field, gain a new knowledge and forward it to others.

General Competencies

A graduate obtains new knowledge in the field by the study and their own creative work. He/she presents the results of their work to the scientific community.

Occupational Profiles of Graduates

Doctoral degree programmes are aimed at scientific research and independent creative activity in the field of research, development and technology with a geological background. Studies are therefore aimed at gaining deeper knowledge of the theoretical rudiments of the whole field of studies and further on detailed study of the outstanding findings in the chosen specialization, which are then resumed in the scientific publications and the doctoral thesis.

Catalog of Geological Engineering study programs of VSB-Technical University of Ostrava (Faculty of Mining and Geology)

A. Bachelor study – English Language

Full-time form of study in English language at VSB-Technical University of Ostrava (Faculty of Mining and Geology) in Ostrava

A.1. Study programme Geological Engineering

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

Guarantor department: Department of Geological Engineering

The study in this field is predominantly focused on the education of the specialists in hydrology, engineering geology, applied mineralogy and petrography, environmental geochemistry, economy geology and applied geophysics. Theoretical as well as practical parts of the education are targeted at implementing, managing,

organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics. This branch is aimed at the natural environment and resources, mining and technical monuments, the goal of this field of study is to educate specialists who would participate in the development of tourism in the Czech Republic.

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics. Except technical and economic subjects, students learn basics in social studies, natural sciences and also gain necessary organizational and language skills.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. He is also able to deal in the management post. The graduates can work as independent specialists in organization and promotion of tourism as well as qualified organizers of tourism and tourist guides specialized in inanimate nature and exploitation of natural resources.

A.1.1. Geological Engineering field of study

The study in this field is predominantly focused on the education of the specialists in hydrology, engineering geology, applied mineralogy and petrography, environmental geochemistry, economy geology and applied geophysics. Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. He is also able to deal in the management post.

A.2. Study programme Mining

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

Guarantor department: Department of Mining Engineering and Safety

The Bachelor's studies in Mining course is conceived so that the alumni will be qualified to work in companies dealing with the mining industry or activities connected to this industry. The course educates students to be experts who are able to work in spheres of mining and in the processing of raw materials, including fossil fuels and metallic and non-metallic minerals. The Alumni will satisfy the conditions to enable them to fill most of the official positions in mines and quarries. Students can influence their specialization by a suitable selection of most of the elective subjects. After successfully graduating in the Bachelor's course, it is possible to continue with studies of mining engineering in the Master's course, which enhances the knowledge gained in specialized areas and that increases the possibilities of advancement in the profession, especially to manage grades.

Graduate's professional knowledge

On the basis of theoretical and practical experience, the graduate can apply their knowledge and expertise in mining, processing, and cleaning up mining as deep, and superficial way, then find application in energy, engineering companies and handlers of valuable minerals and companies that deal with rehabilitation work. Professional theoretical knowledge of the graduates found employment in middle management positions in mining and mineral processing, the liquidation of consequences of mining and reclamation of business. Absolvent can solve design, geological survey, mining engineering, mining their own bearings and rehabilitation after mining bearing minerals. The graduate can navigate and even in the practice of security and legal issues of Mines (mining law, safety regulations).

Graduate's professional skills

Graduates can solve the basic problems of research bearings, mining engineering works, traffic management at the central controller worker. University student can understand the technical documentation and mapping, has expertise in the issue of deploying mining machinery and transport equipment, able to address issues of technological development and security procedures and this operation to ensure the security problems and apply directly to the operation sites firm. The graduate can to lead and manage the work team.

Graduate's general competence

Bachelor's degree in Mining Engineering is designed so that future graduates have the widest application in practice. Graduates bachelor degree in mining meet the qualification criteria for high-performance senior management mining and quarrying, as in deep mines, and quarries including the treatment, transport, rehabilitation and ensuring the security issues of mineral extraction mineral resources. Qualification is ideal for carrying mid-management positions designing, planning, production and control of the enterprise.

Potential employment of graduates

Mining engineering graduates meet all the conditions to enable them in the relevant regulations to hold middle management positions to "race down" eventually "race quarry and manage the technical side of the operation. Next find jobs in other economic features of coal, ore and non-ore businesses in the areas of application of geomechanical service professionals ventilation, air conditioning, transportation, quality control, safety.

A.2.1. Mining of Mineral Resources and Their Utilization field of study

The field of study "Mining and Utilization of Mineral Resources" was created by combining two existing accredited fields of study "Mining Engineering" and "Utilization of Construction Mineral Resources". The new field of study accepts the change in conditions in the mining industry, which has resulted in a decreasing number of students registered for the first year. With the decrease in mining coal deposits, however, mining non-coal deposits and construction materials increases. The field of study is designed so that future graduates have the widest possible options of finding employment. The choice of specialized

subjects is based on Decree no. 298/2005 Coll. as amended, which is the fundamental document for the performance of selected regulated activities for graduates. It educates qualified professionals working in the areas of resource industries in the Czech Republic and abroad, both in surface and underground mines. Students can also find employment in public administration, design companies, construction and other sectors dealing with occupational safety, traffic safety and remediation of mining activities. To some extent, students can influence their specialization by appropriate selection of elective courses.

Graduate's professional knowledge

Graduates acquire a broad knowledge of the issues related to the particular field of study, they can solve the concept of geological exploration, work with a map, design mining deposits, propose remediation and reclamation of post-mining deposits. They can apply simpler tasks in order to maximize the efficiency of mining works. They are able to understand the fundamental issues of safety and legal issues of mining. They have knowledge of theories and methods of the discipline.

Graduate's professional skills

Using the expertise based on generally defined task, graduates can solve practical problems in the field, find, organize and interpret information relevant to a given task, and use some basic research processes in the field. They are able to understand the technical documentation and mapping, they have expertise in the issue of deploying engineering, mining and transport equipment, and they are able to solve issues of developing technological and safety procedures, and to ensure and apply these issues directly to the operating departments. They can organize teamwork.

Graduate's general competence

Graduates of the Bachelor's degree study "Mining and Utilization of Mineral Resources" meet the criteria for qualification requirements of certain management positions ("ČBÚ – Czech Mining Administration Decree 298/2005") in mining and quarrying both in underground mines and quarries. They are able to make responsible decisions in familiar contexts based on the framework specification and according to the assignment and allocation of resources to coordinate the activities of the team and assume responsibility for its results. While solving problems, they are able to consider the ethical dimension, to clearly and persuasively communicate with professionals and laymen about the nature of the issue according to their own opinion of the solutions.

Potential employment of graduates

Graduates of the Bachelor's degree study "Mining and Utilization of Mineral Resources" have wide possibilities of finding employment especially in organizations carrying out mining operations and mining activities under the "ČBÚ Decree 298/2005 as amended on professional qualification". According to the professional skills, they can find employment in other economic positions, coal, ore and non-ore operations, in the areas of design, geomechanical services, ventilation, transportation, quality control and safety.

A.3. Study programme Geodesy, Cartography and Geoinformatics

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

The aim of the program is to prepare both graduates who can master the technical themes at the application level and with sufficient theoretical basis for further study. They will be able both to actively work with existing applications of relevant technologies. They will be exercisable in both the state and local governments as well as in the private sector and further develop his / her theoretical knowledge through further studies.

Graduate's professional knowledge

Graduates of this degree program will have: - broad knowledge and understanding of the subject and scope of the field of study - broad knowledge of theories, concepts and methods of the field of study - understanding of the possibilities, conditions and constraints on the use of the theories, concepts and methods of the field of study in practice

Graduate's professional skills

Graduates of this degree program will be able to: - using the expertise and based on generally defined task to solve practical problems in the field of study - search, organize and interpret information relevant to solving

practical problems defined - use some basic procedures of the field to the extent necessary for solving practical problems in a field of study

Graduate's general competence

Graduates of this degree program will be able to: - take independent and responsible decisions in a partially known context under the framework assignment - based on the general assignment and allocation of resources to coordinate the activities of the team and be accountable for its results - communicate clearly and persuasively both professionals and laymen about the nature of professional issues and their own views on their solution - clearly summarize the views of other team members - by self-training or follow-up study to acquire additional knowledge, skills and competence based on practical experience and in particular its assessment, but also by independent studies of the theoretical field of knowledge

Potential employment of graduates

The degree program is designed to provide graduates with the opportunity to continue their studies in a follow-up study program or to provide the graduates with the possibility of taking courses in business and public institutions using to support their work activities appropriate procedures and technologies.

A.3.1. Geoinformatics Field of study

The aim of the study branch is to prepare graduates who master geoinformatics and geoinformation technologies at the application level and will be able to actively work with the existing applications of geoinformation technologies, from data gathering across the spatial analysis up to the presentation of the outputs of the analyses. Part of the subject is taught in English. They will be able to work both in the field of state administration and local government, as well as in the private sector (managers of the utilities, transport undertakings, companies involved in the collection and distribution of data, etc.), both for Czech and international companies. They can also further develop their theoretical knowledge through follow-up studies.

Graduate's professional knowledge

Graduates are equipped with knowledge of the basics of programming, geoweb technology, geographic information systems, satellite navigation and positioning systems, remote sensing, digital terrain models, gathering, storage, analysing, and publishing of geodata, and from the area of project management.

Graduate's professional skills

The graduate can acquire geodata in the field, or, where appropriate, from existing resources, he can update them, insert them into the database, perform simple or standard analysis and visualization of geodata, and manage existing applications geoinformation technology.

Graduate's general competence

The graduate may act as a geodata collector, geodat database manager, geodat analyst, application manager for geoinformation technologies, and may continue to follow-up study.

Potential employment of graduates

The aim of the course is both theoretical and practical mastering of basics of geoinformation technologies and their application in practice. After the basic theoretical subjects, which develop mathematical, physical and informatics basis for the study at the study branch, students obtain knowledge of geoinformation technologies in specialized subjects. The study is accompanied by the subjects from the fields of social sciences. The study branch is designed to provide students with the opportunity to continue to study in a follow-up study program or to get job in the field of companies and public institutions that use relevant practices and technologies to support their work activities.

B. Bachelor study – Czech Language

Full-time form of study in Czech language at VSB-Technical University of Ostrava (Faculty of Mining and Geology) in Ostrava

B.1. Study programme Geological Engineering

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

Guarantor department: Department of Geological Engineering

The study in this field is predominantly focused on the education of the specialists in hydrology, engineering geology, applied mineralogy and petrography, environmental geochemistry, economy geology and applied geophysics. Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics. This branch is aimed at the natural environment and resources, mining and technical monuments, the goal of this field of study is to educate specialists who would participate in the development of tourism in the Czech Republic.

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics. Except technical and economic subjects, students learn basics in social studies, natural sciences and also gain necessary organizational and language skills.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. He is also able to deal in the management post. The graduates can work as independent specialists in organization and promotion of tourism as well as qualified organizers of tourism and tourist guides specialized in inanimate nature and exploitation of natural resources.

B.1.1. Geological Engineering field of study

The study in this field is predominantly focused on the education of the specialists in hydrology, engineering geology, applied mineralogy and petrography, environmental geochemistry, economy geology and applied geophysics. Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of

geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. Hi is also able to deal in the management post.

B.1.2. Geoscience and Industrial Tourism Field of study

This branch is aimed at the natural environment and resources, mining and technical monuments, the goal of this field of study is to educate specialists who would participate in the development of tourism in the Czech Republic.

Graduate's professional knowledge

Except technical and economic subjects, students learn basics in social studies, natural sciences and also gain necessary organizational and language skills.

Graduate's professional skills

Graduates of this field should be able to use their professional knowledge and skills to develop tourism in the area of mining and geological conservation of monuments.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

The graduates can work as independent specialists in organization and promotion of tourism as well as qualified organizers of tourism and tourist guides specialized in inanimate nature and exploitation of natural resources.

B.2. Study programme Mineral Raw Materials

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

Guarantor department: Department of Environmental Engineering

The Bachelor's study branches have a multidisciplinary character and combine natural-science, technical, technological and economic sciences focusing on the issue of mineral resources. The studies of Mineral Raw Materials comprise a whole number of fields of study, which are grounded in modern approaches to extraction and exploitation of raw material resources in a wide social context with respect to the environmental impacts and environmental protection, including recycling technologies and water management. Further to processing technologies, students are offered modern fields of study grounded in the knowledge of modern processing biotechnologies, application of the latest knowledge of physics on the structure and treatment of materials and fields of study focused on economics, management and control in the branch of mineral raw materials.

Graduate's professional knowledge

Students gain expert knowledge of methods that are required for the performance of independent professions. They learn technical terminology of the field in question. They are able to use their theoretical knowledge, on which the methods are based, in the professional practice. Students acquire knowledge concerning the principles of modern technologies of the studied fields. Having gained some experience, the

natural-science, technical and technological subjects along with learning a foreign language enable the graduates to find jobs in other branches too, as well as in numerous state or private companies and institutions. The system of university subjects provides essential understanding of the issue and prepares students for a further career growth.

Graduate's professional skills

On the grounds of a generally defined task, making use of their expertise, the graduates of the Bachelor's study programme of Mineral Resources are able to deal with practical matters in the field. Next, they are capable of searching for, sorting and interpreting information relevant for the solution of a specified practical problem. Graduates can also use particular fundamental research procedures in the field in the extent necessary to deal with practical tasks in the field. Selecting a suitable topic of their Bachelor's thesis, students may expand their expertise and concentrate more on the field of study.

Graduate's general competence

Graduates are able to apply their expert knowledge in practice. They can work independently and responsibly deal with simple technological matters. Graduates are capable of comprehensible and persuasive communication of their own opinions, formed during the studies, to other colleagues in the team. They can work with information sources, understand professional terminology and synthetically evaluate experimental results and be responsible for them. Next, graduates are fully prepared for the follow-up Master's Studies.

Potential employment of graduates

Graduates are specialists able to deal with basic process technologies connected with processing of mineral resources, which includes a spectrum of fields from raw material extraction and their processing, via the production all the way to the product consumption and environmental protection. They may find jobs in laboratories of various companies or institutes, in the public administration and its auditing bodies. The technical grounds of the studies enable the graduates to find jobs directly in the industry, in various technical fields or other interdisciplinary branches. They may also continue studying in the follow-up Master's Studies.

B.2.1. Economics and Management in the Field of Raw Materials field of study

Study branch Economics and management in the field of raw materials comes out from the opinion that industrial enterprise economic results are reflex of technical solution of particular processes. Management of industrial enterprise economics has to arise from the knowledge of production process technology. Study branch has fundament in the field of natural sciences (physic, geology, raw materials deposits, raw materials processing etc). These knowledge enable to students to understand the key problems of deposits extraction are connected with industrial enterprise economic results. Economic disciplines create the economic system of enterprise. There are described its basic elements, its operation, design and analysis. There is paid attention to information from the point of view of general approach and from the point of view of accountancy. Industrial enterprise financing is connected with problems of banking. Industrial enterprise management concerns the general principles but also staff management from the point of view of human resources management, psychology and sociology. Substantial attention is devoted to legal problems in connection to economics but also in connection to mining industry.

Graduate's professional knowledge

The Bc. graduate profile is a description of the personal qualities, skills and attributes a student is expected to obtain by the end of an undergraduate degree programme at the University.

Graduate's professional skills

Graduates have a thorough understanding of the theories, concepts and methods of their particular subjects. They have also acquired understanding of options, conditions and limitations of applying the theories and general concepts in practice.

Graduate's general competence

Graduates are able to generate ideas, concepts, proposals, solutions or arguments both in response to set briefs and self initiated activity. They can select, classify and interpret relevant information for developing an idea from the first concept to finished outcome of providing solutions to practical problems. They are also able to provide for implementation of basic research projects in the framework of solving practical problems. In that effort, they demonstrate resourcefulness, entrepreneurship and professionalism. Graduates have abilities to access, identify, organise and communicate knowledge effectively in both written and spoken

Czech and one foreign language. They can lead in the community, and have willingness and ability to engage in constructive discourse with both experts in their field and general public. They are critical and creative thinkers, with an aptitude for continued self-directed learning, adept at learning in a range of ways, including through information and communication technologies.

Potential employment of graduates

Study branch graduates can be employed in technical and economical grades of enterprise in the field of raw materials industry but also in economical grades of various institutions, in universities and research establishments.

B.2.2. Water Technologies and Water Management field of study

The study branch incorporates physical-chemical and chemical processes used in treating water to the parameters of drinking water, technological processes, sanitation measures, wastewater treatment and sludge disposal. Within the studies, an emphasis is placed on the chemical and physical-chemical disciplines, enriched with vital courses in mathematics, computer-assisted techniques and foreign languages. Next, students are acquainted with the basics of water management, design of water-management facilities, hydrology and climatology, wastewater treatment technology and revitalisation of water courses.

Graduate's professional knowledge

Knowledge and understanding of the subject in the required scope. Knowledge of theories, concepts and methods and use of the theories, concepts and methods in practice

Graduate's professional skills

Ability to use the knowledge to solve practical challenges within a general task. Ability to search for, sort and interpret information necessary for a certain issue. Ability to use some general research procedures needed for practical solution of professional issues.

Graduate's general competence

Ability to use special knowledge and skills. Ability to summarise in a clear way opinions of other team members. Ability to make independent and responsible decision within a general task even if some context is given only. Ability to continue studying the master study programme.

Potential employment of graduates

In line with the main focus of studies. In Water Management, the graduate should be able to work in any water management business or institution. In Water Technology, the graduate should be able to work in technology or other jobs in companies which operate waste water treatment plants and water processing plants. The graduates can also work as water managers in industrial businesses or researchers in industrial waste water treatment processes. Future jobs for a graduate from Water Technologies and Water Management -designing in construction and reconstruction of water facilities -designing in construction and reconstruction of water networks, sewage systems, waste water treatment plants and water processing facilities -research in water management -state administration and surveillance bodies responsible for environment issues (municipalities, regional authorities, ministries) -deputy managers in operation of water facilities of different types -managers of technology processes in waste water treatment and water processing

B.2.3. Environmental Engineering field of study

The study branch aims to prepare graduates for qualified positions in the state and public administration focusing on complex and sustainable care of the diverse environmental constituents and the landscape. The studies are grounded in the theoretical fundamentals of mathematics, physics, biology and chemistry, and related disciplines dealing with the landscape tending and environmentally friendly exploitation of natural resources. Within the course, students will gain an overview of the economic and legal relations and their environmental solutions. Students obtain high-quality basics of natural-science and engineering disciplines, and learn about important laboratory procedures.

Graduate's professional knowledge

Graduates have a broad knowledge in the field of speciality in the study branch, including interactions, able to use acquired knowledge to solve problems, to be able to use computer technology for environmental assessments and its components. Scientific, technical and technological subjects and the language will enable graduates to apply for other fields focusing on the environment and also to a wide range of public and

private companies and institutions. Graduates have a broad knowledge of theories, concepts, methods and practical solutions in the field of natural, biological and engineering sciences with emphasis on protection and development of environmental technologies, including caring for the environment and have extensive knowledge in the branch of CR and EU legislation. It is able to cooperate in solving environmental development projects, applying methods and tools of environmental policy. Study of this branch profiles graduate as an expert in the field of sustainable environmental development in all its aspects.

Graduate's professional skills

A Graduate of a Bachelor degree in Environmental Engineering is able to independently use the relevant professional knowledge, on the basis of generally defined load to solve the practical problems of environmental protection, use basic research procedures, applying methods and techniques of obtaining and processing of environmental data and information, analyze and evaluate current issues in environmental protection, to apply the measures and solutions. It can operate effectively in interdisciplinary teams focused on solving environmental and ecological problems.

Graduate's general competence

Study of this branch profiles graduate as an expert in the field of sustainable environmental development in all its aspects. Graduates will be able to independently acquire additional knowledge, skills and competence based on practical experience, but also by independent studies of theoretical knowledge in various areas related to solving environmental problems. A Graduate is communicative, and able to engage in teamwork for research as well as practical parts. Bachelor's degree is designed so that graduates are able to continue studying in the master's program (including relatives), and the practice.

Potential employment of graduates

- Professional specialists in the branches of protection and creation of the environment (ecology and landscape ecology, land reclamation, waste materials processing, water management, environmental monitoring, water protection, soil protection, biotechnology, prevention officer in protecting the environment), specifics are the broad professional scope of graduate - Lower and secondary skilled and management work in companies focused on the protection and creation of environment - Professionals in the testing and inspection organizations dealing with environmental issues.

B.2.4. Waste Treatment and Disposal field of study

The study branch instructs about basic processes applied in waste management, i.e. activities focusing on handling of waste. The course prepares professionals who will be capable of independent and responsible waste management work as well as professionals who may assert themselves in the public administration. Within the bachelor's studies there is an emphasis on a wide knowledge in the sphere of waste management, including preparation for waste property evaluation, mineralogy, chemistry, instrumental methods, physics and technologies including the waste management legislative framework.

Graduate's professional knowledge

Students gain expert knowledge of methods which are required for the performance of independent professional activities in the public administration. They become familiar with technical terminology of the field. They are further able to build on the theoretical knowledge, which is the grounds of the branch methods, and use it in practice. Students gain knowledge related to the principles of modern technologies focusing on handling of waste. Graduates have a grasp of basic information technologies and technologies connected with treatment, utilization and disposal of wastes.

Graduate's professional skills

On the basis of the acquired theoretical knowledge a graduate is capable of identifying, sorting and interpreting information related to handling of waste. During the studies the graduates learn practical skills of laboratory work, not only to be able to determine the characteristics and properties of wastes but concerning a wide spectrum of activities related to their processing.

Graduate's general competence

The graduates will be able to use their expertise in the practice. They will be capable of dealing with simple technological problems in an independent and responsible manner. The graduates can intelligibly and convincingly convey their expert opinions formed during the studies to their colleagues or other team members. In addition, they are fully prepared for the follow-up Master's studies.

Potential employment of graduates

The graduates are professionals able to deal with basic problems connected with handling of waste, which includes a spectrum of areas from mineral extraction and their processing, via production all the way to product consumption. Therefore, they may find employment in the public administration departments responsible for waste management and auditing bodies, in companies as waste managers, experts dealing with collection of used products or technologists in waste disposal facilities.

B. 3. Study programme Mining

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

Guarantor department: Department of Mining Engineering and Safety

The Bachelor's studies in Mining course is conceived so that the alumni will be qualified to work in companies dealing with the mining industry or activities connected to this industry. The course educates students to be experts who are able to work in spheres of mining and in the processing of raw materials, including fossil fuels and metallic and non-metallic minerals. The Alumni will satisfy the conditions to enable them to fill most of the official positions in mines and quarries. Students can influence their specialization by a suitable selection of most of the elective subjects. After successfully graduating in the Bachelor's course, it is possible to continue with studies of mining engineering in the Master's course, which enhances the knowledge gained in specialized areas and that increases the possibilities of advancement in the profession, especially to manage grades.

Graduate's professional knowledge

On the basis of theoretical and practical experience, the graduate can apply their knowledge and expertise in mining, processing, and cleaning up mining as deep, and superficial way, then find application in energy, engineering companies and handlers of valuable minerals and companies that deal with rehabilitation work. Professional theoretical knowledge of the graduates found employment in middle management positions in mining and mineral processing, the liquidation of consequences of mining and reclamation of business. Absolvent can solve design, geological survey, mining engineering, mining their own bearings and rehabilitation after mining bearing minerals. The graduate can navigate and even in the practice of security and legal issues of Mines (mining law, safety regulations).

Graduate's professional skills

Graduates can solve the basic problems of research bearings, mining engineering works, traffic management at the central controller worker. University student can understand the technical documentation and mapping, has expertise in the issue of deploying mining machinery and transport equipment, able to address issues of technological development and security procedures and this operation to ensure the security problems and apply directly to the operation sites firm. The graduate can to lead and manage the work team.

Graduate's general competence

Bachelor's degree in Mining Engineering is designed so that future graduates have the widest application in practice. Graduates bachelor degree in mining meet the qualification criteria for high-performance senior management mining and quarrying, as in deep mines, and quarries including the treatment, transport, rehabilitation and ensuring the security issues of mineral extraction mineral resources. Qualification is ideal for carrying mid-management positions designing, planning, production and control of the enterprise.

Potential employment of graduates

Mining engineering graduates meet all the conditions to enable them in the relevant regulations to hold middle management positions to "race down" eventually "race quarry and manage the technical side of the operation. Next find jobs in other economic features of coal, ore and non-ore businesses in the areas of application of geomechanical service professionals ventilation, air conditioning, transportation, quality control, safety.

B.3.1. Mining of Mineral Resources and Their Utilization field of study

The field of study “Mining and Utilization of Mineral Resources” was created by combining two existing accredited fields of study “Mining Engineering” and “Utilization of Construction Mineral Resources”. The new field of study accepts the change in conditions in the mining industry, which has resulted in a decreasing number of students registered for the first year. With the decrease in mining coal deposits, however, mining non-coal deposits and construction materials increases. The field of study is designed so that future graduates have the widest possible options of finding employment. The choice of specialized subjects is based on Decree no. 298/2005 Coll. as amended, which is the fundamental document for the performance of selected regulated activities for graduates. It educates qualified professionals working in the areas of resource industries in the Czech Republic and abroad, both in surface and underground mines. Students can also find employment in public administration, design companies, construction and other sectors dealing with occupational safety, traffic safety and remediation of mining activities. To some extent, students can influence their specialization by appropriate selection of elective courses.

Graduate's professional knowledge

Graduates acquire a broad knowledge of the issues related to the particular field of study, they can solve the concept of geological exploration, work with a map, design mining deposits, propose remediation and reclamation of post-mining deposits. They can apply simpler tasks in order to maximize the efficiency of mining works. They are able to understand the fundamental issues of safety and legal issues of mining. They have knowledge of theories and methods of the discipline.

Graduate's professional skills

Using the expertise based on generally defined task, graduates can solve practical problems in the field, find, organize and interpret information relevant to a given task, and use some basic research processes in the field. They are able to understand the technical documentation and mapping, they have expertise in the issue of deploying engineering, mining and transport equipment, and they are able to solve issues of developing technological and safety procedures, and to ensure and apply these issues directly to the operating departments. They can organize teamwork.

Graduate's general competence

Graduates of the Bachelor's degree study “Mining and Utilization of Mineral Resources” meet the criteria for qualification requirements of certain management positions (“ČBÚ – Czech Mining Administration Decree 298/2005”) in mining and quarrying both in underground mines and quarries. They are able to make responsible decisions in familiar contexts based on the framework specification and according to the assignment and allocation of resources to coordinate the activities of the team and assume responsibility for its results. While solving problems, they are able to consider the ethical dimension, to clearly and persuasively communicate with professionals and laymen about the nature of the issue according to their own opinion of the solutions.

Potential employment of graduates

Graduates of the Bachelor's degree study “Mining and Utilization of Mineral Resources” have wide possibilities of finding employment especially in organizations carrying out mining operations and mining activities under the “ČBÚ Decree 298/2005 as amended on professional qualification”. According to the professional skills, they can find employment in other economic positions, coal, ore and non-ore operations, in the areas of design, geomechanical services, ventilation, transportation, quality control and safety.

B.4. Study programme Geodesy and Cartography

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

Guarantor department: Department of Geodesy and Mine Surveying

The aim of the program is to prepare graduates who can master the technical themes of the various accredited degree programs at the application level and will be able to actively work with existing applications of relevant technologies. They will be exercisable in both the state and local governments as well as in the private sector.

Graduate's professional knowledge

Graduates of this degree program will have: - broad knowledge and understanding of the subject and scope of the field of study - broad knowledge of theories, concepts and methods of the field of study - understanding of the possibilities, conditions and constraints on the use of the theories, concepts and methods of the field of study in practice

Graduate's professional skills

Graduates of this degree program will be able to: - using the expertise and based on generally defined task to solve practical problems in the field of study - search, organize and interpret information relevant to solving practical problems defined - use some basic procedures of the field to the extent necessary for solving practical problems in a field of study

Graduate's general competence

Graduates of this degree program will be able to: - take independent and responsible decisions in a partially known context under the framework assignment - based on the general assignment and allocation of resources to coordinate the activities of the team and be accountable for its results - communicate clearly and persuasively both professionals and laymen about the nature of professional issues and their own views on their solution - clearly summarize the views of other team members - self-training to acquire additional knowledge, skills and competence based on practical experience and in particular its assessment, but also by independent studies of the theoretical field of knowledge

Potential employment of graduates

Degree program is designed to provide the graduates of the possibility of taking courses in business and public institutions using to support their work activities appropriate procedures and technologies.

B.4.1. Mining Surveying field of study

Field of study specified as Mine Survey (bachelor's curriculum) represents an interdisciplinary field of science, focused to issues on ensuring basic survey data and their processing for the purpose of compiling map documents for standard underground mineral exploitation.

Graduate's professional knowledge

- General knowledge and understanding to the subject and scope of given profession - General knowledge as for theories, concepts, and methods of the discipline - Understanding to the potential, terms and conditions, and limitations in use of theories, concepts, and methods of the discipline in practice

Graduate's professional skills

- To solve practical issues of the discipline using professional knowledge based on general specification of the allocated tasks - To search, classify, and interpret the information relevant for solving of specified practical issue - To apply some basic research procedures of the discipline within the scope of needed for solving practical issues within said discipline

Graduate's general competence

- To make independent and responsible decisions within context being known partially only, based on general specification - To coordinate activities of the team based on general specification and awarded resources as well as to assume responsibility for its results - To involve considering of ethical dimensions into solutions of an issue - To provide professionals and amateurs comprehensibly and convincingly with

information on the nature of professional issues and graduate's own opinion as for appropriate solution - To summarize opinions of other team members convincingly - To apply graduate's own professional knowledge, professional and general skills with strong command of one foreign language at least - To acquire independently further professional knowledge, skills, and competences especially based on practical experience and its evaluation, but also thru independent studying theoretical know-how within appropriate discipline

Potential employment of graduates

Executing mine surveyor works and compiling basic documents for performance of mine surveying documentation as per the Regulation of the Czech Mining Office Board No. 435/1992 of Law Digest, in wording of later rulings.

B.4.2. Engineering Geodesy field of study

Field of study specified as Engineering Survey (bachelor's curriculum) deals with issues focused to surveying the Earth's surface, compiling maps, and National Map Series of the Czech Republic. Students are to be familiar with mission of the geodesy, environment for measuring the geodetic values, geodetic measuring of the raw mineral deposits and mining areas, the values basis methods for determining position and altitude of the points, and basic concepts as for the theory of errors. Geodetical surveying involves basic data needed for complex representation concerning the location of buildings in terrain as per the project, their dimensions, correctness of building performance, as well as compilation of their geodetic documentation. Processing of measured values and compilation of map documentation are tutored using the most modern software. Also legal and economic aspects of surveyor's activities are taken into account.

Graduate's professional knowledge

- General knowledge and understanding to the subject and scope of given profession - General knowledge as for theories, concepts, and methods of the discipline - Understanding to the potential, terms and conditions, and limitations in use of theories, concepts, and methods of the discipline in practice

Graduate's professional skills

- To solve practical issues of the discipline using professional knowledge based on general specification of the allocated tasks - To search, classify, and interpret the information relevant for solving of specified practical issue - To apply some basic research procedures of the discipline within the scope of needed for solving practical issues within said discipline

Graduate's general competence

- To make independent and responsible decisions within context being known partially only, based on general specification - To coordinate activities of the team based on general specification and awarded resources as well as to assume responsibility for its results - To involve considering of ethical dimensions into solutions of an issue - To provide professionals and amateurs comprehensibly and convincingly with information on the nature of professional issues and graduate's own opinion as for appropriate solution - To summarize opinions of other team members convincingly - To apply graduate's own professional knowledge, professional and general skills with strong command of one foreign language at least - To acquire independently further professional knowledge, skills, and competences especially based on practical experience and its evaluation, but also thru independent studying theoretical know-how within appropriate discipline

Potential employment of graduates

To execute surveying activities in terrain and their processing in the form of documentation

B.5. Study programme Geodesy, Cartography and Geoinformatics

Faculty: Faculty of Mining and Geology

Type of study: Bachelor

Standard length of study: 3 years

Academic degree: Bc.

Guarantor department: Department of Geoinformatics

The aim of the program is to prepare both graduates who can master the technical themes at the application level and with sufficient theoretical basis for further study. They will be able both to actively work with

existing applications of relevant technologies. They will be exercisable in both the state and local governments as well as in the private sector and further develop his / her theoretical knowledge through further studies.

Graduate's professional knowledge

Graduates of this degree program will have: - broad knowledge and understanding of the subject and scope of the field of study - broad knowledge of theories, concepts and methods of the field of study - understanding of the possibilities, conditions and constraints on the use of the theories, concepts and methods of the field of study in practice

Graduate's professional skills

Graduates of this degree program will be able to: - using the expertise and based on generally defined task to solve practical problems in the field of study - search, organize and interpret information relevant to solving practical problems defined - use some basic procedures of the field to the extent necessary for solving practical problems in a field of study

Graduate's general competence

Graduates of this degree program will be able to: - take independent and responsible decisions in a partially known context under the framework assignment - based on the general assignment and allocation of resources to coordinate the activities of the team and be accountable for its results - communicate clearly and persuasively both professionals and laymen about the nature of professional issues and their own views on their solution - clearly summarize the views of other team members - by self-training or follow-up study to acquire additional knowledge, skills and competence based on practical experience and in particular its assessment, but also by independent studies of the theoretical field of knowledge

Potential employment of graduates

The degree program is designed to provide graduates with the opportunity to continue their studies in a follow-up study program or to provide the graduates with the possibility of taking courses in business and public institutions using to support their work activities appropriate procedures and technologies.

B.5.1. Geoinformatics field of study

The aim of the study branch is to prepare graduates who master geoinformatics and geoinformation technologies at the application level and will be able to actively work with the existing applications of geoinformation technologies, from data gathering across the spatial analysis up to the presentation of the outputs of the analyses. Part of the subject is taught in English. They will be able to work both in the field of state administration and local government, as well as in the private sector (managers of the utilities, transport undertakings, companies involved in the collection and distribution of data, etc.), both for Czech and international companies. They can also further develop their theoretical knowledge through follow-up studies.

Graduate's professional knowledge

Graduates are equipped with knowledge of the basics of programming, geoweb technology, geographic information systems, satellite navigation and positioning systems, remote sensing, digital terrain models, gathering, storage, analysing, and publishing of geodata, and from the area of project management.

Graduate's professional skills

The graduate can acquire geodata in the field, or, where appropriate, from existing resources, he can update them, insert them into the database, perform simple or standard analysis and visualization of geodata, and manage existing applications geoinformation technology.

Graduate's general competence

The graduate may act as a geodata collector, geodata database manager, geodata analyst, application manager for geoinformation technologies, and may continue to follow-up study.

Potential employment of graduates

The aim of the course is both theoretical and practical mastering of basics of geoinformation technologies and their application in practice. After the basic theoretical subjects, which develop mathematical, physical and informatics basis for the study at the study branch, students obtain knowledge of geoinformation technologies in specialized subjects. The study is accompanied by the subjects from the fields of social sciences. The study branch is designed to provide students with the opportunity to continue to study in a

follow-up study program or to get job in the field of companies and public institutions that use relevant practices and technologies to support their work activities.

C. Follow-up Master study – English Language

Full-time form of study in English language at VSB-Technical University of Ostrava (Faculty of Mining and Geology) in Ostrava

C.1. Study programme Geological Engineering

Faculty: Faculty of Mining and Geology

Type of study: Follow-up Master

Standard length of study: 2 years

Academic degree: Ing.

Guarantor department: Department of Geological Engineering

Guarantor: prof. Ing. Petr Skupien, Ph.D.

The study in this field is predominantly focused on the education of the engineers in the applied geology (hydrology, engineering geology, technical mineralogy and petrography, environmental geochemistry, economy geology, drilling exploration and applied geophysics). Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. Hi is also able to deal in the management post.

C.1.1. Geological Engineering field of study

The study in this field is predominantly focused on the education of the engineers in the applied geology (hydrology, engineering geology, technical mineralogy and petrography, environmental geochemistry, economy geology, drilling exploration and applied geophysics). Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of

geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. Hi is also able to deal in the management post.

C.2. Study programme Mining

Faculty: Faculty of Mining and Geology

Type of study: Follow-up Master

Standard length of study: 2 years

Academic degree: Ing.

Guarantor department: Department of Mining Engineering and Safety

The Master's studies in Mining course is undertaken on completion of the Bachelor's studies. It enriches the knowledge gained in the specialized field and that increases the possibilities of advancement in the profession, especially to manage grades. The Alumni satisfies the conditions required by the government for all official positions in mines and quarries in the Czech Republic. The course educates experts to work in the sphere of mining and in the processing of raw materials, including fossil fuels and metallic and nonmetallic minerals. The Alumni will be well-qualified to work in establishments engaged in civil engineering or to be employed as research workers working as state administration clerks in municipal offices and in regional authorities and ministries. After a successful graduation of the Master's course, it is possible to continue in a doctorate [Ph.D.] in postgraduate studies in the field of Mining or Mining Geomechanics.

Graduate's professional knowledge

On the basis of theoretical and practical experience, the graduate can apply their knowledge and expertise in mining, processing, and clean up the mining activities, as deep, and superficial way, then find application in energy, engineering companies and handlers of valuable minerals and companies that deal with landscaping work. Professional graduate theoretical knowledge is used in all levels of management functions, the mining and mineral processing, the disposal and reclamation následků mining, energy sector, state mining authorities, research institutes, specialized firms for the mining and quarrying (geomechanics, geophysics). Graduate able to develop projects that address the design, development and strategy firm. Je able to design mineral exploration, mining engineering, mining their own bearings and rehabilitation after mining bearings. The graduate can to understand and engage in the practice and safety and legal problems of mining.

Graduate's professional skills

Graduate Mgr.studia Mining sector can provide engineering, design and manage the exploratory phase of the preparation of deposits, mining engineering works, traffic management, rehabilitation and liquidation activity in higher levels of management bussines.Can to understand the technical, mapping, documentation of administrative and legal-security matters bearing mined raw materials.Is to expertise in labor law issues mining issues in the design and deployment of mining, transport and other technology to solve equipment.Can to mining and project design, preparation, mining, developing technology and techniques, and the traffic safety issues to ensure and apply directly to the operation sites bussines.Is able to hold technical and other specialized functions, geomechanics, ventilation, air conditioning, degassing, safety.

Graduate's general competence

Master's degree in Mining course is conceived so that future graduates going to have the widest application. Graduates Master degree in mining meet the criteria for qualification performance managerial positions mining and quarrying, as in deep mines, and quarries, including in treatment, transport, rehabilitation and ensuring the security issues of mining and quarrying, energy, mineral processing raw materials.Their

professional qualification is ideal for carrying out managerial functions of business-management and project execution, planning, production and control of the enterprise performance of the state mine inspector reports.

Potential employment of graduates

Mining engineering graduates meet all the conditions to enable them in the relevant regulations to hold all the control functions to "race down" eventually "race quarry and manage the technical side of the operation. Further of find jobs in other economic features of coal, ore and non-ore businesses in the areas of application of geomechanical service professionals ventilation, air conditioning, transportation, quality control, safety work. Further of careers in energy and mineral processing.

C.2.1. Mining of Mineral Resources and Their Utilization field of study

The choice of specialized subjects is based on Decree no. 298/2005 Coll. as amended, which is the fundamental document for the performance of selected regulated activities for graduates. The subjects follow the Bachelor degree study of the above mentioned field. Graduates are professionals for management positions in the areas of resource industries and skilled professionals for domestic and foreign surface and underground mines. The field of study is designed so that future graduates have the widest possible options of finding employment (from mine opening to mine liquidation and remediation of mining activities). Students can also find employment in public administration, design companies, construction and other sectors dealing with occupational and operational safety.

Graduate's professional knowledge

Graduates can analyse input information, find mutual links and order it according to its importance, and apply the information when designing particular proposals of ways of opening, preparation and mining of coal, ore and non-ore deposits, using both underground and surface methods. Graduates can assess the strengths and weaknesses of the proposals with the subsequent recommendation of the implementation. They have knowledge of the mining safety and legal issues.

Graduate's professional skills

Graduates are able to lead and manage a team, they are able to clarify the nature of a particular issue, to answer questions in a discussion on the issue of solutions, analyse problems and recommend the most appropriate alternative of the solution, they are able to apply their knowledge on specific solutions and to communicate the results to a wider range of employees. They are knowledgeable in the area of legislative and safety standards associated with mining and utilization of mineral resources.

Graduate's general competence

Graduates of the follow-up Master's degree in the field of study "Mining and Utilization of Mineral Resources" meet the qualification requirements for the performance of key management positions in mining and quarrying in mines and quarries. They can make independent and responsible decisions, coordinate the activities of the team and assume responsibility for its results. They clearly and convincingly communicate the requirements in order to solve specific situations. They are able to clearly summarize the opinions of other team members and use their expertise, skills and general professional qualifications in at least one foreign language. They are able to acquire additional expertise, skills and competence independently, primarily on the basis of practical experience and its evaluation, as well as through independent study of theoretical knowledge in the field.

Potential employment of graduates

Graduates the field of study "Mining and Utilization of Mineral Resources" have wide possibilities of finding employment in organizations carrying out mining operations and mining activities under the "ČBÚ Decree 298/2005 as amended on professional qualification". They can hold key management positions up to the "mine manager" or "quarry manager" (quarry operations with an annual extraction of up to 500 thousand tonnes). Students can also find employment in state administration, design companies, construction and other industries dealing with occupational safety, traffic safety and remediation of mining activities.

C.3. Study programme Geodesy, Cartography and Geoinformatics

Faculty: Faculty of Mining and Geology

Type of study: Follow-up Master

Standard length of study: 2 years

Academic degree: Ing.

Guarantor department: Department of Geoinformatics

The aim of the program is to prepare graduates who can handle the topic of the professional field of study to permit the creation of new procedures and applications of relevant technology, management of projects and find new ways of solving various problems. Graduates can work both in the field of state administration and self-government, as well as in the private sector, as well as in academic and research institutions.

Graduate's professional knowledge

Graduate of the program will have: - wide and / or deep knowledge and understanding of the subject and scope of the field of study relevant to contemporary state of knowledge - wide and / or deep knowledge and understanding of theories, concepts and methods relevant to contemporary state of knowledge in the study area - understanding of the possibilities, conditions and constraints on the use of knowledge from related fields

Graduate's professional skills

Graduate of the study program will be able to: - using the expert knowledge to define and creatively solve theoretical or practical problems in the study area - independently and creatively address complex problems using the selected theories, concepts and methods of a studied branch - use some of the most advanced research methods in the study area in a manner allowing to obtain new information

Graduate's general competence

Graduate of the study program will be able to: - independently and responsibly decide in a new or changing context or fundamentally changing environment, taking into account the wider social implications of decisions - by developing relationships and resources available to define the terms of reference for professional activities, coordinate them, and bear ultimate responsibility for the result - communicate clearly and persuasively his own expert opinions to both professionals and the wider public, - plan, promote and manage the acquisition of additional field expert knowledge, skills and competencies of other team members,

Potential employment of graduates

The study program is designed to provide students both with the possibility of applying in the field of companies and public institutions involved in the creation and development of procedures and applications of relevant technologies used to support the work activities of organizations and end users, and as well as in academic and research institutions or in follow-up studies.

C.3.1. Geoinformatics field of study

The aim is to prepare graduates who master professional subject matters from the sphere of geoinformatics and geoinformation technologies at the level that enables the creation of new applications of geoinformation technologies, project management and the management and administration of geoinformation systems, the implementation of the advanced analysis, and search for new ways to solve different spatial problems. Graduates can work for both the state and local governments as well as in the private sector (manager of the utilities, transport undertakings, companies involved in the collection and distribution of geodata, etc.). They can apply for job also in academic and research institutions

Graduate's professional knowledge

Graduates are equipped with the knowledge from the area of digital processing of remote sensing data, planning of applications of geoinformation technologies, advanced methods of gathering, storing, analyzing, and publishing of data, modelling and simulation of geosciences problems, and from the area of entrepreneurship and management.

Graduate's professional skills

The graduate can plan and manage the application of geoinformation technologies and large databases of geodata, creating algorithms for the spatial problems solving, apply advanced statistical methods of processing of data, collaborate in creating models and simulation of spatial processes and in the use of geoweb technology.

Graduate's general competence

The graduate can act in the role of the commercial agent, analyst for the needs of applications development and as geodata analyst, manager of large scale applications and databases of data, geoweb technology manager (mapservers and servers of geoweb services).

Potential employment of graduates

The aim of the course is both theoretical and practical mastering of geoinformation technologies, including the creation of their applications for practice. After study of theoretical subjects, who create a mathematical and physical basis of study, students obtain knowledge from geoinformation technologies in specialized subjects. Study is designed to provide students the possibilities of the applications in the field of companies and public institutions, concerned with the production and the development of applications of geoinformation technologies, used to support the business activities of end-users, and also in the area of building and managing large-scale applications of geoinformation technologies in organizations. Graduates may also find job in academic and research institutions, or they may continue in their studies.

D. Follow-up Master study – Czech Language

Full-time form of study in Czech language at VSB-Technical University of Ostrava (Faculty of Mining and Geology) in Ostrava

C.3. Study programme Mineral Raw Materials

Faculty: Faculty of Mining and Geology

Type of study: Follow-up Master

Standard length of study: 2 years

Academic degree: Ing.

Guarantor department: Department of Environmental Engineering

The follow-up Master's study branches expand the knowledge acquired during the Bachelor's study programmes and provide education in specialized domains, particularly extraction and processing of mineral resources, including their applications in other constituents of the biosphere. The offered Master's study branches are highly specialized and prepared on the grounds of the state-of-the-art knowledge and approaches to the studied issues. Interconnection of the individual fields with the issue of mineral resources ensures formation of right attitudes and decisions during assessing raw material sources with respect to sustainable development as well as to the assessment of anthropogenic impacts in the widest environmental contexts.

Graduate's professional knowledge

Students deepen their knowledge of methods which are required for the performance of independent professions. Next, they gain information in accordance with the contemporary state of knowledge in the field of study. Students acquire additional knowledge of the technical terminology of the field. Thanks to their powers of invention, they are further able to transfer the theoretical knowledge, which is the grounds of the branch methods, and use it in practice. Students are educated about the principles of modern technologies in their field of study. Graduates are able to understand the options, conditions and limitations of the knowledge also in related fields.

Graduate's professional skills

Graduates of the follow-up Master's Studies are prepared to use their expertise and skills in an independent definition of research, theoretical or practical tasks in various disciplines of the study programme. On the basis of further study (professional literature, applications and expert sources), own knowledge and attitudes, they can denominate a problem, deal with it in a creative manner, interpret and defend it. Dealing with more complex issues, they can work with both national and foreign professional literature and professional databases, as well as produce new data, information and procedures in a creative manner. Graduates are not

only well informed about the professional matters but they are also capable of decision-making and finding solutions.

Graduate's general competence

Graduates will be capable of independent and responsible decision making in new or ever changing contexts of such diverse environment as the study programme of Mineral Resources. They will be able to implement their expertise in the practice. Next, they will be capable of dealing with technological problems in an independent and responsible manner and will be prepared to be accountable for them. The graduates can intelligibly and convincingly convey their expert opinions formed during the studies to their colleagues or other team members as well as to the public. Having gained necessary experience, they will be ready to execute auditing activities in the given field. Further professional growth, acquisition and application of new information in the field are a matter of fact.

Potential employment of graduates

Graduates may find jobs as technologists or specialists employable as managers in specialized fields, particularly in extraction and processing of mineral resources, including their applications onto other constituents of the biosphere and environmental protection. They are well equipped for check and control of technological processes in dressing mineral resources. Thanks to their knowledge and experience, they may also assert themselves in research in various laboratories. They can work in the public administration and self-administration focusing on the environmental control. Their advanced language skills and knowledge of legislation in the field predestine them to work within the whole EU or in business related to the field. Moreover, graduates have an opportunity of further education in related PhD programmes with the prospects of scientific or academic careers.

C.3.1. Economics and Management in the Field of Raw Materials field of study

Study branch Economics and management in the field of raw materials comes out from the opinion that industrial enterprise economic results are reflex of technical solution of particular processes. Management of industrial enterprise economics has to arise from the knowledge of production process technology. Study branch has fundament in the field of natural sciences (physic, geology, raw materials deposits, raw materials processing etc). These knowledge enable to students to understand the key problems of deposits extraction are connected with industrial enterprise economic results. Economic disciplines create the economic system of enterprise. There are described its basic elements, its operation, design and analysis. There is paid attention to information from the point of view of general approach and from the point of view of accountancy. Industrial enterprise management concerns the general principles but also staff management from the point of view of human resources management. Substantial attention is devoted to legal problems in connection to economics but also in connection to mining industry.

Graduate's professional knowledge

The Ing. Graduate profile is a description of the personal qualities, skills and attributes a student is expected to obtain by the end of a graduate's degree programme that can be completed after an undergraduate's degree is earned at the University.

Graduate's professional skills

Graduates have mastered of a body of knowledge, including an understanding of broad conceptual and theoretical elements, in the major fields of their study. They understand and can recognize and evaluate current issues and debates in the major fields of knowledge studied. They have understanding and appreciation of methodologies, research and creative work and are able to research in a range of different contexts to provide for solutions of practical problems.

Graduate's general competence

Graduated have a capacity for creativity and originality, conceptual and reflective thinking. They can demonstrate intellectual integrity, respect for truth and for the ethics of research and scholarly activity. They are able to recognize when information is needed and a capacity to locate, evaluate and use information effectively. Graduates have awareness of international and global dimension of intellectual, political and economic issues, and distinctive qualities of their country as well as close community of their fellow citizens. They are able to recognise when information is needed and have capacity to locate, evaluate and use this information effectively.

Potential employment of graduates

Study branch graduates can be employed in technical and economical grades of enterprise in the field of raw materials industry but also in economical grades of various institutions, in universities and research establishments because: - they exhibit: • knowledge and understanding of items and extent of branch corresponding to topical know edge supplemented by the boundary disciplines knowledge • broad and profound knowledge and understanding of theories, conceptions and methods corresponding to topical know edge in branch enabling execution of higher grades of management in operational area - they are able to: • independently define and solve by creative way the theoretical or practical problem of profession • independently solve a complex problem by creative way, with utilization of selected theories, conceptions and methods of branch to elaborate extensive analytical and synthetical works in the framework of the whole organization • apply some advanced research procedures in branch by the way enabling to acquire a new original data from the practice

C.3.2. Water Technologies and Water Management field of study

Studied topics include water supply and water management systems as well as emergencies and control of water facilities. A particular attention is paid to waste water treatment and processing of water. Graduates should be able to make independent and responsible decisions in any type of a water company, institution or business operating a waste water treatment plant or a water processing facility. In-depth knowledge is required for chemistry of water, mine water, waster water and technical subjects. Students also learn about bases of microbiology, water management systems, hydrology and underground hydraulics, land improvement, anthropogenic impacts on environment, hydro-technical facilities, hydro-toxicology and protection of soil.

Graduate's professional knowledge

Deep knowledge and understanding of the subject in the required scope. Deep knowledge of theories, concepts and methods and use of the theories, concepts and methods in practice

Graduate's professional skills

Ability to use special knowledge for solving an issue and ability to approach in a creative way theoretical and practical challengers. Ability to solve independently a complex issue using necessary theories, concepts or methods.

Graduate's general competence

Ability to understand opinions of others and communicate convincingly own opinions to experts as well as public. Ability to solve an ethical problem. Ability to use special knowledge, skills and general competences in one foreign language at least. Ability to plan, support and manage, using theoretical knowledge. Ability to acquire other special knowledge. Ability to make independent and responsible decisions in new or changing situations.

Potential employment of graduates

In line with the main focus of studies. In Water Management, the graduate should be able to work in any water management business or institution. In Water Technology, the graduate should be able to work in technology or other technical jobs in companies which operate waste water treatment plants and water processing plants. The graduates can also work as water managers in industrial businesses or researchers in industrial waste water treatment processes. Future jobs for a graduate from Water Technologies and Water Management -designing in construction and reconstruction of water facilities -designing in construction and reconstruction of water networks, sewage systems, waste water treatment plants and water processing facilities -managers in operation of water facilities of different types -research in water management -state administration and surveillance bodies responsible for environment issues (municipalities, regional authorities, ministries) -senior managers of technology processes in waste water treatment and water processing

C.3.3. Environmental Engineering field of study

The follow-up master's study program Environmental Engineering is conceived as interdisciplinary study field which is based on combination of natural, technical and technological sciences and fields. The study program is focused on profiling graduates for professional and qualified work in research, evaluation, planning and deciding on the sphere of environment Formation and Protection. Graduates will be able to work in a variety of expert positions in various state and private institutions, non-governmental and other organizations. The master's program Environmental Engineering follows on knowledge obtained from bachelor's program Environmental Engineering or similar bachelor's program. The program is composed of courses such as physical science, mathematics, computer technology, field legislation and economics. Students will have knowledge of ecology, landscape systems, landscape restoration, geochemistry, environmental analysis, toxicology, waste management, air protection, hydrobiology, water protection, pedology, soil conservation, nature and landscape conservation, environmental impact assessment, environmental management, production technology and preventive techniques of environment.

Graduate's professional knowledge

Graduates of the follow-up master's study program Environmental Engineering have the broad, high and complex knowledge of environment formation and protection. Graduates are able to use their knowledge and attainments from particular sphere for solving the environmental and landscape problems. They are also able to solve the research fields and contribute to other understanding of development.

Graduate's professional skills

Graduates of the follow-up master's study are ready to use their professionally knowledge and attainments for the determinating research theoretical or practical problems of branches of environment. They are able to study literature from special resources [Czech and foreign specialized literature and databases] and use this information and self proper knowledge for solving problems. They are also able to develop new processes and methods for environmental branch.

Graduate's general competence

The study programme prepares the engineers of the follow-up master's study who are independent specialists who are able to make responsible decision and take bearings in high spectrum of environmental problems. They are able to prepare, coordinate and manage a team of specialists and work with them. They can qualify the setting on the basis of current situation and available resources and hold responsible for the records. Graduates can intelligibly and convincingly transmit their opinion to the general public by letters and verbally as well. They are able to use the language such as English, Spanish, German and others for publishing information in the scientific journals. For graduates could be possible the expert growth and acquiring new information for practical application. Graduates are able to solve ethics problems and human rights as well. They are ready for follow-up doctoral study Environmental Protection in the Industrial Areas and elicit the Ph.D. university degree.

Potential employment of graduates

Given the openness of the program and its multidisciplinary nature, the graduates can easily find their application in related fields such as in natural, technical and technological state and private institutions, non-governmental and other organizations, or anywhere else on managerial positions. They can work like experts of environmental protection such as consultants, designers, project engineers and scientists. They can be also the teachers for the specialist courses.

C.3.4. Waste Treatment and Disposal field of study

The study branch of the follow-up Master's Studies deepens the knowledge of basic technological processes applied in waste management, i.e. activities focusing on handling of waste. The course prepares specialists who will be capable of independent and responsible waste management work. The Master's Studies course puts emphasis on deep understanding of the field corresponding to the contemporary state of knowledge in the sphere of waste management. The study branch of Waste Treatment and Disposal applies more sophisticated information in the area of waste property evaluation, waste recycling technologies, chemical and physical treatment methods of wastes and mineral resources, and remediation of old ecological loads connected with past industrial activities.

Graduate's professional knowledge

Students deepen their acquired knowledge of methods which are required for the performance of independent professional activities. They also gain information corresponding to the contemporary state of knowledge in the sphere of waste management. They become more familiar with technical terminology of the field. Thanks to their powers of invention, they are further able to transfer the theoretical knowledge, which is the grounds of the branch methods, and use it in practice. Students gain knowledge related to the principles of modern technologies focusing on removal of selected substances from waste, technologies of retrieval of rare substances and technologies processing bio-degradable waste. Graduates understand possibilities, conditions and limitations of the acquired knowledge also in related fields.

Graduate's professional skills

On the basis of the acquired theoretical knowledge a graduate is capable of creative solving of theoretical or practical problems in the sphere of waste management. A graduate is able to deal with complex issues related to handling of waste independently. They can identify, sort or interpret information related to the field and assert it in practice. During the studies the graduates learn practical skills of laboratory work, not only to be able to determine the characteristics of wastes but concerning a wide spectrum of activities related to their processing. With respect to studying sectional expert subjects and soft skills subjects, a graduate is able to deal with basic technological and managerial tasks related to handling of waste.

Graduate's general competence

The graduates will be capable of independent and responsible decision making in new or ever changing contexts of diverse waste management environments. They will be able to implement their expertise in the practice. Next, they will be capable of dealing with technological problems in an independent and responsible manner and will be prepared to be accountable for them. The graduates can intelligibly and convincingly convey their expert opinions formed during the studies to their colleagues or other team members as well as to the public. Having gained necessary experience, they will be ready to execute auditing activities in the sphere of waste management.

Potential employment of graduates

The graduates are professionals able to deal with problems connected with handling of waste, which includes a spectrum of areas from mineral extraction and their processing, via production all the way to product consumption. Therefore, they may find employment in the public administration departments responsible for waste management and auditing bodies, in companies, as waste managers, technologists in waste disposal facilities, in material processing or research.

C.3.5. European School for Brownfields Technical Redevelopment field of study

The Master's program of the European school for technical brownfields redevelopment is interdisciplinary 2 years study branch. It is based on a combination of natural, economic and construction engineering sciences, including professional disciplines. The main aim of the study is to prepare graduates to manage project and work activities in the restoration and development of abandoned industrial areas = brownfields. Teaching and education has base in scientific disciplines such as mathematics, physics and chemistry. It is expected that a bachelor study graduate has such knowledge. The study plan is composed of the compulsory subjects and compulsorily chosen subjects that enable to tailor their studies according to their own interests and professional intentions. Individual courses are designed to give students theoretical and practical knowledge to the extent of master study. Theoretical knowledge from lectures is developed further in field work, seminars, colloquia and exercises. The case study solutions that are discussed and dealt with in the professional colloquium and practical field works have a significant role in the educational process. The case studies are created in order to help students develop professional, systematic and independent work.

Graduate's professional knowledge

Graduates are equipped with complex knowledge in the fields: Landscape and nature conservation, their components and functions, Technical restoration of functions of landscape segments, Environmental assessment of brownfields, Civil engineering and technical assessment, Economical and socio-economical assessment, Remediation and regeneration of areas, Consultancy and expert activities and Environmental protection and design. Graduates are able to use their knowledge and attainments from particular sphere for solving the problems of the brownfields in the urban area and open countryside.

Graduate's professional skills

On the basis of the acquired theoretical knowledge a graduate is capable of identifying, sorting and interpreting information related to brownfield redevelopment. During their studies the students deepen their skills in laboratory, experimental and field tasks and consequently can work with maps and local plans, legislation, they can propose solutions for decontamination and remediation of brownfields or analyse and produce data in a GIS.

Graduate's general competence

Graduates are independent experts who can make responsible decisions and understand the wide range of issues related to the problems of brownfields. They are able to build up and lead a professional team and work in it. According to evolving context and available resources they are able to define the terms of reference for professional activities, coordinate them and to bear ultimate responsibility for the results. Graduates are able to clearly and persuasively communicate their own expert opinion with professionals and the general public, they are able to express themselves verbally and also in specialized press. Of course there is a continuous professional development, acquisition and use of new knowledge in the field. Master's degree graduates will be also able to independently and responsibly solve the ethical problems.

Potential employment of graduates

Graduates will have the right to use the title Engineer (Ing., Dipl. Ing.), they find their application as managers and technologists in a companies focused on regeneration of derelict industrial buildings, landscapes and areas, as professionals and executive directors in municipalities, first of all in the field of environmental protection and creation, in building authorities, urban enters, as experts in the field of renovation and reuse of abandoned areas, in industrial or agriculture companies, projection offices, business companies, in a research and other social activities in Czech Republic and all member states of the European union. Graduates are fully eligible for PhD. studies.

D.2. Study programme Geological Engineering

Faculty: Faculty of Mining and Geology

Type of study: Follow-up Master

Standard length of study: 2 years

Academic degree: Ing.

Guarantor department: Department of Geological Engineering

The study in this field is predominantly focused on the education of the engineers in the applied geology (hydrology, engineering geology, technical mineralogy and petrography, environmental geochemistry, economy geology, drilling exploration and applied geophysics). Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. Hi is also able to deal in the management post.

D.2.1. Geological Engineering field of study

The study in this field is predominantly focused on the education of the engineers in the applied geology (hydrology, engineering geology, technical mineralogy and petrography, environmental geochemistry, economy geology, drilling exploration and applied geophysics). Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. Hi is also able to deal in the management post.

D.3. Study programme Mining

Faculty: Faculty of Mining and Geology

Type of study: Follow-up Master

Standard length of study: 2 years

Academic degree: Ing.

Guarantor department: Department of Mining Engineering and Safety

Guarantor: prof. Ing. Vlastimil Hudeček, CSc.

The Master's studies in Mining course is undertaken on completion of the Bachelor's studies. It enriches the knowledge gained in the specialized field and that increases the possibilities of advancement in the profession, especially to manage grades. The Alumni satisfies the conditions required by the government for all official positions in mines and quarries in the Czech Republic. The course educates experts to work in the sphere of mining and in the processing of raw materials, including fossil fuels and metallic and nonmetallic minerals. The Alumni will be well-qualified to work in establishments engaged in civil engineering or to be employed as research workers working as state administration clerks in municipal offices and in regional authorities and ministries. After a successful graduation of the Master's course, it is possible to continue in a doctorate [Ph.D.] in postgraduate studies in the field of Mining or Mining Geomechanics.

Graduate's professional knowledge

On the basis of theoretical and practical experience, the graduate can apply their knowledge and expertise in mining, processing, and clean up the mining activities, as deep, and superficial way, then find application in energy, engineering companies and handlers of valuable minerals and companies that deal with landscaping work. Professional graduate theoretical knowledge is used in all levels of management functions, the mining and mineral processing, the disposal and reclamation následkū mining, energy sector, state mining authorities, research institutes, specialized firms for the mining and quarrying (geomechanics, geophysics).s

Graduate able to develop projects that address the design, development and strategy firm. Je able to design mineral exploration, mining engineering, mining their own bearings and rehabilitation after mining bearings. The graduate can to understand and engage in the practice and safety and legal problems of mining.

Graduate's professional skills

Graduate Mgr.studia Mining sector can provide engineering, design and manage the exploratory phase of the preparation of deposits, mining engineering works, traffic management, rehabilitation and liquidation activity in higher levels of management bussines.Can to understand the technical, mapping, documentation of administrative and legal-security matters bearing mined raw materials.Is to expertise in labor law issues mining issues in the design and deployment of mining, transport and other technology to solve equipment.Can to mining and project design, preparation, mining, developing technology and techniques, and the traffic safety issues to ensure and apply directly to the operation sites bussines.Is able to hold technical and other specialized functions, geomechanics, ventilation, air conditioning, degassing, safety.

Graduate's general competence

Master's degree in Mining course is conceived so that future graduates going to have the widest application. Graduates Master degree in mining meet the criteria for qualification performance managerial positions mining and quarrying, as in deep mines, and quarries, including in treatment, transport, rehabilitation and ensuring the security issues of mining and quarrying, energy, mineral processing raw materials.Their professional qualification is ideal for carrying out managerial functions of business-management and project execution, planning, production and control of the enterprise performance of the state mine inspector reports.

Potential employment of graduates

Mining engineering graduates meet all the conditions to enable them in the relevant regulations to hold all the control functions to "race down" eventually "race quarry and manage the technical side of the operation.Further of find jobs in other economic features of coal, ore and non-ore businesses in the areas of application of geomechanical service professionals ventilation, air conditioning, transportation, quality control, safety work. Further of careers in energy and mineral processing.

D.3.1. Mining of Mineral Resources and Their Utilization field of study

The choice of specialized subjects is based on Decree no. 298/2005 Coll. as amended, which is the fundamental document for the performance of selected regulated activities for graduates. The subjects follow the Bachelor degree study of the above mentioned field. Graduates are professionals for management positions in the areas of resource industries and skilled professionals for domestic and foreign surface and underground mines. The field of study is designed so that future graduates have the widest possible options of finding employment (from mine opening to mine liquidation and remediation of mining activities). Students can also find employment in public administration, design companies, construction and other sectors dealing with occupational and operational safety.

Graduate's professional knowledge

Graduates can analyse input information, find mutual links and order it according to its importance, and apply the information when designing particular proposals of ways of opening, preparation and mining of coal, ore and non-ore deposits, using both underground and surface methods. Graduates can assess the strengths and weaknesses of the proposals with the subsequent recommendation of the implementation. They have knowledge of the mining safety and legal issues.

Graduate's professional skills

Graduates are able to lead and manage a team, they are able to clarify the nature of a particular issue, to answer questions in a discussion on the issue of solutions, analyse problems and recommend the most appropriate alternative of the solution, they are able to apply their knowledge on specific solutions and to communicate the results to a wider range of employees. They are knowledgeable in the area of legislative and safety standards associated with mining and utilization of mineral resources.

Graduate's general competence

Graduates of the follow-up Master's degree in the field of study "Mining and Utilization of Mineral Resources" meet the qualification requirements for the performance of key management positions in mining and quarrying in mines and quarries. They can make independent and responsible decisions, coordinate the activities of the team and assume responsibility for its results. They clearly and convincingly communicate the requirements in order to solve specific situations. They are able to clearly summarize the opinions of other team members and use their expertise, skills and general professional qualifications in at least one foreign language. They are able to acquire additional expertise, skills and competence independently, primarily on the basis of practical experience and its evaluation, as well as through independent study of theoretical knowledge in the field.

Potential employment of graduates

Graduates the field of study “Mining and Utilization of Mineral Resources” have wide possibilities of finding employment in organizations carrying out mining operations and mining activities under the “ČBÚ Decree 298/2005 as amended on professional qualification”. They can hold key management positions up to the “mine manager” or “quarry manager” (quarry operations with an annual extraction of up to 500 thousand tonnes). Students can also find employment in state administration, design companies, construction and other industries dealing with occupational safety, traffic safety and remediation of mining activities.

D.4. Study programme Geodesy and Cartography

Faculty: Faculty of Mining and Geology

Type of study: Follow-up Master

Standard length of study: 2 years

Academic degree: Ing.

Guarantor department: Department of Geodesy and Mine Surveying

The aim of the program is to prepare graduates who can handle the topic of the professional field of study to permit the creation of new procedures and applications of relevant technology, management of projects and find new ways of solving various problems. They will be employable in both state and local governments and the private sector.

Graduate's professional knowledge

Graduate program will have: - wide and / or deep knowledge and understanding of the subject and scope of the field of study relevant to contemporary state of knowledge - wide and / or deep knowledge and understanding of theories, concepts and methods relevant to contemporary state of knowledge in the study area - understanding of the possibilities, conditions and constraints on the use of knowledge from related fields

Graduate's professional skills

Graduate of the study program will be able to: - using the expert knowledge to define and creatively solve theoretical or practical problems in the study area - independently and creatively address complex problems using the selected theories, concepts and methods of a studied branch - use some of the most advanced research methods in the study area in a manner allowing to obtain new information

Graduate's general competence

Graduate of the study program will be able to: - independently and responsibly decide in a new or changing context or fundamentally changing environment, taking into account the wider social implications of decisions - by developing relationships and resources available to define the terms of reference for professional activities, coordinate them, and bear ultimate responsibility for the result - communicate clearly and persuasively his own expert opinions to both professionals and the wider public, - plan, promote and manage the acquisition of additional field expert knowledge, skills and competencies of other team members,

Potential employment of graduates

Degree program is designed to provide the students the opportunity to apply for companies and public institutions engaged in the creation and development of procedures and applications of relevant technologies used to support the work activities of organizations and end users.

D.4.1. Mine Surveying field of study

Field of study specified as Mine Survey (continuation master's curriculum) solves the issues which cover ensuring basic surveying data and their processing for the purpose of compiling map documentation for running mining activities and activities being executed like mining ones. Knowledge acquired during bachelor's curriculum are deepened with effects resulting from exploitations of workings to the surface, measuring of motions and deformations, science on physical fields of the Earth, especially on a field of gravity and its influence over surveying values. Knowledge in geodesy is extended over the sphere of both the 3D geodesy and theory of global positioning systems. Students are familiar with calculations of mineral resource deposits, as well, with physical principles of surveying instrumentation, as well as metrology issues and accreditation of mine surveying works as per ISO 9000 standards.

Graduate's professional knowledge

- Wide and/or deep knowledge and understanding to the subject and scope of the field corresponding to the contemporary state-of-the-art - Wide and/or deep knowledge and understanding to theories, concepts and methods, corresponding to the contemporary state-of-the-art within this field - Understanding to possibilities, conditions and terms, and limitation to utilize knowledge in related fields of sciences

Graduate's professional skills

- Utilizing professional knowledge to delimitate independently and creatively solve theoretical or practical issue in the field of science - Independently and creatively solve complex issue utilizing appropriate theories, concepts, and methods within the field of science - To utilize some of advanced research procedures within the field of science utilizing a method/procedure to acquire new original information

Graduate's general competence

- To make independent and responsible decision in new, changing context or take into account principally changing environment respecting extended social consequences of such making decisions - As per evolving context and available/accessible resources to delimitate specification for running professional activities, to coordinate them, and to assume final responsibility for their results - Of independent solution of ethical issue - To convey/present both to professionals and general public intelligibly and convincingly graduate's own professional opinions - To utilize his/her professional knowledge, professional skill and general competences applying competence with strong command of one foreign language at least - To plan, support, and manage other team members utilizing theoretical knowledge in the field of science, acquiring further professional knowledge, skills, and competences

Potential employment of graduates

Responsibility for professional management, fulfilling, and saving mine surveying documentation as per the Regulation of the Czech Mining Office Board No. 435/1992 of Law Digest, in wording of later rulings.

D.4.2. Engineering Geodesy field of study

Field of study specified as Engineering Survey (continuation master's curriculum) amends the knowledge of basic Geodesy with measuring the displacement and deformations, geodetic setting out grid, geodetical methods and procedures during preparation and designing buildings, erection sites, with documentation and controlling the stability of building objects. Knowledge in basic geodesy are extended with the sphere of 3D geodesy, theory of global positioning systems, with methods of cosmic geodesy and Earth remote observation. Students are familiar with contemporary building materials; they would acquire knowledge covering hall type objects within industrial buildings, as well as on selected building construction type parts of buildings. They would be familiar with physical principles of geodetic instrumentation, problems of metrology, and accreditation of geodetical works as per ISO 9000 standard. They would acquire complete overview as for issues covering land law relationships and institutes within mutual context, as per the Czech legislation.

Graduate's professional knowledge

- Wide and/or deep knowledge and understanding to the subject and scope of the field of science corresponding to the contemporary state-of-the-art - Wide and/or deep knowledge and understanding to theories, concepts and methods, corresponding to the contemporary state-of-the-art within this field of science - Understanding to possibilities, conditions and terms, and limitation to utilize knowledge in related fields of sciences

Graduate's professional skills

- Utilizing professional knowledge to delimitate independently and creatively solve theoretical or practical issue in appropriate field of science - Independently and creatively solve complex issue utilizing selected theories, concepts, and methods within the respective field of science - To utilize some of advanced research procedures within the field of science utilizing a method/ procedure to acquire new original information

Graduate's general competence

- To make independent and responsible decisions within new, changing context or considering principally changing environment, respecting extended social consequences of decisions made such a way - As per evolving context and available/accessible resources to delimitate specification for running professional activities, to coordinate them, and to assume final responsibility for their results/consequences - Of independent solution of ethical issue - To convey/present graduate's own professional opinions both to

professionals and general public intelligibly and convincingly - To utilize his/her professional knowledge, professional skills and general competences applying competence of strong command of one foreign language at least - To plan, support, and manage other team members utilizing theoretical knowledge in the field of science, acquiring further professional knowledge, skills, and competences

Potential employment of graduates

To apply professional competence of authorized surveyor, pertinently to executing responsibilities of mine surveyor and main mine surveyor

D.4.3. Geoinformatics field of study

The aim is to prepare graduates who master professional subject matters from the sphere of geoinformatics and geoinformation technologies at the level that enables the creation of new applications of geoinformation technologies, project management and the management and administration of geoinformation systems, the implementation of the advanced analysis, and search for new ways to solve different spatial problems. Graduates can work for both the state and local governments as well as in the private sector (manager of the utilities, transport undertakings, companies involved in the collection and distribution of geodata, etc.). They can apply for job also in academic and research institutions

Graduate's professional knowledge

Graduates are equipped with the knowledge from the area of digital processing of remote sensing data, planning of applications of geoinformation technologies, advanced methods of gathering, storing, analyzing, and publishing of data, modelling and simulation of geosciences problems, and from the area of entrepreneurship and management.

Graduate's professional skills

The graduate can plan and manage the application of geoinformation technologies and large databases of geodata, creating algorithms for the spatial problems solving, apply advanced statistical methods of processing of data, collaborate in creating models and simulation of spatial processes and in the use of geoweb technology.

Graduate's general competence

The graduate can act in the role of the commercial agent, analyst for the needs of applications development and as geodata analyst, manager of large scale applications and databases of data, geoweb technology manager (mapservers and servers of geoweb services).

Potential employment of graduates

The aim of the course is both theoretical and practical mastering of geoinformation technologies, including the creation of their applications for practice. After study of theoretical subjects, who create a mathematical and physical basis of study, students obtain knowledge from geoinformation technologies in specialized subjects. Study is designed to provide students the possibilities of the applications in the field of companies and public institutions, concerned with the production and the development of applications of geoinformation technologies, used to support the business activities of end-users, and also in the area of building and managing large-scale applications of geoinformation technologies in organizations. Graduates may also find job in academic and research institutions, or they may continue in their studies.

D. Doctoral study – Czech Language

D.1. Study programme Geological Engineering

Faculty: Faculty of Mining and Geology

Type of study: Doctoral

Standard length of study: 4 years

Academic degree: Ph.D.

Guarantor department:

Department of Geological Engineering

D.1.1. Geological Engineering field of study

The Ph.D. study in this field is predominantly focused on the education of the engineers in the applied geology (hydrology, engineering geology, technical mineralogy and petrography, environmental geochemistry, economy geology, drilling exploration and applied geophysics). Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. Hi is also able to deal in the management post.

D.2. Study programme Mineral Raw Materials

Faculty: Faculty of Mining and Geology

Type of study: Doctoral

Standard length of study: 4 years

Academic degree: Ph.D.

Guarantor department: Department of Environmental Engineering

The study in this field is predominantly focused on the education of the engineers in the applied geology (hydrology, engineering geology, technical mineralogy and petrography, environmental geochemistry, economy geology, drilling exploration and applied geophysics). Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics

Graduate's professional knowledge

Theoretical as well as practical parts of the education are targeted at implementing, managing, organizing and assessing of all kinds of geological operations. The core of the study concentrates on the analysis of geological phenomena, assessment of economic and ecological aspects of geological activities, mining and industrial utilizations, application of computer technologies and geoinformatics.

Graduate's professional skills

Graduates are able to solve individually wide complex of geological and geoscience problems with utilization theory, concepts a methodology concern also problematic of related technical and geoscience fields.

Graduate's general competence

Graduate is able to decide individually in relation to new and varying circumstances, so as take into account wide social consequences.

Potential employment of graduates

Graduate can find employment in wide range of geological investigation and exploitation enterprises, organization which deal with ecological geology problematic etc. Hi is also able to deal in the management post.

D.1.2. Processing field of study

The processing is the science which is historically connected to development and research of technologies used for processing of raw materials and waters which, in the extracted condition, do not have any utility value and cannot be utilised. The Ph.D. study in this science is intended for graduates with the master degree in technology. It focuses on processing of raw materials, waste recycling and water technology. The study programme is based on extended knowledge of science (applied mathematics, physics, chemistry and biochemistry). Specialised subjects focus on preparatory processes (modification of particle size such as the crushing or sorting) and main processes which separate utility components (or harmful substances) from heterogeneous multi-phase systems. An integral part of the scientific training is the study of the technology of mineral processing. To provide more general scientific background, specific subjects are included into the study programme. They deal with the monitoring of certain components in raw materials, wastes and waters, with degradation of harmful substances and research of advanced raw material technologies and biotechnologies. The processing science is rather flexible and original in connection with extracted raw materials, industrial/other wastes and wastewater and sludge. For this purpose, students can make a choice from among a wide range of optional subjects in order to be prepared for their scientific career with a focus on a certain area. A young scientist can acquire thus knowledge for investigation or applied research – in particular, for research and development of little-waste and waste-free raw material technologies and for improvement of environment quality.

Graduate's professional knowledge

- in-depth and systematic knowledge and understanding of the subject in the required scope - understanding of theories, concepts and methods being the basis of the current knowledge at the international level - understanding of the system of scientific and research issues being on the border between the sciences

Graduate's professional skills

- the graduate is able to develop and evaluate theories, concepts and methods and to view the science in a wide context - the graduate is able to design and use advanced research procedures

Graduate's general competence

- to acquire new specialised knowledge, skills and competence through own creative activities and to influence background for education of the others - to evaluate new findings and to plan extensive creative activities - to communicate, convincingly and in a comprehensive way, own findings to other scholars, scientists and general public - to plan extensive creative activities and acquire sources for performance of such activities - to evaluate new findings and manage problems independently

Potential employment of graduates

Those with Ph.D. in the processing science will have up-to-date theoretical knowledge about the processing. The graduates can work as teachers or scholars in universities. They can also work independently in creative activities. Other jobs include research or management in industries relating to the processing science.

E.3. Study programme Mining

Faculty: Faculty of Mining and Geology

Type of study: Doctoral

Standard length of study: 4 years

Academic degree: Ph.D.

Guarantor department: Department of Mining Engineering and Safety

The Ph.D. in Mining study programme is undertaken on completion of the Bachelor's and Master's studies. It enriches the knowledge gained in the specialized field and that increases the possibilities of advancement in the profession, especially to manage grades. The Alumni satisfies the conditions required by the government for all official positions in mines and quarries in the Czech Republic. The course educates experts to work in the sphere of mining and in the processing of raw materials, including fossil fuels and metallic and nonmetallic minerals. The Alumni will be well-qualified to work in establishments engaged in civil engineering or to be employed as research workers working as state administration clerks in municipal offices and in regional authorities and ministries.

Graduate's professional knowledge

On the basis of theoretical and practical experience, the graduate can apply their knowledge and expertise in mining, processing, and clean up the mining activities, as deep, and superficial way, then find application in energy, engineering companies and handlers of valuable minerals and companies that deal with landscaping work. Professional graduate theoretical knowledge is used in all levels of management functions, the mining and mineral processing, the disposal and reclamation následků mining, energy sector, state mining authorities, research institutes, specialized firms for the mining and quarrying (geomechanics, geophysics). Graduate able to develop projects that address the design, development and strategy firm. Je able to design mineral exploration, mining engineering, mining their own bearings and rehabilitation after mining bearings. The graduate can to understand and engage in the practice and safety and legal problems of mining.

Graduate's professional skills

Graduate Ph.D. study can Mining sector provide engineering, design and manage the exploratory phase of the preparation of deposits, mining engineering works, traffic management, rehabilitation and liquidation activity in higher levels of management bussines. Can to understand the technical, mapping, documentation of administrative and legal-security matters bearing mined raw materials. Is to expertise in labor law issues mining issues in the design and deployment of mining, transport and other technology to solve equipment. Can to mining and project design, preparation, mining, developing technology and techniques, and the traffic safety issues to ensure and apply directly to the operation sites bussines. Is able to hold technical and other specialized functions, geomechanics, ventilation, air conditioning, degassing, safety.

Graduate's general competence

Ph.D. graduates professional qualification is ideal for carrying out managerial functions of business-management and project execution, planning, production and control of the enterprise performance of the state mine inspector reports.

Potential employment of graduates

Graduates of the doctoral study of field "Mining and mining geomechanics" fulfills all the conditions for the performance of all the management functions in accordance with the relevant regulations ("head of mine" or "head of quarry "). Additional opportunities - all leading economic functions of coal, ore and industrial minerals companies, geomechanical services, researchers of geomechanics and geophysics minerals, ventilation and air conditioning, quality control, safety and the energy, professional specialists, heads of research teams and university teachers.

E.3.1. Mining and Mining Geomechanics field of study

Graduate's professional knowledge

Graduate is able to work as a technical specialist, work out projects, solve concepts, development and strategy of the company and all on the basis of theoretical and practical experiences. He is able to project geological exploration, mining, extraction own deposits and maintenance after extraction. He can solve the problems of anomalous geomechanical effects. He can be applied in practice safety and legal issues in mining. The graduate can apply theoretical knowledge in research institutes and other scientific institutions.

Graduate's professional skills

Graduates can within the company ensure, project and control: exploration, preparation of deposits, project and use of mining and other technological equipment, mining in difficult geomechanical conditions, drive traffic and maintenance and clean-up activities. He can be oriented in the technical, administrative mapping and documentation. He has professional knowledge in labor-safety issues in mining. He is able to hold more specialized technical functions

- geomechanics, geophysics, ventilation and air conditioning, degassing, work safety. He is able work as a researcher.

Graduate's general competence

Doctoral study of field "Mining and mining geomechanics" has been designed to fulfill criteria for the qualifications of all power management functions (projection, research, manufacture, inspection activities - Inspectors of the State mining authority) the mining industry as in underground mines and quarries, including beneficiation, transport, recultivation and safety.

Potential employment of graduates

Graduates of the doctoral study of field "Mining and mining geomechanics" fulfills all the conditions for the performance of all the management functions in accordance with the relevant regulations ("head of mine" or "head of quarry "). Additional opportunities - all leading economic functions of coal, ore and industrial minerals companies, geomechanical services, researchers of geomechanics and geophysics minerals, ventilation and air conditioning, quality control, safety and the energy, professional specialists, heads of research teams and university teachers.

E.4. Study programme Geodesy and Cartography

Faculty: Faculty of Mining and Geology

Type of study: Doctoral

Standard length of study: 3 years

Academic degree: Ph.D.

The aim of the program is to prepare graduates who can handle the topics of the professional field of study to permit the creation of new procedures and applications of relevant technology, management of large projects and find new ways of addressing various problems. They will be employable in both the academic and research community, and in the field of the state and local governments and the private sector.

Graduate's professional knowledge

Graduate of the program will have: - deep and systematic knowledge and understanding of the subject and scope of field corresponding to the contemporary state of knowledge - deep and systematic knowledge and understanding of theories, concepts and methods that are at the forefront of the field at the international level

- understanding of science and research issues on the border between disciplines

Graduate's professional skills

Graduate of the program will be able to: - design and apply advanced research procedures in a manner allowing to expand knowledge of the field by an original research - develop and evaluate theories, concepts and methods, including definition of the field sectors and their inclusion in the wider context

Graduate's general competence

Graduate of the program will be able to: - evaluate new knowledge and ideas with regard to long-term social consequences of their use - plan extensive activities of creative nature and get and plan resources for their implementation - clearly and convincingly communicate their own knowledge in the field to the other members of the scientific community at the international level and to the general public - use his expertise, technical skills and general competence in at least one foreign language - to acquire new expertise, skills and competence through their creative work and to affect the conditions and contexts of the learning of the others

Potential employment of graduates

Degree program is designed to provide the students the opportunity to exercise in academic and research institutions, as well as companies and public institutions engaged in the creation and development of applications of relevant processes and technologies used to support the work activities of these entities.

E.4.1. Mine Surveying and Geodesy field of study

This represents multidisciplinary tertiary step of education for research and development in the field of mine survey and geodetics. Graduates are solving tasks connected with problems of higher surveying, like research in mining impacts to Earth surface and a landscape.

Graduate's professional knowledge

- Deep and systematic knowledge and understanding to the subject and scope of the field of science corresponding to the contemporary state-of-the-art - Deep and systematic knowledge and understanding to theories, concepts, and methods, which are considered to be advanced in the field of science at the international level - Understanding to the system of sciences and research problems at the borders of appropriate fields of sciences

Graduate's professional skills

- To propose and utilize advanced research procedures within the field of science in a way enabling to extend knowledge within the field of science by original research - To develop and evaluate theories, concepts, and methods within the field of science, including delimitation of fields of science, or their wider ranking

Graduate's general competence

- To evaluate new knowledge, know-how, and ideas considering long-term social consequences of their utilization - To plan comprehensive activities of creative nature and to acquire and plan resources for their performance - To solve independently a complicated ethic issue during the creative activities and/or utilization of its results/consequences - To convey/present intelligibly and convincingly graduate's own knowledge within the field of science to the members of scientific community at the international level as well as to the general public - To utilize his/her professional knowledge, professional skills, and general competences with strong command of one foreign language at least - To acquire new professional knowledge, skills, and competences thru graduate's own creative activities, and to affect conditions/terms and education context for others

Potential employment of graduates

Application in research institutes, scientific institutions, and at universities.

E.5. Study programme Geodesy, Cartography and Geoinformatics

Faculty: Faculty of Mining and Geology

Type of study: Doctoral

Standard length of study: 4 years

Academic degree: Ph.D.

Guarantor department: Department of Geoinformatics

Geoinformatics is a discipline dealing with the study of the properties, behaviour and interactions of spatial objects, phenomena and processes through their digital models and using information and geoinformation technologies. Doctoral study Geoinformatics, therefore, provides students with advanced knowledge in the

field of spatial data collection, storing them in spatial databases, in the field of advanced methods of spatial analysis and visualisation, all with the use of geoinformation technology. Also, it provides students with knowledge of the natural and socio-economic processes and their modelling using geoinformation technologies and linked specific modelling systems. Doctoral study Geoinformatics responds to increasing demands for working with spatial data both in scientific applications as well as in the public and private sectors. The program follows the master's degree program in geoinformatics, which was first accredited in 1994.

Graduate's professional knowledge

The expertise of its graduate is due to the individual study plan and dissertation theme.

Graduate's professional skills

Professional skills of its graduate are due to the individual study plan and dissertation theme.

Graduate's general competence

General eligibility of its graduate is due to the individual study plan and dissertation theme.

Potential employment of graduates

Graduate of doctoral degree in Geoinformatics can process and integrate spatial data obtained using advanced geoinformation technologies (GNSS, remote sensing, aerial photogrammetry, mapping, etc.), create advanced data models for the storage, use modern techniques for spatial data analysis (geostatistics, spatial data analysis, utilization of expert systems, etc.), create models of natural and socio-economic processes, based both on classical models and also on modern approaches (cellular automata, multi-agent systems, ant colonies, etc.) and visualize results of analysis and modelling. It also can design and manage the creation of large-scale applications of geospatial technologies. The knowledge and professional skills can apply in various application areas. The graduate can work in both academic and research institutions (public and private), as well as companies working with spatial data, modeling of natural and socio-economic processes, creating of applications of geoinformation technologies, and also in the area of public administration and state agencies.

E.5.1. Geoinformatics field of study

Geoinformatics is a discipline dealing with the study of the properties, behaviour and interactions of spatial objects, phenomena and processes through their digital models and using information and geoinformation technologies. Doctoral study Geoinformatics, therefore, provides students with advanced knowledge in the field of spatial data collection, storing them in spatial databases, in the field of advanced methods of spatial analysis and visualisation, all with the use of geoinformation technology. Also, it provides students with knowledge of the natural and socio-economic processes and their modelling using geoinformation technologies and linked specific modelling systems. Doctoral study Geoinformatics responds to increasing demands for working with spatial data both in scientific applications as well as in the public and private sectors.

Graduate's professional knowledge

The expertise of its graduate is due to the individual study plan and dissertation theme.

Graduate's professional skills

Professional skills of its graduate are due to the individual study plan and dissertation theme.

Graduate's general competence

General eligibility of its graduate is due to the individual study plan and dissertation theme.

Potential employment of graduates

Graduate of doctoral degree in Geoinformatics can process and integrate spatial data obtained using advanced geoinformation technologies (GNSS, remote sensing, aerial photogrammetry, mapping, etc.), create advanced data models for the storage, use modern techniques for spatial data analysis (geostatistics, spatial data analysis, utilization of expert systems, etc.), create models of natural and socio-economic processes, based both on classical models and also on modern approaches (cellular automata, multi-agent systems, ant colonies, etc.) and visualize results of analysis and modelling. It also can design and manage the creation of large-scale applications of geospatial technologies. The knowledge and professional skills can apply in various application areas. The graduate can operate both in academia and within the research institutions (public and private) as well as in companies working with spatial data, creating models of natural

and socio-economic processes and the creation of applications of geoinformation technologies as well as in public administration and state agencies.

E.6. Study programme Engineering Ecology

Faculty: Faculty of Mining and Geology

Type of study: Doctoral

Standard length of study: 3 years

Academic degree: Ph.D.

Guarantor department: Department of Environmental Engineering

The study programme is aimed at minimizing the negative impact of industry on the environment. The programme includes the study of processes leading to the reduction of harmful emissions of all kinds, reducing pollutants in surface and groundwater, waste management, minimize the effects of mining on the surface and reduce the negative impact of industrial technologies on the environment. Furthermore, the study is focused on at the measurement of anthropogenic impacts on the environment and economic issues of environmental protection.

Graduate's professional knowledge

Graduates of programme have a deep (thorough) and systematic knowledge of the issue of the precautionary approach in the environmental field in the range corresponding to the contemporary state of knowledge. Graduates demonstrate a deep knowledge and understanding of theories, concepts and methods, that are at the forefront of understanding the field of Environmental Protection in Industry at the international level. Graduates will understand the system of science and research issues at the interface between disciplines, possibilities and conditions and restrictions on the use of knowledge-related disciplines (e.g. Mineral Processing).

Graduate's professional skills

Graduates of programme are able to design and apply advanced research procedures in the environmental industry in a way that allows knowledge to expand the field of original research. Graduates can develop and evaluate theories, concepts and methods, including definition of fields and their inclusion in the wider area.

Graduate's general competence

Graduates of programme can evaluate new knowledge and ideas with regard to long-term social consequences of their use. Graduates can plan extensive creative nature activities, obtain and plan the resources for their implementation. Graduates are able to separate a complex ethical problem solving in creative activity or the use of results. Graduates are able to clearly and convincingly communicate your own knowledge in the field of Environmental Protection in Industry other members of the scientific community at the international level and the general public. Graduates can apply their professional knowledge, professional skills and general competence in at least one foreign language. Graduates are able to acquire new expertise, skills and competence of their own creativity and influence the conditions and respect the learning of others.

Potential employment of graduates

The goal of the programme study is to prepare graduates of Ph.D. (doctoral) program for application in the research or applied research in scientific research institutes, centers of advanced and innovative technologies in universities and workplaces of Czech Academy of Sciences in the field of environmental protection.

E.6.1 Environment Protection within industry field of study

The study is designed for graduates from all technical disciplines. It is aimed at minimizing the negative impact of industry on the environment. The scope of the field includes the study of processes leading to the reduction of harmful emissions of all kinds, reducing pollutants in surface and groundwater, waste management, mining wastw management, minimize the effects of mining on the surface and reduce the negative impact of industrial technologies on the environment. Furthermore, the study is focused on at the measurement of anthropogenic impacts on the environment and economic issues of environmental protection.

Graduate's professional knowledge

Graduates have a deep (thorough) and systematic knowledge of the issue of the precautionary approach in the environmental field in the range corresponding to the contemporary state of knowledge. Graduates demonstrate a deep knowledge and understanding of theories, concepts and methods, that are at the forefront of understanding the field of Environmental Protection in Industry at the international level. Graduates will understand the system of science and research issues at the interface between disciplines, possibilities and conditions and restrictions on the use of knowledge-related disciplines (e.g. Mineral Processing).

Graduate's professional skills

Graduates are able to design and apply advanced research procedures in the environmental industry in a way that allows knowledge to expand the field of original research. Graduates can develop and evaluate theories, concepts and methods, including definition of fields and their inclusion in the wider area.

Graduate's general competence

Graduates can evaluate new knowledge and ideas with regard to long-term social consequences of their use. Graduates can plan extensive creative nature activities, obtain and plan the resources for their implementation. Graduates are able to separate a complex ethical problem solving in creative activity or the use of results. Graduates are able to clearly and convincingly communicate your own knowledge in the field of Environmental Protection in Industry other members of the scientific community at the international level and the general public. Graduates can apply their professional knowledge, professional skills and general competence in at least one foreign language. Graduates are able to acquire new expertise, skills and competence of their own creativity and influence the conditions and respect the learning of others.

Potential employment of graduates

The goal of the study is to prepare graduates of Ph.D. (doctoral) program for application in the research or applied research in scientific research institutes, centers of advanced and innovative technologies in universities and workplaces of Czech Academy of Sciences in the field of environmental protection.

E.7. Study programme Management of systems in the field of mineral resources

Faculty: Faculty of Mining and Geology

Type of study: Doctoral

Standard length of study: 3 years

Academic degree: Ph.D.

Guarantor department: Department of Economics and Control Systems

The doctoral study course, Management of Systems in the Field of Raw Materials, is based on basic knowledge of techniques and technologies common for industries active in the field of raw materials, as economic performance is largely influenced by technicalities of processes used by industrial extraction and processing of minerals. Individual subjects of the course develop theoretical knowledge of business management and economy, system thinking, predicting abilities for economic development and analyses, modelling of economic processes, gathering and processing information. All subjects of the course are performance oriented regarding business activities of enterprises operating in the field specified.

Graduate's professional knowledge

The graduates of the doctoral course in the field of raw materials will have learnt and studied: • Aspects of natural sciences essential for understanding the origin and occurrence of minerals; engineering, technological and economic sciences applied for extraction and processing of minerals oriented by economic performance and environment friendly attitudes, • Managerial and economic knowledge essential for understanding standards applied for eco-friendly prospecting and economic utilization of exhaustible natural resources, • Practical knowledge of at least one foreign language for realizing of expert stays abroad, and for presentation and dissemination of research outcomes, • Systematic knowledge of the discipline and collateral sciences that enable communication with colleagues as well as related field partners concerning technical, technological, environmental, and legal issues of mineral resource extraction and enterprise, • Knowledge of research methods and application of research results in managerial, economic, and technical practice, • Leadership knowledge and know-how for leading of people and working teams.

Graduate's professional skills

Graduate's expert skills and competence: • Independent realization of scientific research goals, suggestion of new methods and practices for theoretical and practical application in the field of the discipline, •

Presentation and dissemination of original research outcomes on domestic and international levels, • Ability of abstraction, modelling, analysis and synthesis for application at solving problems of economic and managerial practice,

Graduate's general competence

Graduate's general abilities: • New knowledge assessment and application concerning long-term impact on society and environment, • Continuous learning abilities and creativity, • Knowledge of at least one foreign language for realizing of expert stays abroad, and for presentation and dissemination of research outcomes.

Potential employment of graduates

Graduates find their jobs in mineral extraction and processing industries as economic and technological managers within the same industry as well as in fields of related practice like the environmental protection. Regarding practical experience and success, graduates can assist in implementation of governmental initiatives like those of the Ministry of Industry and Commerce of the Czech Republic, or the Ministry of the Environment of the Czech Republic, especially when taking of strategic political decisions is on the agenda (for example environmentally oriented restriction of lignite extraction). Graduates can also teach at universities and institutions of higher education.

F. The ideas of possible continuation of the Intermin project

An example of a possible continuation of the Intermin project is the organization of short-term courses (several weeks) in the field of earth sciences in the European Union for geologists from developing countries in Africa, Latin America and Asia.

Topics could be geochemical methods used in prospecting as well as in environmental protection, monitoring, reclamation of the area after mining and the social impacts of mine closure on population. The target could also be mining heritage.

A useful topic could be the issue of mining, environmental protection in the extraction of raw materials, but also the subsequent reclamation of the landscape, mine water treatment, monitoring of abandoned mines, use of mining areas after the closure of mines or social development of mining regions after mining. It would be ideal to organize courses in areas with functional and reclaimed mining areas, which could be used for visits. As an example of such a successful course, we present the geochemical course GEOCHIM organized in the past in the Czech Republic by the Czech Geological Survey.

F.1. Experience of the Czech Geological Survey with organizing a geochemical course GEOCHIM

GEOCHIM/UNESCO –

Postgraduate course in methods of geochemical exploration and their environmental applications

It has been tradition to organize very successful UNESCO Postgraduate Courses on Geochemical Prospecting Methods in the former Czechoslovakia from mid 70's. The first certificated course - GEOCHIM PRAHA UNESCO 1975 – was launched on September 5, 1975 and lasted till October 25, 1975. Since that time this course was organized biannually until 1989 by the Czech Geological Survey in Prague together with the Dionýz Štúr Geological Survey in Bratislava and sponsored by the Division of Earth Sciences (UNESCO/Paris) and the International Association of Geochemistry (IAGS). The course was specialized on both theoretical and practical training in classical geochemical prospecting methods. A team of internationally experienced geoscientists has soon earned high international reputation and the GEOCHIM ČSSR UNESCO Postgraduate Course developed into one of the most successful Postgraduate Training Programmes of UNESCO.

In the 1970s and 1980s the former Central Geological Institute, the predecessor of the present Czech Geological Survey, organized postgraduate GEOCHIM course under the auspices of UNESCO. These courses were specifically designed to train geologists in the methods used in geochemical exploration for mineral deposits and were attended by many geologists from developing countries. The courses were suspended in the late 1980s because of political and economic changes.

The GEOCHIM course was revived in 1999 at the request of the Czech Commission for UNESCO.

Since then, the CGS has undertaken the organization of the course in cooperation with UNESCO. In addition to teaching standard methods of geochemical exploration, the content of the course was revised to include environmental applications. As a result, many professional men and women from a range of countries attended the courses. Re-organizing the course was possible thanks to Dr. Jan Pašava. In 2001, GEOCHIM was incorporated in the Cooperative Development Programme of the Czech Republic for the period 2001–2004. As a result of the attention given to the organization and the quality of the scientific and practical content of the course, as well as promotion on the UNESCO and CGS websites and through papers published in international periodicals, the course has acquired an international reputation. The programme of lectures, seminars and practical training in the field took place at Dolní Rožínka, the site of the last underground uranium mine, in that time, still in operation in the Czech Republic (mining in Dolní Rožínka was terminated in 2017).

The training covered the following topics:

- (1) introduction to methods of exploration geochemistry,
- (2) fundamentals of environmental geochemistry,
- (3) basic methods used for geochemical analysis,
- (4) heavy mineral surveys,
- (5) stream sediment surveys,
- (6) soil geochemical surveys,
- (7) biochemical prospecting,
- (8) lithogeochemical prospecting,
- (9) hydrogeochemical prospecting,
- (10) methods of geophysical exploration and their application to environmental assessment including radon risk,
- (11) computer processing of data and their interpretation.

The emphasis in these topics was placed on the application of the various methods to environmental problems. Lectures in the morning were followed by practical training sessions in the field during the afternoon, including the use of the PC to store and analyze data.

Visits to the underground uranium mine Rožná I and to the DIAMO (state enterprise) mineral processing plant as well as to areas where mining operations had ceased and waste dumps were already reclaimed, formed an integral part of the training course. The area around Dolní Rožínka proved to be a very suitable location for international training courses because the staff of DIAMO were available to demonstrate a range of geochemical methods used in mineral exploration as well as in environmental studies.

The course was supplemented by a one-day field trip to the North Bohemian lignite basin where the participants could see huge open cast operations and also the remedial and reclamation work being carried out in excavated areas. Altogether seven GEOCHIM courses were successfully organized during the years 1999–2005 and 95 participants from more than 30 countries in Africa, Asia, South America and East Europe received training in the theoretical and practical aspects of applied geochemistry.

The conveners of the courses received many letters of appreciation from the participants on the course and also an award from UNESCO. Unfortunately, as a result of the reorganization of the Cooperative Development Programme of the Czech Republic in 2006, it became impossible to guarantee continued financial support for this internationally recognized course.

In recent years the CGS has organized a range of other educational training courses for foreign geologists under the terms of Cooperative Development Programmes of the Czech Republic and through contracts with foreign companies and Geological Surveys.

The Geochim course was designed for 15 participants (minibus capacity), the length of the course was two weeks.

A 150-page printed textbook was published especially for the needs of the Geochim course.

All financial costs for the course, including air tickets from the countries of participants, were covered by the Czech organizers.



Participants from the course GEOCHIM visiting the deep underground uranium mine at Dolní Rožínka (photo by J. Pašava).



Participants from the course GEOCHIM sampling in the stream (photo by J. Pašava).

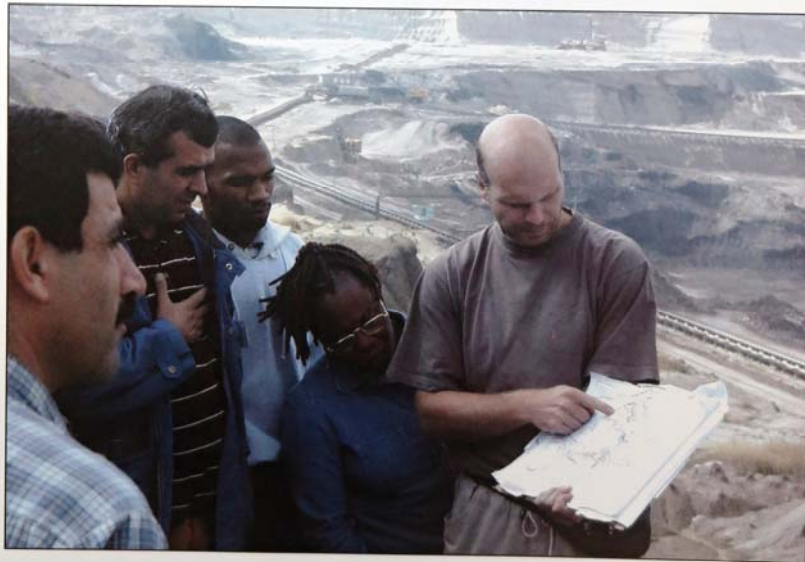
CGS/UNESCO/SGA POSTGRADUATE TRAINING COURSE



GEOCHEMICAL PROSPECTING METHODS AND THEIR ENVIRONMENTAL APPLICATIONS

*Geo*chim
postgraduate course

Edited by Jan Pašava and Bohdan Kříbek



Czech Geological Survey

The printed GEOCHIM textbook.

F. 2. Raw Materials Webside

It would be very useful to create a website - as a continuation of the INTERMIN project - for high school youth focused on mining, processing, reclamation and history of raw materials in EU countries (other countries).

After interviews with high school students, it is clear that knowledge about the sources of essential raw materials is very poor, but without natural raw materials our economic development is not possible.

Main points of the possible webside project:

localization of mineral resources on the territory of EU countries (other countries)

brief geological situation

historical potential of minerals

mining heritage of individual states

use of minerals in the past

use of minerals today

raw material processing (obtaining the necessary material)

summary of mining - how many raw materials are extracted, consumption

import, export of raw materials, international trade

consequences of raw material mining

reclamation of raw materials areas, environmental impact

how mineral and raw material exploration is carried out

...

The aim of the project would be to increase the level of knowledge of the high school youth about the necessary conditions for the development of each state - about raw materials and minerals, source of our prosperity.