FACULTY OF EARTH SCIENCE AND ENIGNEERING

COURSES OFFERED IN ENGLISH IN THE ERASMUS PROGRAMME

Please note that these courses are taught in personal consultations with the teachers

Practical Petrology
Contact hours/week: 3, assessment of studies: semester report
Credits: 3
Tutor: Ferenc MÁDAI, Department of Mineralogy and Petrology

Classification principles of magmatic rocks. CIPW norm calculation. Classification principles of metamorphic rocks. Classification principles of sedimentary rocks. Classification of artificial ground and natural superficial deposits. Analytical methods in petrology: determination of chemical and mineralogical composition. Texture analysis of rocks. Determination of weathering state of rocks.

Mineral Resource Management
Contact hours/week: 2, assessment of studies: exam / semester report
Credits: 2
Tutor: Ferenc MÁDAI, Department of Mineralogy and Petrology

The scope of mineral resource management. Definition of mineral resource categories. Resource availability, the concept of sustainable development. Basic economic concepts of mineral resource management. Project analysis of mineral endowements, mineral taxation. Basic elements of a mineral poicy. The regulation of extractive industries in the EU.

Geology of Fossil Fuels
Contact hours/week: 4, assessment of studies: exam / semester report
Credits: 4
Tutor: István BÉRCZI, Department of Mineralogy and Petrology

The resources and the future of oil-, gas- and coal provinces of the Earth. Formation of fossil fuels. Exploration and production methods of petroleum fields. Tectonic and lithological aspects of petroleum exploration and production. Static and dynamic models of petroleum fields.

Analytical Methods in Mineralogy and Petrology
Contact hours/week: 2, assessment of studies: semester report
Credits: 2
Tutor: Norbert ZAJZON, Department of Mineralogy and Petrology

Preparation of samples, basic investigations of minerals by wet chemistry, binocular microscopy. Thermoanalytical determination of minerals. Traditional optical and electronoptical microscopies (TEM, SEM - BE, SE images). Different X-ray microanalytical techniques (EDX, WDX). X-ray diffractometry in mineralogy and petrology .

Introduction to Mineralogy and Petrography
Contact hours/week: 4, assessment of studies: exam
Credits: 4
Tutor: Sándor SZAKÁLL, Department of Mineralogy and Petrology

Basics of crystallography, crystal chemistry, crystal physics. Mechanical, electric, thermal and optical properties of minerals. Systematic mineralogy. Important rock types and rock forming minerals of magmatic, metamorphic and sedimentary rocks.

Mineralogy of the Carpathian-Pannonian Region
Contact hours/week: 2, assessment of studies: semester report
Credits: 2
The main magmatic, sedimentary and metamporphic mineral associations. The most important ore deposits with with pegmatites, greisens, and hydrothermal origin. Ore deposits connected with sedimentary, metamorphic processes. Minerals, which were discovered in the Carpathian-Pannonian region.

Basic Concepts of Geology
Contact hours/week: 4, assessment of studies: exam
Credits: 4
Tutor: E. Seresné Hartai, Department of Geology and Mineral Resources
The Earth as a planet. The Earth as a system. Rock-forming processes in the lithosphere. Magmatic, sedimentary and metamorphic systems. Principles of structural geology. Global tectonics. The geological time. A short history of Earth and life. Interpretation of geological maps and sections.

Mineral Resources
Contact hours/week: 4, assessment of studies: exam
Credits: 4
Tutor: J. Földessy**,** Department of Geology and Mineral Resources
Minerals and their application - a historic review. History of Mining - World, Europe, Hungary. Ores - ferrous metals and alloys. Ores - base metals, precious metals, bauxite. Energy minerals - gas and oil. Energy minerals - solid fossil fuels. Industrial minerals - raw materials for modern technologies. Minerals and the environment. Minerals and industry - economics of mining. Breaking ground - the mining in the 21st century.

Mineral Exploration
Contact hours/week: 4, assessment of studies: exam
Credits: 4
Tutor: J. Földessy, Department of Geology and Mineral Resources
Geological models. Reconnaissance works. Exploration. Definition of a resource. Surface geophysics – interpretation in the ore explorations. Geological mapping methods. Drilling technologies. Drilling supervision and geological documentation. Sampling. Minerals laboratory tests. Evaluation, feasibility studies.

Introduction to Structural Geology
Contact hours/week: 4, assessment of studies: exam
Credits: 4
Tutor: N. Németh, Department of Geology and Mineral Resources
Primary and secondary structural elements, rock fabrics. Techniques of representation and analysis. Brittle deformation structures: joints, faults. Ductile deformation structures: folds, lineations, foliations. Mechanics of faulting and folding, applications of continuum mechanics. Stress inversion. Deformation models and mechanisms in macro-and microscopic scale.

Fluid Mechanics
Contact hours/week: 2, assessment of studies: exam
Credits: 4
Tutor: Dr. Elemér Bobok, professor, Natural Gas Engineering Department
Properties of fluids, kinematics, balance equations of mass, momentum and energy, hydrostatics, perfect fluid flow, of elements of gas dynamics, laminar flow, similarity theory,

turbulent flow, head loss, friction factor, Moody's chart, isothermal gas flow with friction, non-Newtonian flow

Gas Processing
Contact hours/week: 2, assessment of studies: exam
Credits: 4
Tutor: **Dr. Anikó Tóth** PhD, Natural Gas Engineering Department

Natural Gas: sources and composition. Gas production: Gas wells, well site, basic treatment. Gas Processing: Classification of methods, Typical flow sheets, equipment. Dehydration: Hydrate formation and inhibition, LTX, Absorption, Adsorption. Natural gas liquids: Classification of methods, Absorption and adsorption processes, Recovery of ethane, propane and NGL. Natural gas sweetening: Classification of methods, Process selection, Physical and chemical absorption, Membranes.

Drilling I.
Contact hours/week: 3, assessment of studies: exam
Credits: 3
Tutor: Imre Federer, associate professor, Petroleum Engineering Department

Rig equipment, hoisting systems, draw works, crown block, traveling block, drilling line, derrick, drill string design, drill string accessories, loadings, bottom hole assembly, making hole, drilling bits, bit selection, dull bit evaluation, drilling regime, fundamentals of fluid flow, mud engineering, mud condition equipment, mud hydraulics.

Drilling Lab I.
Contact hours/week: 2, assessment of studies: written test for practical mark
Credits: 2
Tutor: Tibor Szabó, assistant professor Petroleum Engineering Department

Basic Calculations, Usual Operations during Making a Hole, Systems of Units, Drill String Design: Main Components and Their Functions of Drill String, Typical BHA's, Hoisting: Main Components, Drilling Line Design, Ton-miles Calculation, Drilling Bits: Three Cone and PDC Bits, Bits Classification Systems, Dull Bit Evaluation, Bit Selection, Cost per Foot Calculation, Straight and Directional Hole Drilling, Casing Design: Functions, Types and Strength Properties of Casing, Casing Specification, Casing Design Calculation

Drilling II.
Contact hours/week: 3, assessment of studies: exam
Credits: 3
Tutor: Imre Federer, associate professor Petroleum Engineering Department

Optimum bit hydraulics, straight and directional hole drilling, bottom hole assembly design, geometry of directional and horizontal well, directional surveying instruments, down hole motors, fracture gradient, casing seat selection, casing design, casing strength properties, biaxial effects, bending force, primary cementing, properties of cement slurry, casing accessories, mechanics of cementing, liner cementing, squeeze cement plug, hole problems, pipe sticking, lost circulation, fishing operation.

Drilling Lab II.
Contact hours/week: 2, assessment of studies: written test for practical mark
Credits: 2
Tutor: Tibor Szabó, assistant professor Petroleum Engineering Department

Fundamentals of Fluid Flow: Types of Flow, Types of Fluid, Rheological Properties of Mud and Measurement, Mud Engineering: Drilling Mud, Functions of Drilling Mud, Types of Drilling Mud, Mud Calculations, Mud Conditioning Equipment, Rig Hydraulic: Pressure

Losses, Optimization of Bit Hydraulics, Nozzle Selection, Optimum Flow Rate, Fracturing Gradient, Cementing: Functions of Cement, Classes and Types of Cement, Basic Components, Properties of Cement Slurry Practical Calculations.

Blowout Prevention
Contact hours/week: 3, assessment of studies: written test for practical mark
Credits: 4
Tutor: Tibor Szabó, assistant professor Petroleum Engineering Department

Causes of kicks, kick detection, well monitoring during shut-in, shallow gaz hazards, stripping operation, pressure concepts and calculations, gas characteristics and behavior, constant bottom hole pressure well control methods, objectives of well control methods, well control procedures, well control equipment, blowout preventer configurations, manifolds and piping, auxiliary well control equipment, BOP closing unit function and performance, testing pressure control equipment, government and industry rules.

Formation Stimulation
Contact hours/week: 3, assessment of studies: exam
Credits: 3
Tutor: Imre Federer, Petroleum Engineering Department

Tubing string design, make-up to threaded connection, tubing elongation, tubing movement, different type of packers, packer calculations, tubing to packer connections, selection of bottom hole assemblies, bottom hole assemblies, perforating, formation damage control, completion and work over fluids, sand control, well stimulation, hydraulic fracturing, matrix acidizing, coiled tubing operations, wire line operations, nitrogen operations, quality control.

Production Engineering Fundamentals
Contact hours/week: 3, assessment of studies: exam
Credits: 4
Tutor: Dr. Gabor Takács, professor Petroleum Engineering Department

Properties of oilfield fluids. Inflow performance of oil wells. Fundamental description of single-phase flows and pressure drop calculations. Multiphase flow: basic principles, flow patterns. Multiphase flow in oil wells: basic concepts. Pressure drop calculations in oil wells: empirical correlations, mechanistic models, gradient curves. Accuracy of pressure drop calculations. Horizontal and inclined flow. Multiphase flow through restrictions. Temperature distribution calculations in producing wells.

Production Lab I.
Contact hours/week: 2, assessment of studies: written test for practical mark
Credits: 2
Tutor: Zoltán Turzó, assistant professor, Petroleum Engineering Department

Calculation of oilfield fluids properties. Determination of inflow performance of CH wells. Single phase flow pressure drop calculations. Pressure and temperature distribution calculations in: vertical, horizontal inclined pipes and through restrictions.

Artificial Lift
Contact hours/week: 3, Assessment of studies: exam
Credits: 4
Tutor: Dr. Gabor Takács, professor Petroleum Engineering Department

Flowing production, interaction of reservoir and well. Surface and down hole equipment. Theory of continuous flow and intermittent gas lift, design of installations. Gas lift valve types, their operation. Installation types, surface injection control. Plunger lift. Basic components of a beam pumping system. Design of rod strings. Kinematics parameters of

pumping units. The API RP 11L model. Solution of the wave equation. Torque loading on gearboxes. Design and analysis of rod pumping installations.

Production Lab II.
Contact hours/week: 2, Assessment of studies: written test for practical mark.
Credits: 2
Tutor: Zoltán TURZÓ assistant professor, Petroleum Engineering Department

Design of flowing well. Design of continuous- and intermittent gas lifted well installations. Sizing of gas lift valves. Determination of gas lift valve performance.

Advanced Artificial Lift
Contact hours/week: 3, Assessment of studies: exam.
Credits: 4
Tutor: Dr. Gábor TAKÁCS, professor Petroleum Engineering Department

Continuous flow and intermittent gas lift design. Allocation of lift gas. Optimization of continuous flow gas lift installations. Optimization of sucker-rod pumping installations. Calculation of down hole cards from surface dynamometer cards. Modern rod pumping analysis methods. Electrical submersible pumping design. Analysis of ESP installations.

Production Lab III.
Contact hours/week: 2, Assessment of studies: written test for practical mark.
Credits: 2
Tutor: Zoltán TURZÓ assistant professor, Petroleum Engineering Department

Design of sucker-rod pumping system: rod string design, determination of kinematics parameters of pumping units. Analysis of rod pumping installations.

Production Systems
Contact hours/week: 3, Assessment of studies: exam.
Credits: 4
Tutor: Dr. Gábor TAKÁCS, professor Petroleum Engineering Department

Concepts of oil-water-gas separation. Types of two and three phase separators. Emulsion treatment theory and practice. Field storage and measurement of crude oil. Surface gathering systems: types and automatic systems. The use of Nodal Analysis for the design and analysis of oil producing wells.

Reservoir Engineering Fundamentals
Contact hours/week: 3, Assessment of studies: exam.
Credits: 4
Tutor: Dr. Tibor BÓDI, associate professor Petroleum Engineering Department

The reservoir rocks and structures, classification of sedimentary oil reservoirs, the basis of origin, mineral composition and texture of the reservoir rock, relation between geology and reservoir performance. Physical properties of reservoir rocks. Porosity, fluid saturation, permeability to fluids. Relations between rock properties and reservoir behavior, lit logy of the formations, determination of porosity and formation factor, determination of formation-water saturation, reservoir forces and energies (body forces, capillary forces). Reservoir-fluid properties. Hydrocarbon gases and liquids, connate water properties. Volumetric evaluation of oil in place and empirical reserve estimates.

Reservoir Lab I.
Contact hours/week: 2, Assessment of studies: written test for practical mark.
Credits: 2

Tutor: Dr. Tibor BÓDI, associate professor Petroleum Engineering Department

Performing basic measurement of reservoir rocks properties. Porosity measurement by resaturation, and by mercury injection method. Measuring porosity by Extended Range Helium porosimeter. Measuring liquid and gas permeability. Calculation subsurface area of porous rocks. Calculation reservoir-fluid properties, formation volume factors, dissolved gas oil ratio, viscosity of gas oil and water. Calculating Isothermal compressibility factor of oil, gas and water.

Applied Reservoir Engineering

Contact hours/week: 3, Assessment of studies: exam.

Credits: 4

Tutor: Dr. Tibor BÓDI, associate professor Petroleum Engineering Department

Oil production by depletion drive: The material-balance equation, theory of depletion-drive calculations. Theory of oil production by frontal displacement. The fractional-flow formula, the frontal-advance rate formula, high-pressure frontal gas drive. Oil production by water drive: Recognition and evaluation of water drive, generalized method of water drive performance calculations. Oil production by segregation drive: Segregation drive without counterflow. Segregation drive with counterflow.

Advanced Reservoir Engineering

Contact hours/week: 3, Assessment of studies: exam.

Credits: 4

Tutor: Dr. Tibor BÓDI, associate professor Petroleum Engineering Department

Introduction and fundamentals of recovery projection of hydrocarbon fields. Technical and economical criteria of oil and gas recovery. Methods and steps of oil, gas and gas condensate fields exploration. Choosing recovery methods. Using natural energy and drive (exploitation) mechanisms: dissolved gas drive, natural water drive, gas cap drive, gravitation and combined drive mechanisms. Controlling and changing of natural exploitation mechanisms. Analysis of the oil fields hydrodynamical system. Numerical simulation of displacement mechanisms in oil field. Analysis of enhanced oil recovery methods.

Reservoir Lab II.

Contact hours/week: 2, Assessment of studies: written test for practical mark.

Credits: 2

Tutor: Dr. Tibor BÓDI, associate professor Petroleum Engineering Department

Volumetric reserve estimation. Using material balance equation to determining the original oil and gas in place, and water influx properties. Calculating water enrichment by different methods (Van Everdingen-Hurst, Fetkovich). Performing production forecast calculation.

Computer Applications I.

Contact hours/week: 2, Assessment of studies: written test for practical mark.

Credits: 3

Tutor: Zoltán TURZÓ assistant professor, Petroleum Engineering Department

Hardware components of personal computers: CPU-s, memories, motherboards, monitors, input-output and data storage devices.

Operating systems: General introduction of operating systems; Windows operating system.: Usage of graphical user interface (GUI). Important system components: Control Panel, Explorer. File management using Explorer. Useful programs of Windows: WordPad, Paint, Calculator. Hard disk maintenance: defragmenting, compressing and repairing of errors. Installing new software and hardware components. Maintenance of software system, registry. Using Windows in DOS mode. Basic DOS commands.

Computer networks: Local Area Networks, Wide Area Networks. Networking with Windows: file and printer sharing, accessing recourses on LANs.
Internet and intranets. Protocols: TCP/IP, FTP, HTTP. Electronic mail, mailing programs, sending and receiving e-mails. WWW, Netscape and Internet Explorer. Searching on the Web.

Computer Applications II.
Contact hours/week: 2, Assessment of studies: written test for practical mark.
Credits: 3
Tutor: Zoltán TURZÓ assistant professor, Petroleum Engineering Department

General descriptions of spreadsheet programs. Microsoft Excel: creating and formatting tables and diagrams. Using equations: operators and built-in engineering functions. Writing user functions in Visual Basic programming language of Excel. Database management inside Excel: sorting, filtering and maintenance.
General description of word-processing. Microsoft Word: creating and formatting simple documents. Writing and managing of longer documents (i.e. thesis). Useful tools of Word: spelling, thesaurus etc.
Creation of presentations, slides using Microsoft Power Point.
General descriptions of drawing (CAD) programs. Creation of simple engineering drawings using CADKey and CorelDraw.

Well testing
Contact hours/week: 3, Assessment of studies: exam.
Credits: 4
Tutor: Dr. Tibor BÓDI, associate professor Petroleum Engineering Department

Introduction and fundamentals of the hydrodynamical measurement methods can performe in production and injection wells. The subject includes the theoretical base and practical aspects of capacity, pressure drawdown and pressure build-up measurement. The subject covers the modern computer aided evaluation methods of pressure and capacity measurement performed in vertical, vertical fractured and horizontal wells.

Pipeline Transportation
Contact hours/week: 2, Assessment of studies: exam.
Credits: 4
Tutor: András BARTOS , petroleum engineer

Hydraulics: Pressure drop in liquid and gas carrying pipe. Thermodynamics: Temperature of oil in buried pipeline. Pressure loss calculation. Pipeline engineering: Determination of pipe diameters and thickness. Parallel lines, booster pumps. Pipeline construction. Centrifugal pumps and gas compressors: Series and parallel pumps, characteristic curves, control. Instrumentation: Pipeline and metering station instrumentation. Maintenance: Pipeline inspection and repairs, limits of imperfection. MAOP calculation.

Surveying
Contact hours/week: 4, assessment of studies: exam
Credits: 4
Tutor: Dr. I. Havasi, Department of Geodesy and Mine Surveying

Geodesy, plane surveying, survey networks. Triangulation, trilateration, traverses, and single point determination methods (intersection, resection, etc.) Plane surveying methodology, instrumentation and practice (vertical surveying, measuring horizontal and vertical angles, distance measurement). Modern instrumentation (total stations, laser instruments, and GPS). Mapping.

Mine Surveying

Contact hours/week: 6, assessment of studies: exam

Credits: 7

Tutor: Dr. I. Havasi, Department of Geodesy and Mine Surveying

The goal and tasks of mine surveying. Establishing and measuring surface and underground survey networks. Connecting the underground and surface measurements (connecting- and orientating surveys, underground height determination). Special instruments in mine surveying (gyro theodolite, laser instruments, etc). Special mine surveying tasks (breakthrough measurements, monitoring rock- and soil movements, etc). Surveys in open-cut mines. Mining mapping.

Basics of Geoinformatics

Contact hours/week: 2, assessment of studies: exam

Credits: 2

Tutor: Dr. G. Bartha, Department of Geodesy and Mine Surveying

Principles of Information Theory. Computer hardware and software. PERL, PROLOG, JAVASCRIPT programming languages. Databases and SQL. Geo-Objects. Coordinate systems and projections. Geo-Data. Acquisition transfer and storage. Digital mapping using WINSURF GIS using AGIS and SIGIS packages. Knowledge-Based GIS, expert systems.

Hydrogeology

Contact hours/week: 2, assessment of studies: exam

Credits: 2

Tutor: Péter Szűcs PhD, Department of Hydrogeology and Engineering Geology

Fluids in the crust. The science of hydrogeology. Darcy's law and hydraulic head. Properties of porous media. Properties of groundwater and geologic fluids. Transient flow. Near surface flow. Driving forces and mechanisms of fluid flow. Abnormal fluid pressures. Environmental hydrogeology. Chemical hydrogeology. Flow systems under the surface.

Groundwater Flow and Transport Modeling

Contact hours/week: 3, assessment of studies: exam

Credits: 3

Tutor: Péter Szűcs PhD, Andrea Tóth, Department of Hydrogeology and Engineering Geology

Principles of flow. Geology and groundwater flow. Deformation, storage, general flow equation. Modeling steady flow. Modeling transient flow. Computer assisted flow modeling. Groundwater contamination. Advective and dispersive transport and mass transfer. Chemical reactions. Mathematical model and analytical solutions. Simulation of advective - dispersive transport. Case-study simulations with Processing Modflow Pro and Groundwater Modeling System (GMS) program packages.

Well Hydraulics

Contact hours/week: 2, assessment of studies: exam

Credits: 2

Tutor: Péter Szűcs PhD, Andrea Tóth, Department of Hydrogeology and Engineering Geology

Aquifer basics. Groundwater storage. Hydraulic head and groundwater flow. Darcy's law and hydraulic conductivity. Groundwater steady flow problems. Groundwater recharge and discharge .Hydraulics of water wells. Pumping test basics. Aquifer test in confined aquifers. Aquifer tests in leaky confined and unconfined aquifers. Recovery methods.

Landfilling, Waste Management, Waste Disposal

Contact hours/week: 3, assessment of studies: exam

Credits: 3

Tutor: Attila Szabó, Department of Hydrogeology and Engineering Geology

Waste characterization, regulations governing solid waste disposal, site selection and investigation, leachate and gas generation, soil structure, hydraulic properties, factors affecting permeability, ground modification and compaction, design of: liners, leachate collection system, landfill cover, settlement of landfill and landfill bases, stability of waste slopes, monitoring and landfill operation

Remediation of Contaminated Land

Contact hours/week: 3, assessment of studies: exam

Credits: 3

Tutor: Attila Szabó, Tamás Madarász PhD, Department of Hydrogeology and Engineering Geology

Site investigation of contaminated land, contaminant sources, remediation techniques, design of remediation methods, contaminant behavior in subsurface environment, contaminant transport processes and modeling, monitoring

Environmental Risk Assessment

Contact hours/week: 2, assessment of studies: exam

Credits: 2

Tutor: Tamás Madarász PhD, Department of Hydrogeology and Engineering Geology

Risk, hazard terminology, risk assessment methodology, conceptual model construction, exposure assessment, exposure modeling, toxicology background, dose response relation, toxicological character of chemicals, carcinogen, threshold concept in toxicology, toxicological parameter for risk studies,

Geotechniques

Contact hours/week: 2, assessment of studies: exam

Credits: 2

Tutor: Krisztina Beáta Faur, Department of Hydrogeology and Engineering Geology

Soil classification, engineering properties of rocks, site investigation, pore pressure, effective stress, consolidation, shear strength, theoretical basis of rheological soil phenomena, soil models, lateral earth pressure, slope stability, bearing capacity of foundations, foundation settlements, piled foundations, retaining walls, sheet-pile walls, slurry walls

Analysis and Optimisation of Metal Structures

Contacts hours/week: 2, assessment of studies: exam

Credits: 3

Tutor: Zoltán VIRÁG, Department of Geotechnical Equipment

Stability calculations of metal structures. Creating of FEM model by computer. Optimisation methods. Neural networks.

Oilfield Chemistry

Contact hours/week: 2, assessment of studies: exam (semester report/other)

Credits: 5
Tutor: István LAKATOS, Research Institute of Applied Chemistry

Formation and accumulation of oil and gas. Composition of crude oils and natural gases. Fundamentals of oil/water/gas/rock systems. Chemical fundamentals of displacement phenomena. Conventional and advances recovery methods. Chemical flooding. Well treatment and stimulation techniques.

Applied Physical Chemistry
Contact hours/week: 2, assessment of studies: exam (semester report/other)
Credits: 5
Tutor: István LAKATOS, Research Institute of Applied Chemistry

Nature of physical chemistry. Behavior of gases. Fundamentals of Thermodynamics. Chemical equilibrium. Phases and solutions. Chemical kinetics. Reaction mechanism.

Applied Colloid Chemistry
Contact hours/week: 2, assessment of studies: exam (semester report/other)
Credits: 5
Tutor: István LAKATOS, Research Institute of Applied Chemistry

Fundamentals of colloid systems. Sorption phenomena. Surface tension and capillarity. Wettability. Rheology. Diffusion. Sedimentation. Electrokinetic effects. Micro- and macro-heterogeneous systems. stability and structure.

Surface mine design
Contact hours/week: one hour lecture and 2 hours lab
Instructor: Dr. József MOLNÁR)
Credits: 3

Analysis of elements of surface mining systems and their operation. Students evaluate a special problem project supervised by the instructor.

Underground mine design
Contact hours/week: one hour lecture and 2 hours lab
Instructor: Dr. József MOLNÁR
Credits: 3

Analysis of elements of underground mining systems and their operation. Students evaluate a special problem project supervised by the instructor.

Mineral Processing
Contact hours/week: 1 + 2h
Instructor: Dr. Ljudmilla Bokányi Associate Professor
Credits: 3

Technology and design of copper, complex non-ferrous and rare metal ore processing. Technology and design of coke-coal, energetic sub-bitumenous coal and lignite. Clean-coal technologies. Economical evaluation.