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Crystal chemistry of non-silicate minerals

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGML-002	Course: Crystal chemistry of non-silicate minerals
Study design:	
Lectures and consultations, weekly, 2 hours lecture / 1 hour consultation, 39 hours per semester, individual study of recommended literature. Method of study: full time, combined	
Number of credits earned: 5	
Recommended semester: 1.semester	
Degree: 3. Degree	
Prerequisite courses:	
Grading policy: Active participation in the lectures and consultations, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: The aim of the course is to provide students PhD students comprehensive characterization of current trends in the research of selected non-silicate minerals, especially elements, sulfides, oxides, carbonates and phosphates. Emphasis is placed on understanding the relationships between the type of crystal structure (geometry, nature of bonds) and the occupation of individual structural positions in a given mineral with characteristic cations and anions, individual substitutions, vacancies of crystal structures, as well as the degree of their structural arrangement or disorder. Graduates will thus gain a comprehensive overview of the current knowledge of crystal chemistry of important rock-forming and accessory non-silicate minerals.	
Syllabus: Types of crystal structures, their geometry and the nature of bonds in non-silicate minerals. Occupancy of individual structural positions by cations and anions, vacancies and defects of crystal structures. Substitution mechanisms in non-silicate minerals. Selected examples of crystal chemistry of important non-silicate minerals: diamond, graphite, copper group, galena, pyrite group, tetrahedrite group, fluorite, corundum group, spinelides, columbite group, quartz group, calcite, aragonite, apatite group, monazite group, xenotime	
Suggested readings: Deer W. A., Howie R. A., Zussman J., 2003: Rock-forming minerals. 2nd edition (Fleet M. E. ed.). The Geological Society, London. Broska I., Petrík I., Uher P., 2012: Accessory minerals of granitic rocks of the Western Carpathians. Veda, Bratislava. Scientific mineralogical articles in current international journals (according to the focus of the graduate's PhD. work).	
The course is held in: <i>Slovak in combination with English (study literature in English)</i>	
Other course information:	
Grading history	
Professor: Assoc. Prof. Peter Bačík, PhD., Prof. RNDr. Pavel Uher, CSc.	
Last update: 4. februára 2022	
Approved by: Prof. RNDr. Monika Huraiová, PhD.	

Crystal chemistry of silicate minerals

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGML-001	Course: Crystal chemistry of silicate minerals
Study design: Lectures and consultations, weekly, 2 hours lecture / 1 hour consultation, 39 hours per semester, individual study of recommended literature. Method of study: full time, combined	
Number of credits earned: 5	
Recommended semester: 1. semester	
Degree: 3. Degree	
Prerequisite courses:	
Grading policy: Active participation in the lectures and consultations, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: Phd student will gain detailed knowledge about the crystal chemistry of silicates and its laws, the relationship between structure and chemical composition, topology of crystal structures and chemical bonds, subsolid reactions and decompositions of silicates.	
Syllabus: Chemical bond and its properties, coordination bodies, Pauling rules, substitutions, Goldschmidt's rules and substitution vectors, topology of crystal structures and chemical bonds, graph theory and graphs of chemical bonds, bond topology, structural "short-range" and "long-range" effects, subsolid reactions and decompositions of solid solutions. Crystal chemistry of selected groups of silicate minerals.	
Suggested readings: Hawthorne F.C., 2006: Landmark Papers 2: Structure Topology. Mineralogical Society, 308 s. Brown I.D., 2006: The Chemical Bond in Inorganic Chemistry: The Bond Valence Model. Oxford University Press, 278 s. Chojnacki J., 1979: Základy chemické a fyzikální krystalografie, Academia Praha. Deer W. A., Howie R. A., Zussman J., 2003: Rock-forming minerals. 2nd edition (Fleet M. E. ed.). The Geological Society, London. Broska I., Petrík I., Uher P., 2012: Accessory minerals of granitic rocks of the Western Carpathians. Veda, Bratislava. Scientific mineralogical articles in current international journals (according to the focus of the graduate's PhD. work).	
The course is held in Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	
Professor: Assoc. Prof. Peter Bačík, PhD., Prof. RNDr. Pavel Uher, CSc.	
Last update: 4. February 2022	
Approved by: Prof. RNDr. Monika Huraiová, PhD.	

Defence of the dissertation thesis

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Defence of the dissertation thesis
Type, scope and method of academic activities: State examination, no specifications regarding the doctoral student's degree of study.	
Number of credits: 30	
Recommended semester/trimester of study: 8th semester of study	
Degree of study: 3rd degree (PhD)	
Conditional courses: Compulsory a further compulsory optional subjects according to the accreditation list and the doctoral student's individual study plan.	
Conditions for passing the course: Course evaluation takes place as a part of the State examination in accordance to the Study regulations of the Faculty of Natural Sciences UK in Bratislava upon submission of the written part of the dissertation thesis (as final work). Assessment is standard and reflects the student's sufficient orientation in the issue. The conditions for successful course completion are in accordance with the Study Regulations of the Faculty of Natural Sciences UK.	
Educational outcomes: The aim of the course is to capitalise on theoretical, methodological and applied knowledge of doctoral studies in the elaboration and subsequent defence of the dissertation thesis, and thus the successful completion of doctoral studies.	
Brief outline of the course: The student's dissertation thesis will demonstrate his/her ability and readiness for independent scientific and creative activities in the area of research or development or for independent theoretical and creative artistic creativity. It should be characterised by a high degree of analysis and synthesis of knowledge, as well as a sufficient overview of existing literature. The work must be original and created by the author in compliance with the rules of working with information sources. The academic work must not appear to be plagiarised, nor infringe the copyrights of other authors. The author is required to thoroughly cite the information sources used, list the specific results of other authors or team of authors by citing the source, accurately describe the methods and working procedures of other authors or teams of authors, and document the laboratory results and field research of other authors or teams of authors. Style of citation is governed by the practice in the given scientific field, respecting the relevant norms and standards.	
Recommended literature: No specifications regarding the character of a specific topic for the dissertation thesis. Recommended literature is included in the doctoral student's individual study plan.	
Required language for successful course completion: Slovak language in combination with English (study literature in English)	
Remarks:	
Course evaluations Course completion is classed by the grade of pass/fail.	
Total number of student assessments:	
Instructor: Chairperson of the Examination Committee	
Updated last: January 19, 2021	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Dissertation exam

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Dissertation exam (includes elaboration of written work for the dissertation examination)
Type, scope and method of academic activities: State examination, no specifications regarding the doctoral student's degree of study.	
Number of credits: 15	
Recommended semester/trimester of study: 3rd semester of study (no later than the 4th semester) in full-time studies; 5th semester for external students	
Degree of study: 3rd degree (PhD)	
Conditional courses: Compulsory a further compulsory optional subjects according to the accreditation list and the doctoral student's individual study plan.	
Conditions for passing the course: Course evaluation takes place as a part of the State examination in accordance to the Study regulations of the Faculty of Natural Sciences UK in Bratislava, as well as submission of the written part of the dissertation thesis within the set deadline. The subjects of the state examination include a discussion about the written work of the dissertation examination (prepared by the doctoral student), as well as other subjects of the oral examination (ad hoc) approved by the Dean. Assessment is standard and reflects the student's sufficient orientation in the issue. The conditions for successful course completion are in accordance with the Study Regulations of the Faculty of Natural Sciences UK.	
Educational outcomes: The objective of the course is to gain basic habits and cultural-ethical aspects of working with scientific literature, evaluation, and systemization of the studied knowledge. The doctoral student needs to successfully pass the dissertation examination according to the act on Universities and Study Regulations of the Faculty of Natural Sciences of Comenius University in Bratislava.	
Brief outline of the course: Based on the description of the starting points, principles, and conclusions from the published results of the studied issues, the aim is to teach the doctoral student how to process critical research. A further objective is to understand the principles of scientific work and its legal, physical, and social attributes. The main output is the elaboration of the written work for the dissertation examination and its successful completion in accordance with the Study Regulations of the Faculty of Natural Sciences UK. The form and content of the work is regulated by article 34, paragraph 4 of the Study Regulations of the Faculty of Natural Sciences UK. The dissertation examination consists of a part consisting of a discussion of the written work for the dissertation examination, as well as a part in which the doctoral student needs to demonstrate theoretical knowledge according to the focus of the dissertation topic. The composition of the Examination Committee, the determination of the Opponent (expert examiner) and the general course of the dissertation examination are governed by the current Study Regulations of the Faculty of Natural Sciences UK.	
Recommended literature: No specifications regarding the character of a specific topic for the dissertation thesis. Recommended literature is included in the doctoral student's individual study plan.	
Required language for successful course completion: Slovak language in combination with English (study literature in English)	
Remarks:	
Course evaluations	

Course completion is classed by the grade of pass/fail.

Total number of student assessments:

Instructor: Chairperson of the Examination Committee

Updated last: February, 2021

Approved by: prof. RNDr. Monika Huraiová, PhD.

Dissertation Thesis 1,2,3

Course Information

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Dissertation Thesis 1,2,3
Type, scope and methods of instruction: No specifications concerning the degree of study (choice of methods – in class, distant learning, or a combination of both)	
Number of credits: 5	
Recommended semester of study: 1., 2.,3. semester of an internal form	
Degree of study: 3rd degree (PhD)	
Conditional subjects:	
Conditions for passing the course: Course evaluation will be conducted individually based on the doctoral student's individual study plan, as well as on the basis of an agreement between the academic supervisor and doctoral student. Evaluation is standard and shall reflect a sufficient orientation of the student in the presented subject matter for successful course completion according to the Study Regulations of the Faculty of Natural Sciences UK.	
Educational outcomes: By passing this subject, the student will achieve sufficient orientation in the project issue of the dissertation thesis based on specific individual topics. This set task of knowledge is essential for a firmly established theoretical readiness of the course graduate in terms of his/her awareness, and equally supports his/her potential in a wide field of applied practice. Undoubtedly, the outcomes of his/her education will also be reflected in the student's overview in terms of methodological approaches in the subject matter.	
Brief outline of the course: The subject Dissertation Thesis is a compulsory part of the doctoral student's study activities. The student requires a supremely individual character with regard to the specifics of the individual topics of the dissertation thesis. The basic syllabus should already be evident within the individual study plan of the doctoral student. The subject is important especially in terms of understanding the basic theoretical and methodological aspects of the solution to the topic of the dissertation thesis with emphasis on self-study and consultation with the academic supervisor and a wide spectrum of consultants, who will take part in creating the professional potential of the doctoral student for the next (scientific) stage of his/her studies.	
Recommended literature: No specifications regarding the character of a specific topic for the dissertation thesis. Recommended literature is included in the doctoral student's individual study plan.	
Required language for successful course completion: Slovak language in combination with English (study literature in English)	
Remarks:	
Course evaluations Course completion is classed by the grade of pass/fail.	
Total number of student assessments:	
Instructor: Academic supervisor	
Updated last: January 19, 2021	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Gemology

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGML-003	Course: Gemology
Study design: Lectures and seminars, weekly, 2 hours lectures/ 1 hour seminar, 39 hours per semester. Method of study: full time, part-time, combined	
Number of credits earned: 3	
Recommended semester: 1. semester	
Degree: 3. Degree	
Prerequisite courses:	
Grading policy: Active participation in the lectures and seminars, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: The aim of the course is to provide students of a PhD. degree comprehensive overview of the current state of gemology - the science of gemstones. Emphasis is placed on the geological conditions of the formation of gemstones in nature (magmatic, metamorphic, hydrothermal, sedimentary), genetic types of current economically important deposits of gemstones, modern laboratory methods of studying gemstones, as well as crystal chemistry and characteristic properties of selected gemstones, processing and synthesis. Graduates of this course will gain a comprehensive picture of gemstones from their structure, chemical composition, properties, to the genetic types of their accumulations (deposits), processing and valuation.	
Syllabus: Contemporary gemology: modern methods and knowledge. Gemstones in the Earth's lithosphere, their occurrences and accumulations in various types of rock environments. Relationship between the crystal structure type and the physical properties of selected gemstones (optical properties, hardness, chemical resistance). Dependence of chemical composition, structural defects and colour of gemstones. Mineral and fluid inclusions in gemstones - indicators of their genesis. Significance of the study of O, Si, Al, Hf isotopes, etc. in gemstones: an indicator of their provenance. Synthesis and imitation of gemstones. Contemporary world deposits of important precious stones (diamond, corundum, beryl, chrysoberyl, topaz, quartz, opal, tourmalines, zircon, olivine, garnets, turquoise, pearls, tektites).	
Suggested readings: Groat L. A. (Ed.), 2007: The geology of gem deposits. Mineral. Assoc. Canada Short Course Series 37, 23–78. Scientific mineralogical articles in current international journals and monographs (according to the focus of the graduate's PhD. work).	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information:	
Professor: Assoc. Prof. Peter Bačík, PhD., RNDr. Jana Fridrichová, PhD., prof. RNDr. Pavel Uher., PhD.	
Last update: 4. February 2022	

Approved by: Prof. RNDr. Monika Huraiová, PhD.

Genetic mineralogy

Course Information Sheet

University: Comenius University in Bratislava

Faculty: Faculty of Natural Sciences

Code: N-DGML-005

Course: Genetic mineralogy

Study design:

Seminar, 2 hours weekly, 26 hours per semester. Individual study of recommended literature.
Method of study: full time, part-time, combined

Number of credits earned: 3

Recommended semester: 3.semester

Degree: 3. stupeň

Prerequisite courses: none

Grading policy: Active participation in the seminar, elaboration of seminar work (essay) and examination - the condition of completion must be demonstrated by at least 60% of the required knowledge. The completion of the course is evaluated by the classification degrees completed or not completed.

Course objectives:

The aim of the course is to provide a comprehensive characteristic of selected processes of mineral origin and evolution, based on recent trends and the modern methods in mineralogy, at the level of knowledge of PhD. students. The course is focused on genetic problems of various mineralization types using detailed investigation of chemical and isotopic composition of minerals, knowledge of their fluid inclusions, detailed study of internal zoning (texture) and structural state of crystals, their alterations and relationships to texture, chemical composition, age and geological and tectonic evolution of their parental rocks. Consequently, the students understand principles of such comprehensive approach to solution of mineral and rock genesis.

Syllabus:

Character and goals of genetic mineralogy in recent state of knowledge. The role of modern, highly precise analytical methods in mineralogical research. Variations of chemical and isotopic composition of minerals as genetic indicators. Fluid inclusions in minerals: sensitive tracers of genetic environment. Significance of minerals as indicators of temperature, pressure, oxygen and sulphur fugacity. Examples of mineral origin and evolution in various geotectonic processes (e.g., plutonic, volcanic environments, low to ultrahigh metamorphism, hydrothermal conditions, sedimentary environments, biomineralization, weathering).

Suggested readings:

Deer W.A., Howie R.A., Zussman J. (1997–2011): Rock-forming minerals 1–5. The Geological Society, London.

Klein C. (2006): Mineralogy. Oikos-Lumon, Bratislava.

Broska I., Petrík I., Uher P. (2012): Accessory minerals in granitic rocks of the Western Carpathians. Veda, Bratislava.

The course is held in:

Slovak in combination with English (study literature in English)

Other course information:

Grading history

Professor: Prof. Pavel Uher, PhD., Assoc. Prof. Peter Koděra, PhD., Assoc. Prof. Martin Ondrejka, PhD.

Last update: 13 January 2021

Approved by: Prof. Monika Huraiová, PhD.

Genetic petrology

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGPL-009	Course: Genetic petrology
Druh, rozsah a metóda vzdelávacích činností (Study design): Lectures and consultations, weekly, 1 hour lecture / 2 hours consultation, or 39 hour per semester. Method of study: full time, combined.	
Number of credits earned: 3	
Recommended semester: 3.semester	
Degree: 3. Degree	
Prerequisite courses: none	
Grading policy: Active participation in the lectures and consultations, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: Petrogenetic relationships between rock-forming and accessory minerals, and magmatic, metamorphic or sedimentary rock. Methods of study of rocks, their outputs, data processing, classification and genetic interpretation. Calculation or estimation of petrogenetic formation conditions, geodynamic interpretation and development of model.	
Syllabus: Magmatic system: genetic petrology of selected crust and mantle igneous rocks. Magmatic rocks as a record of the processes in the crust, mantle lithosphere and asthenosphere. Mixing of magmas and interaction with xenoliths. Fluid regime during magmatic processes, contents of the main and trace elements. Metamorphic rock system: genetic petrology of metamorphic rocks from different levels of mantle and crust. Metamorphic rocks as an indicator of processes in the lithosphere. Metamorphism on the subduction zone. Interaction of metamorphic rocks with fluids, fluid-induced metasomatism reflected in main and trace elements contents. Sedimentary rock system: genetic petrology of sedimentary rocks from different geotectonic settings. Diagenesis and anchimetamorphism.	
Suggested Readings: Philpotts. A.R., Ague, J.J., 2009: Principles of Igneous and Metamorphic Petrology. Second edition. Cambridge University Press, 667 pp. Philpotts. A.R., Ague, J.J., 2021: Principles of Igneous and Metamorphic Petrology. Third edition. Cambridge University Press, ISBN: 9781108492881 Winter J.D., 2001: An Introduction to Igneous and Metamorphic Petrology. Prentice Hall. Boggs S., Jr. 2009: Petrology of sedimentary rocks, 2nd. Edition, Cambridge Univ. Press, Winter J. D., 2009: Principles of igneous and metamorphic petrology. Second Edition. Prentice Hall. 720 pp.	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	
Professor: Prof. Monika Huraiová, PhD. Assoc. Prof. Martin Ondrejka, PhD., Prof. Marián Putiš, DrSC.	

Last update: 4. februára 2022

Approved by: Prof. Monika Huraiová, PhD.

Geochemistry of rocks

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGPL-005	Course: Geochemistry of rocks
Study design:	
Lectures and consultations, weekly, 2 hours lecture / 1 hour consultation, 39 hours per semester, laboratory works and individual study of recommended literature.	
Method of study: full-time, part-time, combined.	
Number of credits earned: 5	
Recommended semester: 2. semester	
Degree: 3.Degree	
Prerequisite courses: not specified	
Grading policy: Active participation in the lectures and consultations, examination - the condition of completion must be demonstrated by at least 60% of the required knowledge. The completion of the course is evaluated by the classification degrees completed or not completed.	
Course objectives:	
The PhD student will be able to understand the geochemical terminology. He/she will get the information about analytical methods and principles of processing of bulk-rock and pulp measurements. He/she will learn basic principles of geochemistry of major and trace elements in rocks and the geochemical normalizations. He/she will get the information on geochemistry of magmatic, metamorphic and sedimentary rocks.	
Syllabus:	
The characteristic of basic geochemical principles and the bulk-Earth composition. Expression of chemical element abundances and geochemical ratios. Geochemical standards and normalizations. The preparation of geological samples and geochemical measurements. Fractionation of chemical elements. Geochemistry of major and trace elements. Compatible and incompatible elements. LIL and HFS elements. The distribution of chemical elements in terrestrial and extraterrestrial rocks.	
Suggested readings:	
Bouška V. et al., 1980: Geochemie. Praha, Akademie.	
Huraiová, M., Ondrejka M. 2016: Petrológia magmatických hornín. Vydavateľstvo UK. 354 s.	
White W.M. 2013: Geochemistry. Wiley-Blackwell, 668 p.	
Rollinson H. 1993: Using geochemical data: evaluation, presentation, interpretation. Longman Group UK.	
Tutorial texts and presentations with examples.	
The course is held in:	
Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	
Professor: Assoc. Prof. Martin Ondrejka, PhD., Prof Monika Huraiová, PhD, Assoc. Prof. Katarína Šarinová, PhD.	
Last update: 4. februára 2022	
Approved by: Prof. Monika Huraiová, PhD.	

Isotope geology and geochronology

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGPL-007	Course: Isotope geology and geochronology
Study design: Lectures and consultations, weekly, 2 hours lectures/ 1 hour consultations, 39 hours per semester. Method of study: full time, combined.	
Number of credits earned: 3	
Recommended semester: 2.semester	
Degree: 3.Degree	
Prerequisite courses: none	
Grading policy: Active participation in the lectures and consultations, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed (pass/fail).	
Course objectives: The PhD student will be able to understand the terminology of isotope geology. He/she will get the information about analytical methods and principles for processing of stable and unstable isotopes in various fields of inorganic and organic nature. He/she will learn the basic principles of geochronology of geological materials and will get the latest points of view on the age of Earth, or Solar system (terrestrial planets, asteroids). He/she will learn to work with isotope and geochronology software (Isoplot).	
Syllabus: The characteristic of stable and unstable (radiogenic) isotopes. Expression of isotopic abundances and ratios. Isotopic standards. The preparation of geological samples and isotopic measurements. Mass spectrometry. Fractionation of carbon, sulphur and nitrogen isotopes. Radioactive decay chains and origin of radiogenic isotopes. Universal radioactive decay and blocking (closure) temperature. Principles of isotope dating – Sm/Nd, Re/Os, Lu/Hf. The distribution of isotopes in terrestrial and extraterrestrial rocks. Palaeogegeochemical, tectonic and genetic interpretations of isotopic composition. Selected examples of genetic interpretations of stable isotopes in minerals and rocks.	
Suggested readings: Faure,G. 1986: Principles of isotope geology. Oxford Press, 2ed. 427s. Hoefs J. 1997: Stable isotope geochemistry. Springer Verlag, 4ed., 201 s. Cambel.B. et al. 1990: Geochronológia kryštalínika Západných Karpát, Veda, 181 s. Košler J., Jelínek E., Pačesová M. 1997: Základy izotopové geologie a geochronologie, radiogenní izotopy, Univerzita Karlova, Praha, 113. White W.M. 2013: Geochemistry, Wiley-Blackwell, 668 p. Burchart J., Král' J. 2019: Izotopový zápis minulosti Zeme, Univerzita Komenského v Bratislave, 353 p.	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	
Professor: Assoc. Prof. Martin Ondrejka, PhD, Prof. Monika Huraiová, PhD., RNDr. Ondrej Nemec, PhD.	

Last update: 4. februára 2022

Approved by: prof. Monika Huraiová, PhD.

Laboratory methods in mineral research

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGML-006	Course: Laboratory methods in mineral research
Study design: Seminar and exercise, 3 hours weekly, 2 hours seminar / 1 hour exercise, 39 hours per semester. Method of study: full time, combined.	
Number of credits earned: 3	
Recommended semester: 2. semester	
Degree: 3. Degree	
Prerequisite courses:	
Grading policy: Participation in the lectures and exercises, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: The graduate will gain detailed knowledge about the use of modern analytical methods in mineralogy, data interpretation and advanced applications of analytical methods in solving specific problems.	
Syllabus: Electron-optical methods, energy-dispersive electron microanalysis, wavelength-dispersive electron microanalysis, element distribution maps, transmission electron microscopy. Diffraction methods - single crystal and powder methods, Rietveld solution of structures, LeBail and Pawley decomposition of diffraction patterns. Spectroscopic methods, Mössbauer spectroscopy, Infrared spectroscopy, Raman spectroscopy, laser based spectroscopic methods (LIBS, LA ICP OES, LA ICP MS). Synchrotron diffraction (microdiffraction) and absorption spectroscopic (EXAFS, XANES) methods. Visit of available laboratories.	
Suggested readings: Bačík P., Fejdi P., 2013: Prášková rtg. difraktometria. Vydavateľstvo UK, Bratislava, 150 s. Bačík P., Fridrichová J., 2018: Spektroskopické metódy v mineralógii. Vydavateľstvo UK, Bratislava, 168 s. Fenter P. A., Rivers M. L., Sturchio N. C., Sutton S. R., 2002: Applications of Synchrotron Radiation in Low temperature Geochemistry and Environmental science. Min. Soc. of America, 49, 2-106. Hawthorne F. C., 1988: Spectroscopic methods in mineralogy and geology. Reviews in Mineralogy and Geochemistry, 18, 99-159. Beran A., Libowitzky E., 2004: Spectroscopic Methods in Mineralogy. Eötvös University Press, Budapest. David W. I. F., Shankland K., McCusker L.B., Baerlocher Ch., 2002: Structure Determination from Powder Diffraction Data (IUCr Monographs on Crystallography). Oxford University Press. Scientific mineralogical articles in current international journals (according to the focus of the graduate's PhD. work).	
The course is held in: Slovak in combination with English (study literature in English)	

Other course information:**Grading history****Professor:**

doc. Mgr. Peter Bačík, PhD., Mgr. Daniel Ozdín, PhD.

Last update: 4. February 2022**Approved by:** prof. RNDr. Monika Huraiiová, PhD.

Magmatic petrology

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGPL-001	Course: Magmatic petrology
Study design: Lectures and seminar, weekly, 2 hours lecture / 1 hour seminar, 39 hours per semester. Method of study: full time, combined.	
Number of credits earned: 5	
Recommended semester: 1. semester	
Degree: 3. Degree	
Prerequisite courses: none	
Grading policy: Active participation in the lectures and seminars, seminar work (essay), examination – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: The student is trained in interpreting the chemical composition of the magmatic rock (main and trace elements) and to classify it genetically.	
Syllabus: Mineral composition of magmatic rocks – major, minor and accessory minerals. Relationship of modal and mineral compositions and the importance of accessory minerals. The chemical composition of magmatic rock and the different ways of presenting, interpreting and using them. Genesis of main magmatic rock types and conditions of their formation. Mineral thermobarometry. Study of fluid inclusions in petrology and their genetic interpretation. Isotopic petrology.	
Recommended literature: Huraiová, M., Ondrejka, M. (2016): Petrológia magmatických hornín. Vydavateľstvo UK, Bratislava. 354 s. (in Slovak) Philpotts, A.R., Ague, J.J. (2009): Principles of Igneous and Metamorphic Petrology. Second edition. Cambridge University Press, 667 pp. Rollinson, H. (1993): Using Geochemical Data: Evaluation, Presentation, Interpretation. Longman Group UK Limited, 352 pp. Ragland, P.C. (1989): Basic Analytical Petrology. Oxford University Press, New York, 369 pp. Maaløe, S. (1985): Principles of Igneous Petrology. Springer-Verlag, 374 pp. Le Maitre, R.W. (1976): The Chemical Variability of some Common Igneous Rocks. J. Petrology 17, 4, 589-598. Winter J. D. (2010): Principles of igneous and metamorphic petrology. Second Edition. Prentice Hall. 702 pp. Gill, R. (2010): Igneous Rocks and Processes: a practical guide, Wiley-Blackwell, 428 pp. Scientific articles in the field of magmatic petrology.	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information:	
Grading	
Professor: Prof. Monika Huraiová, PhD. Assoc. Prof. Martin Ondrejka, PhD.	
Last update: 4. February 2022	
Approved by: Prof. Monika Huraiová, PhD.	

Metamorphic petrology

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGPL-003	Course: Metamorphic petrology
Study design: Lectures and exercises, weekly, 2 hours lectures / 1 hour exercise, 39 hours per semester, other individual consultations on professional literature. Method of study: full time, combined.	
Number of credits earned: 5	
Recommended semester: 2. semester	
Degree: 3.	
Prerequisite courses: none	
Grading policy: Active participation in the lectures and exercises, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: Detailed knowledge on genetic models of formation of metamorphic rocks, the ability to interpret the results of different types of analyses of metamorphic rocks and critically evaluate their limits. He/she will recognize the geodynamic environments and metamorphic conditions. He/she will be able to identify geotectonic environments of protoliths and their metamorphism. He/she will handle the basics of thermodynamic modelling.	
Syllabus: Mineral associations in metamorphic rocks, their modification during metamorphism. Methods of investigation of metamorphic minerals and rocks and the possibilities for interpreting them. Geochemical composition of metamorphic rocks, modifications of chemical composition in interaction with the fluid phase. Geodynamic environments of metamorphism. Determination of metamorphic protolith. Geothermobarometry and thermodynamic modelling of P-T-X conditions in different environments of the crust and mantle lithospheres.	
Suggested readings: Publications in actual scientific journals, monographs and text-books. Spear F.S., 1993: Metamorphic phase equilibria and pressure-temperature-time paths. Mineralogical Society of America, Washington DC. Bucher K., Grapes R., 2011: Petrogenesis of Metamorphic rocks. Springer-Verlag, 8. ed. Krist E., Korikovsky S.P., Putiš M., Janák M., Faryad S.W., 1992: Geology and Petrology of Metamorphic Rocks of Western Carpathian Crystalline Complexes. Comenius Univ. Press, Bratislava.	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	
Professor: prof. Marián Putiš, DrSc., RNDr. Ondrej Nemec, PhD.	
Last update: 4. February 2022.	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Mineralogy of rocks

Course Information Sheet

University: Comenius University in Bratislava

Faculty: Faculty of Natural Sciences

Code: N-DGPL-002

Course: Mineralogy of rocks

Study design:

Lectures and seminar, 3 hours weekly, 2 hours lecture / 1 hour seminar, or 39 hours per semester and individual study of recommended literature.

Method of study: full time, combined.

Number of credits earned: 5

Recommended semester: 1. semester

Degree: 3. Degree

Prerequisite courses: none

Grading policy: Active participation in lectures and seminars, seminar work (essay), examination - 60 % of the required knowledge must be demonstrated as a condition for completion. The completion of the course is evaluated by the classification degree completed or not completed.

Course objectives:

The aim of course is to provide detailed information concerning selected rock-forming and accessory minerals as important indicators of genesis and evolution of their parental magmatic, metamorphic and sedimentary rocks. The course is focused on understanding the mineral structure and compositional variations as indicators of the host-rock P-T-X conditions, substitution mechanisms and solid solutions of isostructural minerals. Graduates will also learn the importance of studying the internal zoning of minerals and their alteration, as well as application of selected minerals as potential geothermometers, geobarometers, oxygen and sulphur fugacity tracers, and geochronometers for dating of parental rocks. Consequently, the course importantly helps the students during their PhD. scientific work in mineralogy and petrology.

Syllabus:

Distribution and importance of rock-forming minerals in magmatic, metamorphic and sedimentary rocks of Earth's crust and mantle. Distributions and significance of accessory minerals of the rocks. Rock-forming and accessory minerals of extraterrestrial objects (Moon, Mars, meteorites). Crystal structure and crystal chemistry of selected rock-forming and accessory minerals, their compositional variations, solid solutions and substitution mechanisms: a key to understanding of the parental rock evolution. Significance of internal zoning, alterations and breakdowns of the rock-forming and accessory minerals. Geochronological dating of rocks using selected minerals (e.g., zircon, monazite, xenotime, allanite, garnets, micas, molybdenite, columbite).

Suggested readings:

Klein C. (2006): Mineralogy. Oikos-Lumon, Bratislava.

Broska I., Petrík I., Uher P. (2012): Accessory minerals of granitic rocks of the Western Carpathians. Veda, Bratislava.

Deer W.A., Howie R.A., Zussman J. (1997–2011): Rock-forming minerals 1–5. The Geological Society, London.

The course is held in

Slovak in combination with English (study literature in English)

Other course information:

Grading history:

Total number of student assessments:

Professor: Prof. Pavel Uher, PhD., Assoc. Prof. Peter Bačík, PhD.

Last update: 13 January 2021

Approved by: Prof. Monika Huraiová, PhD.

Mineralogy of the environment

Course Information Sheet

University: Comenius University in Bratislava	
Fakulta (Faculty): Faculty of Natural Sciences	
Code: N-DGML-007	Course: Mineralogy of the environment
Study design: Lectures and consultations, weekly, 2 hours lectures or consultations, 26 hour per semester, individual study of recommended literature. Method of study: full time, combined.	
Number of credits earned: 5	
Recommended semester: 2. semester	
Stupeň štúdia (Degree): 3. Degree	
Prerequisite courses:	
Grading policy: Active participation in the lectures and consultations, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: The graduate will gain detailed knowledge on environmental risks related to the extraction and processing of mineral raw materials. The mineral processing products distributed in various environments will be discussed in detail. The thermodynamic conditions in the processes of oxidation of primary raw materials and the formation of secondary mineral phases in the environment of mining waste will also be explained. The importance of mineralogical research for a comprehensive assessment of environmental risks and the impact of crystal chemical laws on the bonding and release of toxic elements in minerals and the possibilities of remediation resulting from their knowledge will be explained. The influence of morphological and structural properties of minerals on the mobility of elements in the environment will also be clarified.	
Syllabus: Origin of mineral-processing products; mobility of mineral-processing products in different environments, biosphere, atmosphere, hydrosphere, pedosphere; thermodynamic conditions during primary raw materials oxidation to secondary mineral phases in mining heaps and sludges; crystal-chemical properties of minerals and their influence on the bonding and release of toxic elements in minerals; the influence of morphological and structural properties on the mobility of minerals in the environment; the impact of mineral processing products on the environment and human health; possibilities of remediation resulting from the knowledge on physical, chemical and structural properties of minerals.	
Suggested readings: Vaughan D. J., Wogelius R. A. (2000): Environmental mineralogy, Eotvos University Press, Budapest, 434; Vaughan D. J., Wogelius R. A. (2012): Environmental mineralogy II, Eotvos University Press, Budapest, 489; Mukherjee S. (2011): Applied Mineralogy Applications in Industry and Environment. Springer Netherlands; Williams P. A. (1990): Oxide Zone Geochemistry. Elis Horwood, Chichester, 286 s. Scientific mineralogical articles in current international journals and monographs (according to the focus of the graduate's PhD. work).	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	

Professor:

Assoc. Prof. Peter Bačík, PhD.

Last update: 4. February 2022**Approved by:** prof. RNDr. Monika Huraiová, PhD.

Professional English

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Professional English
Type, scope and method of academic activities: Autonomous self-study based on recommended literature, quizzes, and information on the Department of Languages website.	
Number of credits: 5 credits	
Recommended semester/trimester of study: 1 st , 2nd or 3rd semester.	
Degree of study: course is intended for 3rd degree (PhD)	
Conditional courses:	
Conditions for passing the course: achieving a minimum of 60% in all parts of the examination. The parts of the examination include grammar and professional vocabulary, reading and listening comprehension, theoretical writing of professional texts and an interview with a native speaker of English. Credits will not be awarded to students who receive less than 60% on any of the parts of the examination.	
Educational outcomes: Doctoral students who successfully pass the examination from Professional English will have the basics for active use of the English language for professional purposes. They will be able to understand professional texts in written or audio form, acquire professional vocabulary as well as know how to use it, understand the characteristic morphological-syntactic phenomena in professional texts, as well as communicate verbally.	
Brief outline of the course: Preparation for the language examination from Professional English based on recommended literature.	
Recommended literature: Team of authors: Writing Professional English (interactive CD) Team of authors: Test your Listening Skills: A Handbook for Science Doctoral students Team of authors: Test your Reading Skills: A Handbook for Science Doctoral students Armer, T.: Cambridge English for Scientists	
Required language for successful course completion: English (study literature in English)	
Remarks: A level of B1 English is required in order to pass this course.	
Course evaluations Course completion is classed by the grade of pass/fail.	
Total number of student assessments:	
Instructor: Kordíková, Sabo, Slováková	
Last updated: February, 2021	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Professional Oral Communication

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Professional Oral Communication
Type, scope and method of academic activities: 2 hours of seminars weekly. Seminars will take place in class.	
Number of credits: 3 credits	
Recommended semester/trimester of study: 1 st , 2nd, 3rd or 4th semester.	
Degree of study: course is intended for 3rd degree (PhD)	
Conditional courses:	
Conditions for passing the course: Regular and active participation in seminars, giving 1 professional presentation. Credits will not be awarded to students who receive less than 60% on their presentations.	
Educational outcomes: Doctoral students who successfully complete the course Professional Oral Communication will gain a wide range of theoretical knowledge and practical skills from field of study in oral communication in the English language.	
Brief outline of the course: Theory and practice of professional oral communication in the English language, focused on professional presentations and discussions. The most important objective is to prepare students for verbal communication in situations related to their PhD studies at home and abroad (mobility, conferences), as well as for professional communication, especially in the form of presentations and discussions.	
Recommended literature: Sabo, M.: English for Academic and Professional Purposes Armer, T.: Cambridge English for Scientists	
Required language for successful course completion: English (study literature in English)	
Remarks: A level of B1 English is required in order to pass this course.	
Course evaluations Course completion is classed by the grade of pass/fail	
Total number of student assessments:	
Instructor: Sabo	
Updated last: January 19, 2021	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Sedimentary petrology

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGPL-004	Course: Sedimentary petrology
Study design: Consultations, weekly 2 hours consultations, in total 26 hours per semester, individual study of recommended literature. Method of study: full time, combined.	
Number of credits earned: 5	
Recommended semester: 2. semester	
Degree: 3	
Prerequisite courses: none	
Grading policy: Active participation in the consultations, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: The doctoral student will handle the main methods and principles sedimentary petrology research. The student will learn the laws and main principles for interpreting results, including searching, understanding and implementation of control factors. The doctoral student will also supplement the knowledge within the focus of his/her dissertation.	
Syllabus: Main trends in petrological sediment research, control factors and problems in the interpretation of results. Topics focused on specific dissertations of students.	
Suggested readings: Blatt E.: Sedimentary petrology. 2. Ed., Freeman Comp., 1992. Boggs S., Jr.: Petrology of sedimentary rocks, IIInd. Edition, Cambridge Univ. Press, 2009; Tucker M.E.: Sedimentary petrology, IIInd. Ed., Blackwell Publ., 2001 Articles in scientific journals.	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	
Professor: Assoc. Prof. Katarína Šarinová, PhD.	
Last update: 4. February 2022	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Seminar for PhD students

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: N-DGML-004	Course: Seminar for PhD students
Study design:	
Seminar, weekly, 2 hours, or 26 hours per semester, individual preparation for seminar presentations.	
Method of study: full time	
Number of credits earned: 3	
Recommended semester: 2. semester	
Degree: 3. Degree	
Prerequisite courses: none	
Grading policy:	
Active participation in the seminars, presentation of the topic of PhD thesis and partial results - the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives:	
Study of the PhD. thesis topic, their research methods and data processing. The aim of the seminar is the learning of doctorand to work with literature, to interpretate results of various laboratory analyses and critical evaluation of their limits. The doctorand will be able to present and discussion partial results of its PhD. thesis.	
Syllabus:	
State and planning of work on PhD thesis project. Debate on chapters of the PhD, based on its goals. Evaluation of the PhD. thesis from the supervisor and reviewer point of view. Formal and scientific deficiencies of the thesis. Presentation and evaluation of the PhD. thesis results during the work with discussion in the presence of the Department staff.	
The course is held in	
Slovak in combination with English (study literature in English)	
Other course information:	
Grading history	
Professor: Prof. Pavel Uher, PhD.	
Last update: 4. February 2022	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Slovak for Foreign Doctoral Students 1

Course Information Sheet

Post-Secondary Institution: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Slovak for Foreign Doctoral Students 1
Type, scope and method of academic activities: 2 hours (at 60 min. per hour) of weekly lessons in the form of seminars. All academic activities will take place during the lessons.	
Number of credits: 3 credits	
Recommended semester/trimester of study: from 1st to 8th semester	
Degree of study: course is intended for 3rd degree (PhD)	
Conditional courses: -	
Conditions for passing the course: Active participation during lessons, ongoing work on the assignments. There will be a final examination at the end of the semester. Credits will not be awarded to students who receive less than 60% on the final examination.	
Educational outcomes: The objective of the course is to acquire the basics of Slovak in a communicative way, to develop individual language skills (listening, reading, writing and speaking) based on the Common European Framework of Reference for Languages (CEFR) for the levels A1 – A2, from a complete beginner.	
Brief outline of the course: The lessons contain the basics of Slovak grammar which are relevant to the specifics of Slovak as a foreign language. Selected grammatical phenomena, conjugation and declination are practiced. Vocabulary is focused on real-life communication needs.	
Recommended literature: Kamenárová, R. a kol.: Krížom-krážom, Slovenčina A1 Kamenárová, R. a kol.: Krížom-krážom, Slovenčina A1+A2, cvičebnica Audio program: https://uniba.sk/krizom-krazom Worksheets are prepared by the course instructor. Portal: https://slovake.eu/sk	
Required language for successful course completion: Slovak in combination with English (the study literature is in both Slovak and English).	
Remarks: It is possible to register for the course 3 times. Students may begin in either the Summer or Winter semester. Student are eligible to sign up for 3 semesters.	
Course evaluations Course completion is classed by the grade of pass/fail.	
Total number of student assessments:	
Instructor: Karin Rózsová Wolfová	
Last updated: February, 2021	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Slovak for Foreign Doctoral Students 2

Course Information Sheet

Post-Secondary Institution: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Slovak for Foreign Doctoral Students 2
Type, scope and method of academic activities: 2 hours (at 60 min. per hour) of weekly lessons in the form of seminars. All academic activities will take place during the lessons.	
Number of credits: 3 credits	
Recommended semester/trimester of study: from 1st to 8th semester	
Degree of study: course is intended for 3rd degree (PhD)	
Conditional courses: Slovak for Foreign Doctoral Students 1	
Conditions for passing the course: Active participation during lessons, ongoing work on the assignments. There will be a final examination at the end of the semester. Credits will not be awarded to students who receive less than 60% on the final examination.	
Educational outcomes: The objective of the course is to acquire the basics of Slovak in a communicative way, to develop individual language skills (listening, reading, writing and speaking) based on the Common European Framework of Reference for Languages (CEFR) for the levels A1 – A2, from a complete beginner to a pre-intermediate level.	
Brief outline of the course: The lessons contain the basics of Slovak grammar which are relevant to the specifics of Slovak as a foreign language. Selected grammatical phenomena, conjugation and declination are practised. Vocabulary is focused on real-life communication needs.	
Recommended literature: Kamenárová, R. a kol.: Krížom-krážom, Slovenčina A1 Kamenárová, R. a kol.: Krížom-krážom, Slovenčina A1+A2, cvičebnica Audio program: https://uniba.sk/krizom-krazom Worksheets are prepared by the course instructor. Portal: https://slovake.eu/sk	
Required language for successful course completion: Slovak in combination with English (the study literature is in both Slovak and English).	
Remarks: It is possible to register for the course 3 times. Students may begin in either the Summer or Winter semester. Student are eligible to sign up for 3 semesters.	
Course evaluations Course completion is classed by the grade of pass/fail.	
Total number of student assessments:	
Instructor: Karin Rózsová Wolfová	
Updated last: February, 2021	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Slovak for Foreign Doctoral Students 3

Course Information Sheet

Post-Secondary Institution: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Slovak for Foreign Doctoral Students 3
Type, scope and method of academic activities: 2 hours (at 60 min. per hour) of weekly lessons in the form of seminars. All academic activities will take place during the lessons.	
Number of credits: 3 credits	
Recommended semester/trimester of study: from 1st to 8th semester	
Degree of study: course is intended for 3rd degree (PhD)	
Conditional courses: Slovak for Foreign Doctoral Students 2	
Conditions for passing the course: Active participation during lessons, ongoing work on the assignments. There will be a final examination at the end of the semester. Credits will not be awarded to students who receive less than 60% on the final examination.	
Educational outcomes: The objective of the course is to acquire the basics of Slovak in a communicative way, to develop individual language skills (listening, reading, writing and speaking) based on the Common European Framework of Reference for Languages (CEFR) for the levels A1 – A2, from a complete beginner to a pre-intermediate level.	
Brief outline of the course: The lessons contain the basics of Slovak grammar which are relevant to the specifics of Slovak as a foreign language. Selected grammatical phenomena, conjugation and declination are practised. Vocabulary is focused on real-life communication needs.	
Recommended literature: Kamenárová, R. a kol.: Krížom-krážom, Slovenčina A1, A2 Kamenárová, R. a kol.: Krížom-krážom, Slovenčina A1+A2, cvičebnica Audio program: https://uniba.sk/krizom-krazom Worksheets are prepared by the course instructor. Portal: https://slovake.eu/sk	
Required language for successful course completion: Slovak in combination with English (the study literature is in both Slovak and English).	
Remarks: It is possible to register for the course 3 times. Students may begin in either the Summer or Winter semester. Student are eligible to sign up for 3 semesters.	
Course evaluations Course completion is classed by the grade of pass/fail.	
Total number of student assessments:	
Instructor: Karin Rózsová Wolfová	
Updated last: February, 2021	
Approved by: prof. RNDr. Monika Huraiová, PhD.	

Volcanism

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences	
Code: NEW	Course: Volcanism
Study design: Seminar or consultations, weekly, 3 hours, or 39 hours per semester, individual study of recommended literature.	
Method of study: full time, combined.	
Number of credits earned: 3	
Recommended semester: 1. semester	
Degree: 3. Degree	
Prerequisite courses: none	
Grading policy: Active participation in the seminars and consultations, exam – the condition of completion must be demonstrated by at least 60 % of the required knowledge. The completion of the course is evaluated by the classification degree completed or not completed.	
Course objectives: The aim is to teach the doctoral student to know and understand volcanic processes, to distinguish various volcanic types and forms, and to perceive the influence of volcanism in the context of the theory of lithospheric plates tectonics. He/she will also be able to interpret the petrochemistry in terms of the type of volcanic activity, the environment of eruption and the tectonic position.	
Syllabus: The main types of volcanism – effusive, extrusive, explosive, their characteristics and origin. Eruption mechanisms, transport and storage of volcanic material. Volcanic areas linked with the tectonics of lithospheric plates. Forms of individual types of volcanism. Geohazards, risks, disasters, anticipation and monitoring of volcanic eruptions. Mineral and chemical composition of pyroclastic deposits and lavas as proxies of volcanic processes. Actual topics related to active volcanism. Specific topics focused on individual dissertations.	
Suggested Readings: H. Sigurdsson (Ed.) 2015: The Encyclopedia of Volcanoes. 2nd ed., Academic Press, 1456 pp. K. Németh, U. Martin 2007: Practical Volcanology, 227p. R.J. Brown, C. Bonadonna, A.J. Durant 2012: A review of volcanic ash aggregation. Physics and Chemistry of the Earth 45–46, 65–78. A. R. Van Eaton, C. J.N. Wilson 2013: The nature, origins and distribution of ash aggregates in a large-scale wet eruption deposit: Oruanui, New Zealand 2013: J. Volcanol. Geotherm. Res., 250, 129–154. R.J. Brown, M.J. Branney, C. Maher, P. Dávila-Harris 2010: Origin of accretionary lapilli within ground-hugging density currents: Evidence from pyroclastic couplets on Tenerife, GSA Bulletin, January/February 2010; v. 122; no. 1/2; p. 305–320; doi: 10.1130/B26449.1 Smith V.C., Shane P., Nairn I.A. 2005: Trend in rhyolite geochemistry, mineralogy, and magma storage during the last 50 kyr at Okataina and Taupo volcanic centers, Taupo Volcanic Zone, New Zealand. J. Volcanol. Geotherm. Res., 148, 372–406. Other articles in professional journals.	
The course is held in: Slovak in combination with English (study literature in English)	
Other course information	

Grading history

Professor: Prof. Monika Huraiová, PhD. Assoc. Prof. Martin Ondrejka, PhD., Assoc. Prof. Katarína Šarinová, PhD.

Last update: 4. February 2022

Approved by: prof. RNDr. Monika Huraiová, PhD.

Writing Professional English

Course Information Sheet

University: Comenius University in Bratislava	
Faculty: Faculty of Natural Sciences UK in Bratislava	
Course code:	Name of course: Writing Professional English
Type, scope and method of academic activities: 2 hours of seminars weekly. Seminars will take place in class.	
Number of credits: 5 credits	
Recommended semester/trimester of study: 1st 2nd 3rd or 4th semester.	
Degree of study: course is intended for 3rd degree (PhD)	
Conditional courses:	
Conditions for passing the course: Regular and active participation in seminars, Credits will not be awarded to students who receive less than 60% on.	
Educational outcomes: Doctoral students who successfully pass the course Writing Professional English will gain a wide range of theoretical knowledge and practical skills from the written communication in the English language.	
Brief outline of the course: Theory and practice of professional writing communication in the English language, including writing emails and letters, filling-in forms for conferences, writing professional resumés, cover letters, abstracts, professional articles, paraphrasing, using citations, citing sources, etc.	
Recommended literature: Team of authors: Writing Professional English (interactive CD) Sabo, M.: English for Academic and Professional Purposes Armer, T.: Cambridge English for Scientists	
Required language for successful course completion: English (study literature in English)	
Remarks: A level of B1 English is required in order to pass this course.	
Course evaluations Course completion is classed by the grade of pass/fail.	
Total number of student assessments:	
Instructor: Sabo	
Last updated: 4. February 2022	
Approved by: prof. RNDr. Monika Huraiová, PhD.	