Course descriptions

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COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KAlCh/N-bENS-022/22	Analytical Chemistry

Educational activities:
Type of activities: practicals / lecture / seminar
Number of hours:
per week: 2 / 2 / 1 **per level/semester:** 28 / 28 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: lecture / seminar / practicals
Number of contact hours: 65 hours
per week: 2 hours lecture (2L) / 1 hour seminar (1S) / 2 hours practicals (2P) per level/semester: 26 / 13 / 26
on-site learning, on-line learning

Number of credits: 5

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Seminar – a maximum of 20 points, for elaboration and presentation of a seminar paper. Practicals – a maximum of 40 points, for theoretical preparation for practicals, active participation in practicals, lab reports from practicals and final test from practicals. Lecture – a maximum of 40 points, for the final test. The final grade will consist of evaluation of the practicals, seminar and the final test from lecture, for a maximum of 100 points. For grade A it is necessary to obtain at least 92 points, for grade B at least 84 points, for grade C at least 76 points, for grade D at least 68 points and for grade E at least 60 points. The evaluation is the same for on-line learning.

Learning outcomes:
Students will get acquainted with the current state of quantitative observation; generation of analytical signal; analytical processes, principles, procedures and techniques and their classification; solving identification problems; and characterization and quantification of chemical substances in science and technology. Students will also get acquainted with the possibility of detecting and finding solutions to materials research, production and social practice using chemical analysis as a tool of analytical chemistry. The objective also involves calculations in analytical chemistry and solution of model situations from social practice, which are discussed in daily press and information media. Students will solve case studies from biochemistry, biotechnology, and other natural sciences. The current use of analytical chemistry methods and their future potential and an outline of their development trends will be discussed. Students will also get acquainted with instrumental experimental work in the laboratory.

Class syllabus:
• Definition, subject of interest and resources of analytical chemistry.

• Relationship between analytical chemistry and chemical analysis. Analytical method (classification). Analytical principle. Sampling.
• Measurement (qualitative and quantitative analysis). Analytical signal and its properties. Calibration. Statistical evaluation of data (measurement errors).
• Simple sample preparation procedures. Decomposition of inorganic and organic samples, extraction.
• Chemical methods of analysis (qualitative, quantitative). Evidence of chemical reactions and tests, gravimetric analysis, volumetric analysis. Titration curves. Principles of neutralization, precipitation, redox and complexometric titrations.
• Chemical equilibria (acid-base, complex-forming, precipitating, redox).
• Electroanalytical methods. Basic scheme of electrochemical cell. Classification of electroanalytical methods. Equilibrium potentiometry (reference and indicator electrodes, direct potentiometry and potentiometric titrations, ion-selective electrodes as a selectivity coefficient). Principle and use of linear and cyclic voltammetry, coulometry and conductometry.
• Optical analytical methods. Properties of electromagnetic radiation. History and classification of optical methods. Basic instrumentation of optical analytical methods. Atomic spectrometry. Atomic spectrometry techniques.
• Molecular spectrometry. Molecular spectrometry techniques – absorption UV-VIS spectrophotometry, spectrofluorometry, infrared and Raman spectrometry. Non-spectral optical methods. Reflectometry, interferometry, polarimetry, turbidimetry and nephelometry.
• Mass spectrometry. Basic principles. Basic scheme of equipment. Measurement conditions. Instrumentation in mass spectrometry. Basic types of ionization techniques and ion sources.
• Separation techniques, their function and importance in analytical procedures. Classification of separation principles and methods. Precipitation and filtration. Separation of volatile substances by distillation. Isolation and separation of substances by extraction. Ion-exchange. Chromatographic separation. Classification of chromatographic methods. Gas chromatography – principles and instrumentation. High-performance liquid chromatography – principle and instrumentation. Electroseparation methods. Capillary electrophoresis vs planar techniques. Instrumentation. Basic principles of electrophoretic methods: zone electrophoresis, isotachophoresis, isoelectric focusing.
• Automation in analytical laboratories. The application of combined analytical methods to solve selected analytical problems.

Practicals

• Volumetric analysis. Determination of calcium and magnesium in water.
• Potentiometric analysis. Determination of acetic acid in fermented spirit vinegar.
• Optical analytical methods. Determination of calcium and sodium in mineral water by emission flame photometry. Spectrophotometric determination of copper in the water. Identification and quantification of synthetic dyes by molecular absorption spectrometry.
• Chromatographic separation methods. Determination of methanol in alcoholic beverages by GC. RP-HPLC separation of aromatic hydroxycompounds and gallic acid. Separation of water-soluble dyes by paper chromatography.
• Electroseparation methods. Isotachophoretic separation of synthetic dyes using column-coupling technique. Isotachophoretic determination of glutamate in food.

Recommended literature:

D.A. Skoog, F.J. West, F.J. Holler, S.R. Crouch: Analytical Chemistry. An Introduction, Saunders Coll. Publ., 2000.
G. Schwedt: The Essential Guide to Analytical Chemistry, Wiley, New York, 1997.
R. Kellner, J.M. Mermet, M. Otto, Analytical Chemistry, John Wiley & Sons Australia, 2013.
For practicals: study material available at www.analytika.sk

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 6

A	B	C	D	E	FX
33,33	0,0	33,33	16,67	0,0	16,67

Lecturers: prof. RNDr. Marian Masár, PhD., Ing. Roman Szücs, PhD., Mgr. Jasna Hradski, PhD.

Last change: 28.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KAgCh/N-bBCH-036/22	Applied Calculations in Chemistry

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
The seminars are evaluated during the term in the form of two written exams. It is possible to get the maximum of 30 points for the first exam and the maximum of 70 points for the second exam. Grade scale: A 92-100%, B 84-92 %, C 76-84 %, D 68-76 %, E 60-68 %, FX 60 % and less.

Learning outcomes:
By completing the course, the student will acquire the necessary knowledge to implement the basic chemical calculations in the field of stoichiometry, solutions, ideal gas and their mutual
· combinations. Upon successful completion of the education process, the student will be able to be prepared independently for the laboratory exercises in inorganic, organic, and physical chemistry, and in subsequent years to understand subjects related to chemical calculations.

Class syllabus:
Physical quantities used in chemical calculations (extensive, intensive). Weight, volume, density, number of particles (moles), mass, molar mass, molar volume. Rounding results of the calculations. Stoichiometry of chemical compounds. Stoichiometry of chemical equations. Calculations according to chemical equations. Determination of the determining reactant and reactant in excess. Calculations using ideal gas laws. Quantities expressing the composition of solutions. Calculations with the weight fraction. Calculations with substance concentration. Mixing and dilution of solutions. Calculations for the preparation of solutions from anhydrous substances and hydrates. Preparation of saturated solutions. Recalculations of different ways for defining the composition of solutions. Combined calculations - calculations according to chemical equations and calculations related to solutions. Combined calculations - calculations related to syntheses.

Recommended literature:
[1] M. Bishop: An Introduction to Chemistry, Chemistry First. ISBN 978-0-9778105-8-1 (online source); Chapter 10: https://preparatorychemistry.com/Bishop_Chemistry_First.htm; [2] E. N. Ramsden: Calculations for A-level Chemistry, Redwood Books, Trowbridge, Wiltshire, 1993, ISBN 0-7487-1594-0

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 6

A	B	C	D	E	FX
33,33	33,33	0,0	16,67	16,67	0,0

Lecturers: Mgr. Olivier Monfort, PhD.

Last change: 27.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-048/22	Applied Conservation Biology

Educational activities:
Type of activities: practicals / seminar
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 2 hours seminar (2S) + 1 hour practice (1P) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam (contributing 60 %) and the report of seminar project (contributing 40 %). The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
This course covers the background and skills needed to understand and apply nature conservation strategies and principles in practice. After the course the student is familiar with the issue of human impact on habitat fragmentation, disturbance and destruction, controls the basic procedures and methodology solutions. Another objective is to gain knowledge and practical experience with the design and implementation of ecological networks in practice.

Class syllabus:
Particularly, the essential problems of habitat loss and fragmentation, habitat disturbance and the non-sustainable exploitation of species in both aquatic and terrestrial ecosystems are presented. The methods that have been developed to address these problems, from the most traditional forms of conservation, to new approaches at landscape scales are then presented, showing how the science can be put into practice. The course is aimed to bring also conceptual approaches of ecological networks in the country at different hierarchical levels, (from European to national and local), including territorial system of ecological stability, as a type of ecological network in Slovakia, as a territorial planning instrument of nature and landscape conservation and part of the land consolidation projects. Within field excursion will be demonstrated examples of practical implementations of natural elements restoration and management and examples of ecoducts in collisions places with migratory routes of animals. Some class meetings will include brief presentations and discussions to introduce seminar projects and their conceptual context.

Recommended literature:

Lindenmayer, D., B., Fischer, J., 2006: Habitat Fragmentation and Landscape Change. An Ecological and Conservation Synthesis. Island press Washington, Covelo, London, 328 pp.
Pullin, A. S., 2002: Conservation Biology. University of Birmingham. Cambridge University Press, 345 pp.
Ružičková, J., 2007: Fragmentation of landscape and biotopes in methods and assessments. Landscape Ecology in Slovakia. Development, Current State, and Perspectives. Bratislava: Ministry of the Environment of the Slovak Republic, 2007, s. 227- 236. (CD-ROM)
Jongman, R.H.G., Bouwma, I.M., Griffioen, A., Jones-Walters, L. & Van Doorn A.M. (2011). The pan European ecological network: PEEN. Landsc. Ecol., 26(3), 311−326. DOI: 10.1007/s10980-010-9567-x.

Languages necessary to complete the course:
English

Notes:
no

Past grade distribution
Total number of evaluated students: 2

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Jana Ružičková, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KIHG/N-bENS-011/22	Applied Geophysics

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 1

A	B	C	D	E	FX
0,0	100,0	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Roman Pašteka, PhD., prof. RNDr. Miroslav Bielik, DrSc., RNDr. Bibiana Brixová, PhD., doc. RNDr. Andrej Mojzeš, PhD., doc. RNDr. René Putiška, PhD.

Last change: 05.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-027/22	Bachelor Seminar 1

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours seminar (2S) per level/semester: 13 week

Number of credits: 2

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
The grades will be based on the preparation of a short written article (contributing 50%) and a presentation about topics of student's Bachelor Thesis (contributing 50%), which has a standardized grading system identified below. A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize, and evaluate. B (81 – 90%): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, and a serious, responsible engagement with the course content. C (73 – 80%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze; satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
The bachelor seminar is an integral part of the Environmental Studies program to improve skills and abilities for independent research. The primary task is to prepare own Bachelor thesis report which will be discussed and reviewed at a seminar. The student is also expected to participate in the seminars as well as review and discuss another thesis in the field.

Class syllabus:
The Bachelor seminar offers an opportunity for Bachelor students (5th to 6th semester) to present and discuss their work in progress. Each session hosts one to two presentations. The discussion is briefly introduced by the researcher and is chaired by one or more professors. Participants are expected to read and provide constructive feedback on the draft chapters. For this type of seminar,

based on the research of the students, there is no specific syllabus. Bachelor Seminar 1 is mainly focused on teaching the students of writing the relevant scientific text including how to find and cited literature, how to prepare research (search relevant articles) for the thesis, which parts of scientific text are necessary, and what is important for their preparation. Students will be able to cite the thoughts of other authors and make the scientific presentation in front of their classmates and teachers of the course. They improve their discussion skills including what kind of questions can be asked and obtain some tips what to do in some specific situations like in the case of the jitters, etc. After absolving this course, students will also be able to recognize the base mistakes connected with preparation and presentation of Bachelor thesis or other relevant lecture.

Recommended literature:

Theoretical lectures on writing scientific text and making presentations will be available to students in the form of PDF files in the e-learning environment of MS Teams. At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites that can improve their skills in this course. Other literature, specifically for writing student's Bachelor Thesis, is recommended by their supervisor.

Next optional relevant literature (available at internet, or ask the teacher):

Chandrasekhar, R. (2008): How to Write a Thesis: A Working Guide. Crawley: The University of Western Australia, Australia, 29 p.

de Koning, J., Stam, R.: How to write a bachelor thesis. Rural Sociology & Sociology of Development and Change, 14 p.

Tips and tricks for writing a bachelor or master thesis at the Institute for Markets and Strategy. WU Vienna, 12 p.

Kasnauskiene, G. (2016): Methodological Guidelines for Writing Bachelor's Theses. Business School at Vilnius University, 55 p.

Languages necessary to complete the course:

English

Notes:

no

Past grade distribution

Total number of evaluated students: 4

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD., doc. RNDr. Eva Záhorská, PhD., prof. RNDr. Ján Buček, CSc., Mgr. Samuel Rybár, PhD., doc. RNDr. Peter Ružička, PhD., prof. RNDr. Peter Fedor, DrSc.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-030/22	Bachelor Seminar 2

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours seminar (2S) per level/semester: 13

Number of credits: 2

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the concept of Bachelor Thesis defence in front of teachers of the course (contributing 100%), that will be preparation for Defence of Bachelor Thesis, and which has a standardized grading system identified below:
A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize, and evaluate. B (81 – 90%): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, and a serious, responsible engagement with the course content. C (73 – 80%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze; satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
The bachelor seminar is an integral part of the Environmental Studies program to improve skills and abilities for independent research. The primary task is to prepare own Bachelor thesis report which will be discussed and reviewed at a seminar. The student is also expected to participate in the seminars as well as review and discuss another thesis in the field.

Class syllabus:
The Bachelor seminar offers an opportunity for Bachelor students (5th to 6th semester) to present and discuss their work in progress. Each session hosts one to two presentations. The discussion is briefly introduced by the researcher and is chaired by one or more professors. Participants are expected to read and provide constructive feedback on the draft chapters. For this type of seminar,

based on the research of the students, there is no specific syllabus. Bachelor Seminar 2 is focused on preparing a good Bachelor Thesis defense at the end of their study that will be training on one presentation during the semester in front of classmates and one or more teachers. This partially presentation is necessary part of grading following the defence of Bachelor Thesis concept lecture at the end of semester.

Recommended literature:

Theoretical lectures on writing scientific text and making presentations will be available to students in the form of PDF files in the e-learning environment MS Teams. At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites that can improve their skills in this course. Other literature, specifically for writing student's Bachelor Thesis, is recommended by their supervisor.

Next optional relevant literature (available at internet, or ask the teacher):

Chandrasekhar, R. (2008): How to Write a Thesis: A Working Guide. Crawley: The University of Western Australia, Australia, 29 p.

de Koning, J., Stam, R.: How to write a bachelor thesis. Rural Sociology & Sociology of Development and Change, 14 p.

Tips and tricks for writing a bachelor or master thesis at the Institute for Markets and Strategy. WU Vienna, 12 p.

Kasnauskiene, G. (2016): Methodological Guidelines for Writing Bachelor's Theses. Business School at Vilnius University, 55 p.

Languages necessary to complete the course:

English

Notes:

no

Past grade distribution

Total number of evaluated students: 5

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD., doc. RNDr. Eva Záhorská, PhD., prof. RNDr. Ján Buček, CSc., Mgr. Samuel Rybár, PhD., doc. RNDr. Peter Ružička, PhD., prof. RNDr. Peter Fedor, DrSc.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-031/22	Bachelor Thesis

Educational activities:
Type of activities: seminar
Number of hours:
per week: 10 **per level/semester:** 140
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours:
per week: 10 hours seminar (10S) per level/semester:

Number of credits: 2

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final Bachelor thesis report (contributing 100%), which has a standardized grading system identified below:
A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
Bachelor thesis is an integral part of the Environmental Studies program to improve skills and abilities for independent research in final Bachelor thesis. The primary task is to prepare own Bachelor thesis which will be discussed and reviewed individually by each supervisor.

Class syllabus:
The course in individual and consultative design offers an opportunity to complete and submit Bachelor thesis as well as to present and discuss work in progress. Participants are expected to read and provide constructive feedback to the draft chapters. For this type of seminar, based on students' research, there is no specific syllabus.

Recommended literature:

Specifically, as recommended by supervisor

Languages necessary to complete the course:
English

Notes:
no

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
33,33	33,33	33,33	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD., prof. RNDr. Ján Buček, CSc., Mgr. Samuel Rybár, PhD., prof. RNDr. Peter Fedor, DrSc., doc. Mgr. Peter Uhlík, PhD., RNDr. Jana Ružičková, PhD., Mgr. Barbora Števove, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-054/22	Basic Ecotoxicology

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours lecture (2L) per level/semester: 13 weeks

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of written test. The test will consist of 30 points. To get the best evaluation, i.e. A there is necessary to obtain min. 27 points (90%), evaluation B min. 25 points (83 %), C min. 23 points (77%), D min. 20 points (68%) and E 18 points (60%). The credits do not obtain student, which will get less than 18 points (less than 60%).

Learning outcomes:
Undergraduates become familiar with toxic compounds effects to organisms living in natural ecosystems (bacteria, plants, invertebrates, and vertebrates including human). The lectures are subdivided to three parts: 1) fundamental ecotoxicology, 2) methodology implemented into the ecotoxicology, 3) ecotoxicological knowledge application and utilization. Lectures are also focused on toxic effects determination and evaluation in various nature components. The xenobiotics metabolisms, their sources, transport, effects, and transformation in living organisms are described and explain too.

Class syllabus:
1. Ecotoxicology as science and its connection with other scientific disciplines. Toxic compound/ living organism interaction. Chemical compounds in the environment - chemical stress, sources, and properties of chemical compounds. 2. General effects of toxic compounds. Compounds fate in the environment. 3. Biological systems in ecotoxicology. Toxicokinetics. 4. Toxicodynamics. Toxic compounds effects on molecular and biochemical level. 5. Effects on physiological level and on the level of individual organisms. 6. Toxic compounds effects on different organisms' levels - populations and communities. 7. Adverse effects determination in ecotoxicology - methods of evaluation, dose - response curves, mixtures' effects. 8. Experimental ecotoxicity determination - ecotoxicological biotests - laboratory and in situ evaluation. 9. Ecological relevancy – results interpretation. Ecotoxicological biotests experimental design. 10. Ecotoxicological biotests – producers, consuments, microbial tests 11. Ecotoxicological biotests for specific toxicity

mechanisms, alternative microbiotests („toxkits“). 12. Ecotoxicological effects evaluation in microcosmos, mesocosmos and fields experiments. 13. General classes of toxic compounds in the environment; stress because of human activities. International standards and guidelines.

Recommended literature:

Lectures will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites. vanLoon, G.W., Duffy, S.J. (2005): Environmental Chemistry. A Global Perspective. 2nd ed. Oxford University Press, 515 p.

Duffus, J.H., Worth, H.G.J. (2006): Fundamental Toxicology. Royal Society of Chemistry, 490 p. (available by remote access for students of Faculty at: ProQuest Ebook Central, https://ebookcentral.proquest.com/lib/uniba-ebooks/detail.action?docID=1185552, 20.1.2022).

Languages necessary to complete the course:

English

Notes:

Past grade distribution

Total number of evaluated students: 4

A	B	C	D	E	FX
25,0	50,0	0,0	25,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD., M. Phil. Ammara Nawaz

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KAn/N-XXXX-005/21	Bioarchaeology

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3., 5.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 930

A	B	C	D	E	FX
73,01	12,37	6,67	3,33	0,97	3,66

Lecturers: doc. RNDr. Radoslav Beňuš, PhD., Mgr. Silvia Bodoriková, PhD., prof. Mgr. Viktor Černý, Dr.

Last change: 07.11.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-051/22	Bioindication and Environmental Monitoring

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 2 hours lecture (2L) + 1 hour practice (1P) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam discussion (contributing 100%). The course has a standardized grading system which is identified below:
A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.C (73 – 80%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course covers the background and skills needed to understand and apply bioindication in environmental assesment. By the end of this course students should be able to:
- Articulate a general understanding of system theory in monitoring ecological change (based on sentinels, exploiters, detectors, bioaccumulators and testing organisms).
- Understand the basic scientific methods that are used to establish environmental standards, evaluate environmental impacts, and assess risk.
- Understand the skills, knowledge, experience and preparation needed to work effectively with modern statistical tools (incl. multidimensional statistical analyses, artificial neural network systems) in bioindication research

- To integrate concepts, skills and approaches from diverse ecological and environmental studies (including science, policy, planning) in applied environmental risk assesment.

Class syllabus:

This course will immerse students in the science and practice of monitoring ecological and environmental science (ecological stability vs. dynamics) and will help to understand the causes and consequences of changes in biodiversity (alpha – gamma level, from genes to communities) due to human activities to evaluate policies directed at preventing such changes. Bioindication (based on sentinels, exploiters, detectors, bioaccumulators and testing organisms) draws on diverse fields of knowledge and practice to address an applied mission (in conservation biology). Accordingly, this course will integrate science (holistic system theory) with concepts and methodical approaches (incl. multidimensional statistical analyses, artificial neural network systems) beyond narrowly defined environmental sciences. Although topics will be illustrated with case studies from around the world, special emphasis will be given to the wealth of examples in Central Europe. Both theoretical and applied approaches will be emphasized. Moreover, the course is structured as a series of research projects, in which students will collect data individually or in small groups (designing and conductiong the final project). Some class meetings will include brief presentations and discussions to introduce projects and their conceptual context. Students are encouraged to collaborate on data analysis (numerical simulations), but individual project reports are required.

Recommended literature:

Markert, B.A., Breure, A.M., Zechmeister, H.G., 2003: Bioindicators and biomonitors. Pergamon, 997 pp.
Conti, M.E., 2008: Biological Monitoring: Theory and Applications—Bioindicators and Biomarkers for Environmental Quality and Human Exposure Assessment. WIT Press, Boston, 228 pp.
Spellerberg, I. E., 2005: Monitoring ecological change. Cambridge University Press, 412 pp.

Languages necessary to complete the course:

English

Notes:

Past grade distribution

Total number of evaluated students: 4

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Peter Fedor, DrSc., Mgr. Jozef Balcerčík

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KAgCh/N-bBCH-034/22	Bioinorganic Chemistry

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 per level/semester: 28 / 14
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 4.

Educational level: I.

Prerequisites:

Recommended prerequisites:
1. Introduction to bioinorganic chemistry: Evolution of life on Earth from the point of view of inorganic chemistry.
2. General considerations, abundance of elements in Nature and living organisms, consequences of changes in chemical composition of Earth´s crust at earlier stages of evolution of life.
3. Biological functions of inorganic components in living systems. Coordination of metals to biological ligands.
4. Oxygen: uptake, transport, and storage.
5. Hemoproteins, peroxidases, catalases.
6. Iron: uptake, transport, and storage. Fe-S centers.
7. Biominerals.
8. Bioinorganic chemistry of copper. Bioinorganic chemistry of zinc. Toxicity of inorganic compounds.
9. Bioinorganic chemistry of molybdenum, vanadium, tungsten. Polyoxometalates.
10. Bioorganometallic chemistry. Medicinal chemistry and applications of coordination compounds
in bioinorganic chemistry: from cis-platin to anti-HIV drugs and beyond. Artificial metalloenzymes.
11. Nuclear medicine: Radioisotopes and their complexes in diagnostics and therapy.
12. Advanced bioinorganic chemistry: inorganic photosynthesis, protein crystallography, geobiotechnology and other examples.
The seminars will be focused on discussions to the chosen topic of the seminar thesis (finding scientific information using databases, analysis and extraction of data, writing the thesis).

Course requirements:

The seminars are evaluated during the term in the form of a seminar work. It is possible to get the maximum of 25 points for the thesis that will be aimed at the bioinorganic chemistry of a chosen element or group of elements. The teacher announces the topics for the seminar work at the beginning of the term. The students are required to submit the thesis prior to the end of teaching period of the term.
The final evaluation will be done by a written exam, for which the maximum of 75 points will be available.
Grade scale: A 92-100%, B 84-92 %, C 76-84 %, D 68-76 %, E 60-68 %, Fx less than 60 %.

Learning outcomes:
The aim of the course is to familiarize students with basic concepts of modern bioinorganic chemistry of the elements focused mostly on coordination chemistry of transition metal ions. The subjects of the course are as follows: the roles of inorganic components in biological systems, evolution of life on Earth from the point of view of inorganic chemistry, functions of transition metal ions such as compositional and supportive ones, catalytic functions, capture and storage of important (micro)elements, reactivity of small molecules, toxicity. The aim of the seminars is to familiarize students with writing of a longer scientific text in English focused on the chosen topic according to the students´ interests.

Class syllabus:
1. Introduction to bioinorganic chemistry: Evolution of life on Earth from the point of view of inorganic chemistry.
2. General considerations, abundance of elements in Nature and living organisms, consequences of changes in chemical composition of Earth´s crust at earlier stages of evolution of life.
3. Biological functions of inorganic components in living systems. Coordination of metals to biological ligands.
4. Oxygen: uptake, transport, and storage.
5. Hemoproteins, peroxidases, catalases.
6. Iron: uptake, transport, and storage. Fe-S centers.
7. Biominerals.
8. Bioinorganic chemistry of copper. Bioinorganic chemistry of zinc. Toxicity of inorganic compounds.
9. Bioinorganic chemistry of molybdenum, vanadium, tungsten. Polyoxometalates.
10. Bioorganometallic chemistry. Medicinal chemistry and applications of coordination compounds in bioinorganic chemistry: from cis-platin to anti-HIV drugs and beyond. Artificial metalloenzymes.
11. Nuclear medicine: Radioisotopes and their complexes in diagnostics and therapy.
12. Advanced bioinorganic chemistry: inorganic photosynthesis, protein crystallography, geobiotechnology and other examples.
The seminars will be focused on discussions to the chosen topic of the seminar thesis (finding scientific information using databases, analysis and extraction of data, writing the thesis).

Recommended literature:
Wolfgang Kaim, Brigitte Schwederski, Axel Klein: Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life: An Introduction and Guide. Wiesbaden, Wiley 2013.
Dieter Rehder: Bioinorganic Chemistry. Oxford, Oxford Univ. Press 2014. ISBN: 9780199655199
Nils Metzler-Nolte, Ulrich Schatzschneider: Bioinorganic Chemistry: A Practical Course. Berlin, De Gruyter 2009.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Lukáš Krivosudský, PhD.

Last change: 31.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEk/N-bENS-046/22	Biological Invasions

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours lecture (2L) per level/semester:13 weeks

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam (test) that has a standardized grading system identified below: A (100 - 92 %): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (91 – 84 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content. C (83 – 76 %): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (75 – 68 %): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (67 – 60%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course provides the students basic insight into one of the most significant global problems of ecology. Biological invasions occur in all types of both terrestrial and aquatic environments, with considerable impacts on native communities. Biological invasions generate considerable changes in the interactions between organisms, affecting all hierarchical levels from individuals and populations up to ecosystems. On the other hand, biological invasions represent great in situ laboratories that allow us to study and better understand central biological phenomena, such as adaptations of organisms, phenotypic plasticity and evolution.

Class syllabus:
• Introduction, general characteristic of biological invasions; terms and definitions.
• Sources and primary causes of biological invasions, impacts of biological invasions at the population, community and ecosystem levels.

• Biological invasions as vectors of parasites.
• Impacts of biological invasions on native plant and animal communities, invasive plants in Slovakia, Europe and in the world.
• Most significant biological invasions in Slovakia, examples of biological invasions in the world: Australia, New Zealand, Victoria Lake, Great Lakes.
• Typical attributes of invasive species and invaded ecosystems
• Biological invasions and evolution.
• Basic stages of biological invasions, theoretical concepts, the meltdown hypothesis, the enemy release hypothesis.
• Social, economic and health aspects of biological invasions, impacts on human societes.
• Risk assessment.
• Prevention and control.
• Legislation aimed at biological invasions.

Recommended literature:

Elton, C.S., 2000: The Ecology of Invasions by Animals and Plants. Publisher: University Of Chicago Press, 196 pp.
Simberloff, D. 2013: Invasive Species: What Everyone Needs to Know. Oxford University Press, 352 pp.
Lockwood J. L., Hoopes M.F. Marchetti, M.P., 2013: Invasion Ecology. Wiley-Blackwell, 466 pp.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
0,0	66,67	33,33	0,0	0,0	0,0

Lecturers: doc. RNDr. Eva Záhorská, PhD.

Last change: 29.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-058/22	Bioremediation

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours lecture (2L) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
Students will gain knowledge about the principles and basic processes and mechanisms applied in biological remediation, groups of organisms and specific organisms (plant and microbial species) used in commercial bioremediation techniques. Students will get acquainted with bioremediation of different types of substrates (soil, water, sludge, air, waste), materials and other substances (plastics, bioplastics, drugs, pharmaceuticals, pesticides, POPs, organic pollutants, heavy metals, potentially toxic elements). They will gain basic information about the possibilities of application of biological remediation methods in technological applications and about the most common bioremediation technologies used in practice.

Class syllabus:
Basic terminology in relation to bioremediation (bioavailability, speciation, toxicity, biomagnification). Mechanisms of bioremediation (biosorption, biotransformation - biooxidation, bioreduction, biodegradation, bioaccumulation). Organisms used in bioremediation, extremophiles in relation to bioremediation. Bioleaching and biomining. Biodegradation - period of adaptation, activation of non-toxic pollutant, cometabolism, biodegradation of selected substances - PCBs, polymers - plastics, bioplastics, petroleum substances, phthalates, glyphosate and other pesticides, drugs, POPs). Natural methods of treatment of polluted surface and wastewater - soil filters, natural and artificial wetlands, biological reservoirs, the importance of vegetation and microorganisms in the treatment process. Composting and vermicomposting. Revitalization of eutrophic waters. Biogas and anaerobic digestion. Mining water treatment. Selected bioremediation technologies

applied in practice - activated sludge, phytoremediation, bioventing, landfarming, biopiling, natural attenuation, biosparging, bioreactors, biofiltration.

Recommended literature:

Atlas, R. M., Philip, J. (2005): Bioremediation: Applied microbial solutions for real-world environmental cleanup. ASM Press, Washington D.C., 400 pp.
Kumar, E. P., Kumar, E. V. (2018): Textbook of Environmental Biotechnology, Woodhead Publishing India, New Delhi, 304 pp.
Singh, H. (2006): Mycoremediation. Fungal Bioremediation. Wiley, Hoboken, 592 pp. Suggested literature is available on request from the teacher.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 2

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Slavomír Čerňanský, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-024/22	Biostatistics

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 52 hours
per week: 2 hours lecture (2L) + 2 hours practice (2P) per level/semester: 13 weeks

Number of credits: 5

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the one partial test done during the semester (contributing 20%) and the final exam test (contributing 80%). The course has a standardized grading system which is identified below: A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem- solving ability, exhibiting a serious, responsible engagement with the course content. C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course.
D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course covers the background and skills needed to understand and apply modern statistical methods in environmental studies, biology, and other biology-related areas. By the end of this course students should be able to:
· Articulate a general understanding of basic statistical methods that are most often using in environmental and biological literature.
· Understand the principles of descriptive statistics and all the major numeric and graphic tools used for displaying environmental and biological data.
· Understand the principles of probability (incl. probability distributions), regression analysis, analysis of variance, understand the concept of drawing random samples from different populations, as well as the concept of hypothesis testing.

Understand the skills, knowledge, experience, and preparation needed to work effectively with the major modern statistical tools (incl. multidimensional statistical analyses) in environmental and biological research.

Class syllabus:
The lectures represent very intensive introductory course in statistical methods used in applied research. The purpose of the course is to familiarize students with the most common statistical methods used in environmental studies, biology, and other related areas. It should develop all the skills needed for effective data management, data manipulation and data analysis at a basic level. During the course, students should acquire all basic skills in the use of different statistical packages through classroom demonstrations and independent lab assignments. The course will emphasize data definition and verification, principles of statistical reasoning, graphical presentation, and careful interpretations of results. Topics such as descriptive statistics, graphical displays of data, introduction to probability, expectations and variance of random variables, confidence intervals and tests for means, differences of means, proportions, chi-square tests for categorical variables, regression, and multiple regression will be covered.

Recommended literature:
Lectures will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, examples, and interesting websites.
Field, A. (2009): Discovering Statistics Using SPSS (and sex and drugs and rock ‘n’ roll). London: SAGE Publications, 3rd edition, 821 pp. https://www.nhm.uio.no/english/research/infrastructure/past/ (free statistical software for analyses, graphs, etc., with manual) https://www.qtiplot.com/ (free limited statistical software for analyses, graphs, etc., with manual)
Other relevant and useful (voluntary) literature:
Arora, P.N., Malhan, P.K. (2010): Biostatistics. Mumbai: Himalaya Publishing House, India, 555 pp. (available by remote access from Comenius University)
Rosner, B. 2016: Fundamentals of Biostatistics. Boston: Cengage Learning, USA, 962 pp.
Motulsky, H. 2018: Intuitive Biostatistics: A Nonmathematical Guide to Statistical Thinking. New York: Oxford University Press, USA, 568 pp. (available at internet, 31.12.2021)
Kaps, M., Lamberson, W.R. (2004): Biostatistics for Animal Science: An Introductory Text. CABI Publishing, UK, 445 pp. (available at: https://www.academia.edu/8705674/Biostatistics_for_Animal_Science, 31.12.2021)

Languages necessary to complete the course:
English

Notes:
no

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
88,89	11,11	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KBo/N-bENS-011/22	Botany

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 4 / 1 **per level/semester:** 56 / 14
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Active participation at practical and seminars and a successful completion of the final exam. For the grade A, it is necessary to get at least 90% of the point total in the exam, for B at least 81%, for C at least 71%, for D at least 61%, for E at least 51% of of the point total in the exam.

Learning outcomes:
By completing the course, the students get a basic overview of plant evolution, morphology and systematics including their phylogenetic relationships, a basic knowledge of plant communities as well as a broader view of their significance in the evolution of life on Earth. In the seminars the students get a more detailed knowledge about a few chosen species from the Slovak flora, their determination and uses and in the practical part of the course they meet their real representatives in the laboratory or in the field.

Class syllabus:
The significance of plants and photosymthesis for the life on Earth, principles of plant taxonomy, cyanobacteria, primary and secondary endosymbiosis, life cycles of plants, algae and their systematics, systematics of fungi and their significance for the life on Earth, lichens, colonisation of dry land by plants, plant morphology, evolution and systematics of sporulating plants and seed plants, plant communities and domestication of plants.

Recommended literature:
Lee, R. E. 2018. Phycology. Cambridge University Press, 546 p.
Simpson, M. 2018. Plant Systematics, Third Edition. Academic Press, 774 p.
Watkinson, S. C., Boddy, L., Money, N. P. 2015: The Fungi, Third Edition. Academic Press, 466 p.

Languages necessary to complete the course:
English

Notes:

Past grade distribution Total number of evaluated students: 11					
A	B	C	D	E	FX
9,09	0,0	0,0	27,27	36,36	27,27
Lecturers: Ing. Mgr. Eva Zahradníková, PhD.					
Last change: 01.08.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF-FMFI.KAFZM/N-bENS-014/22	Climatology

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final written test.
The course has a standardized grading system which is identified below:
A (92 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate); B (84 – 91%): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content; C (76 – 83%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course; D (68 – 75%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material; E (60 – 67%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course offers basic information about general and regional climatology and meteorology. By the end of this course students should be able to understand the theory of the global climate system and the theory of formation and development of specific climatic patterns in the individual Earth's regions. Students should be able to account environmental problems relating to climate system and to solve some practical problems in contemporary climatology.

Class syllabus:
This course will focus on following topics: The climate system; Atmosphere of Earth; Meteorological stations; The Earth´s radiation budget; Greenhouse effect; Heat transfer from the surface; Temperature; The water cycle; Evaporation and sublimation; Air humidity; Condensation and deposition; Atmospheric precipitation; Winds and pressure; General circulation of the atmosphere; Middle-latitude cyclones, fronts, weather; Tropical cyclones; Climate classifications and regions; Local climates (the urban climate, the mountain climate, microclimates); Climates of

the past and present; Human interaction with climate; Modelling the climate; Climate change and the future – climate scenarios.

Recommended literature:

Robinson, P. J., Henderson-Sellers, A. 1999. Contemporary Climatology (Second Edition). Harlow: Pearson Education Limited, 317pp. ISBN 0 582 27631 4.
IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. In Press. (available at: www. ipcc.ch)
Ahrens, C.D. 1988. Meteorology Today. An Introduction to weather, climate, and the environment. West Publishing Company, 582 pp.
Rapp, D. 2014. Assessing Climate Change. Temperatures, Solar Radiation, and Heat Balance. Springer International Publishing Switzerland, 816 pp. ISBN 978-3-319-00454-9, ISBN 978-3-319-00455-6 (eBook).
Barry, R. G., Chorley, R. J. 2003. Atmosphere, Weather and Climate (Eight edition). London, New York: Routledge, 421pp. ISBN 0-415-27170-3 (hbk), 0-415-27171-1 (pbk).
Oliver, J.E.(ed): Encyclopedia of World Climatology. Dordrecht: Springer, 2008. 854 pp. ISBN 978-1-4020-3264-6.
The newest information from the INTERNET and journals.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 4

A	B	C	D	E	FX
50,0	50,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Marián Melo, PhD., doc. RNDr. Martin Gera, PhD.

Last change: 14.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-050/22	Conservation Biology

Educational activities:
Type of activities: seminar
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 3 hours seminar (3S) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Mandatory participation on seminars. Students are evaluated in the form of a verbal examination with answer(s) confirming adequate orientation in examined theme on excellent level with perfect study results (A: 100–90%), very good with stabile results above the average (B: 89–80%), good with average overview in subject area (C: 79 –73%), satisfactory with acceptable results (D: 72–66%) or sufficient with minimum acceptable study results (E: 65–60%). Evaluation requirements for successful course graduation are regulated by Study Order of Comenius University.

Learning outcomes:
The course originates in conservation biology. From the theoretical background it has developed into more synthetic dimensions within complex ecological systems. The lectures are focused on basic ecosozological problems of numerous ecological systems in accordance with their zonal and azonal classification from wetland forests in lowlands to mountainous or even alpine communities. Being concentrated on the area of Slovakia it deals with relevant regional problems of ecosozology corresponding with a wide diversity of biota, habitats as well as ecosystems as a consequence of their mutual interactions.

Class syllabus:
- Basic terminology in the sphere of the nature conservation (nature, environment, ecosystem, biosphere, technosphere, noosphere, ecosozology, physiotactics), conservation ethics
- International cooperation in the sphere of environmental problems (international organisations and conventions)
- Species protection of plants (reasons of the plants species extinction, Red Data Books, plants introduction, legislation in the plants species protection, international cooperation)
- Species protection of animals (reasons of the animal species extinction, diversity, its levels and importance, population characteristics, Red Data Books & Species Action Plans, animal introduction/invasion, legislation in the animal species protection, international cooperation)

- Landscape and territorial conservation (landscape, categories of the protected areas in Slovakia and European union, special types of protected areas, legislation in the sphere of the territorial protection, international cooperation in the territorial protection)
- Nature conservation in the urbanised areas.
- Species, landscape and ecosystem approaches solving conservation problems, conservation planning
- Case studies (on regional and/or global level) concerning to threatened taxa extinction/ conservation/management.

Recommended literature:
Groom, M.J., Meffe G.K., Carroll C.R. et all., 2006: Principles of Conservation Biology. Sinauer Ass., Sunderland., 793 pp.
Conservation Biology (Journal, Wiley, http://onlinelibrary.wiley.com)
Biological Conservation (Journal, Elsevier, http://www.journals.elsevier.com/biological-conservation/)

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
88,89	11,11	0,0	0,0	0,0	0,0

Lecturers: RNDr. Mirko Bohuš, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEGD/N-bENS-017/22	Demography and Population Studies

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of a written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
Course provides essential information of the study of population under various social, historical, cultural, or economic circumstances. Students are able to recognize and analyze core demographical processes, such as fertility, nuptiality, mortality, as well as demographical structures – especially age and ageing of population. Introductory lectures include basic information on world population development, and demographic projection of population. Practical exercises include discussion on current demographical events and means of calculating various demographic data.

Class syllabus:
1) Introduction, definitions and core approaches in demography, demographic data 2) Fertility and abortions 3) Mortality and health demography 4) Nuptiality, family behavior 5) Typology of family forms and households 6) Variability of demographic regimes in Europe 7) Migration – global and local scales 8) Age and gender composition of population, aging of the population 9) Cultural aspects (ethnicity, and religion) in demography 10) Historical aspects of the study of population 11) Methods of visualisation of demographic data 12) Population projections and forecasts

Recommended literature:
Livi-Bacci, M. 2003. A Concise History of World Population. Oxford: Blackwell.
Newbold, K. B. 2013. Population Geography: tools and issues. Lanham: Rowman & Littlefield.
Poston, D. L. ; Bouvier, L. F. 2010. Population and Society. An Introduction to Demography. Cambridge: Cambridge University Press.
Johnson, T. M., Grim. B. J. 2013. The World's Religions in Figures : An Introduction to International Religious Demography. Chicester: Wiley-Blackwell.
Lutz, W. et al. (2018). Demographic and human capital scenarios for the 21st century: assessment for 201 countries. https://ec.europa.eu/jrc/sites/default/files/lutz_et_al_2018_demographic_and_human_capital.pdf

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 7

A	B	C	D	E	FX
0,0	28,57	42,86	28,57	0,0	0,0

Lecturers: prof. RNDr. Branislav Bleha, PhD., Mgr. Juraj Majo, PhD.

Last change: 09.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-132/22	ESP 1/English for Specific Purposes

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 204

A	B	C	D	E	FX
67,65	15,69	8,82	0,98	2,45	4,41

Lecturers: PhDr. Jarmila Cihová, PhD., PhDr. Štefánia Dugovičová, PhD., Mgr. Lenka Jeleňová, Mgr. Barbara Kordíková, PhD., PaedDr. Stanislav Kováč, PhD., PhDr. Oľga Pažitková, CSc., RNDr. Tatiana Slováková, PhD., Mgr. Simona Tomášková, PhD.

Last change: 26.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-133/22	ESP 2/English for Specific Purposes

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 151

A	B	C	D	E	FX
84,11	13,91	1,32	0,66	0,0	0,0

Lecturers: PhDr. Jarmila Cihová, PhD., PhDr. Štefánia Dugovičová, PhD., Mgr. Lenka Jeleňová, Mgr. Barbara Kordíková, PhD., PaedDr. Stanislav Kováč, PhD., PhDr. Oľga Pažitková, CSc., RNDr. Tatiana Slováková, PhD., Mgr. Simona Tomášková, PhD.

Last change: 26.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-134/22	ESP 3/English for Specific Purposes

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 173

A	B	C	D	E	FX
76,88	15,03	4,05	0,0	1,16	2,89

Lecturers: PhDr. Jarmila Cihová, PhD., PhDr. Štefánia Dugovičová, PhD., Mgr. Lenka Jeleňová, Mgr. Barbara Kordíková, PhD., PaedDr. Stanislav Kováč, PhD., PhDr. Oľga Pažitková, CSc., RNDr. Tatiana Slováková, PhD.

Last change: 26.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-135/22	ESP 4/English for Specific Purposes

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 129

A	B	C	D	E	FX
93,8	5,43	0,78	0,0	0,0	0,0

Lecturers: PhDr. Jarmila Cihová, PhD., PhDr. Štefánia Dugovičová, PhD., Mgr. Lenka Jeleňová, Mgr. Barbara Kordíková, PhD., PaedDr. Stanislav Kováč, PhD., PhDr. Oľga Pažitková, CSc., RNDr. Tatiana Slováková, PhD.

Last change: 26.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEk/N-bENS-047/22	Ecology

Educational activities:
Type of activities: lecture
Number of hours:
per week: 4 **per level/semester:** 56
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 52 hours
per week: 4 hours lecture (4L) per level/semester: 13 weeks

Number of credits: 5

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on partial evaluation of quality of presentations presented by students at the seminars, as well as their overall activity, and the final exam that has a standardized grading system identified below: A (100 - 92 %): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (91 - 84 %): Good, competent work; laudable performance with evidence of some original thinking, good problem solving ability, exhibiting a serious, responsible engagement with the course content. C (83 – 76 %): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (75 – 68 %): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (67 – 60 %): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%) Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This is a basic course of Ecology, focused on the principles and interactions between biotic and abiotic components of ecosystems, i.e. between organisms and their environment, as well as between organisms themselves. Special emphasis is given to ecological factors, adaptations of organisms, phenotypic plasticity, attributes of populations and communities, interactions within and among populations and communities, structure and function of ecosystems, energy flows and biogeochemical cycles, structure, dynamics and attributes of biomes of the Earth, etc

Class syllabus:
· Introduction to Ecology, ecological disciplines, relationships to other fields of science, environmental sciences, ecology and economy. Global environmental problems. Evolution of ecosystems 1.

· Basic physical principles in the Universe and on the Earth, conditions for the existence of life. Evolution of ecosystems 2.
· Ecological factors, reaction norm, tolerance, adaptations, two basic sources of variation (genetic and epigenetic), epigenetic mechanisms, phenotypic plasticity. Limiting factors, ecological space, ecological niche. The Biome of Polar regions.
· Main ecological factors in terrestrial and aquatic environments. The Biome of Tundra.
· Population, abundance, distribution, age structure, sex ratio, unitary ad modular organisms, dispersal, migrations, biological invasions. The Biome of Taiga (boreal forests).
· Population dynamics, life cycles, natality, survival rate, mortality. Growth of populations, J and S- models, r- and K- strategies. Mountain ecosystems.
· Life-history strategies, alternative life-histories. Grassland ecosystems.
· Abundance dynamics: oscilations, fluctuations and cycles. Interspecific interactions. Bushy ecosystems.
· Biocoenosis, individualistic and supraorganismal principles, quantitative and tructural attributes of communities, ecotones. The Biome of temperate forests.
· Vertical and horizontal structure of communities, diversity and equitability. Primary and secondary biocoenoses. Succession, climax. The Biome of tropical rainforest.
· Ecosystem, structure, function. The processes of synthesis and decomposition in ecosystem. Trophic structure, interactions, chains, pyramids. The Biome of deserts and semi-deserts.
· Energy flow in ecosystems, sources and forms of energy. Primary production, effectivity of assimilation, primary brutto and netto production, productivity of ecosystems. Secondary production, consumption, respiration. Freshwater ecosystems.
· Biogeochemical cycles, types, structure and sources. Cycles of H2O, O, C, N, S, P. Evolution of biosphere, the Gaia hypothesis. Oceans ans marine ecosystems.

Recommended literature:

Begon, M., Townsend, C. R., Harper J. L. 2006: Ecology: From Individuals to Ecosystems. Wiley-Blackwell; 4 edition, 752 pp.
Jørgensen, S.E. 2009: Ecosystem Ecology. Academic Press; 1 edition, 521 pp.
Stiling, P. 2011: Ecology: Global Insights and Investigations. McGraw-Hill Science/Engineering/ Math; 1 edition, 656 pp

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 7

A	B	C	D	E	FX
42,86	28,57	0,0	0,0	0,0	28,57

Lecturers: doc. RNDr. Eva Záhorská, PhD.

Last change: 28.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEGD/N-bENS-033/22	Economic and Social Geography

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of a final written test. The course has a standardized grading system which is as follows: A: 100 - 92 %, B: 91- 84 %; C: 83 - 76 %, D: 75 - 68 %, E: 67 - 60 % FX: 0 - 59 %.

Learning outcomes:
The course is focused on basic issues of economic and social geography. It develops students' knowledge on principal issues of economic geography, with a special focus on global processes and their impact on economic activities. The course will introduce basic concepts and approaches in economic geography and stimulate students to understand global economic inequalities as well as relationship between economic activities and the environment. The course also explains relationship between social inequalities and space in different geographical scale. Students adopt the knowledge how inequalities are constructed within society and how they relate with space (from microspace of household, neighborhood, city, region etc.). Within social geography will subject focused on class, gender and race/ethnicity, espacially in the context of transitive society and postsocialism. The aim of the course is not only present and sumarize new information for students from the field of Economic and Social geography, but also to stimulate verbal communication and critical thinking of students.

Class syllabus:
Introduction to economic geography. Essential principles and theories in economic geography, factors of production, role of market, core-periphery theories of economic development, effects of agglomeration, etc.
Globalising economy, globalisation in production and services, role of ICT. Transportation networks, mobility turn, virtual mobility.
Formation of global cities, mega-cities. Knowledge economies, transition economies, geography of emerging markets. Case studies: upgrading industries as driving forces in central European transition economies.
Class and space. Geography of poverty, socio-spatial inequalities in different geographical scale. Social inequalities in the city - ghetto, segregation, gated communities in the city.

Gender in space. Feminisation of poverty, gender inequalities in Slovakia in the context of different historical and regional context;
Race, ethnicity and space. Patterns of interaction majority/minority within Slovak society, segregation and poverty of Roma population.
Spaces of postsocialism. Socialism, transformation, neoliberalism and its impact on society, regional specifics and strategies in household economy and social reproduction.

Recommended literature:

Gill Valentine. 2001. Social Geographies: Space and Society. Pearson Education Ltd, England.
Hoyle, B., Knowles, R. (eds.) 2001. Modern Transport Geography. John Wiley&Sons, Chichester.
Iammarino, S., Rodríguez-Pose, A., Storper, M. (2019). Regional inequality in Europe: evidence, theory and policy implications. Journal of economic geography, 19(2), 273-298.
Knox, P. (2009): Urban Social Geography. Longman Group Limited. Essex, England. Pain, R. et al. 2001. Introducing social geographies. Arnold publishers. New York.
Pavlínek, P. (2018). Global Production Networks, Foreign Direct Investment, and Supplier Linkages in the Integrated Peripheries of the Automotive Industry, Economic Geography, 94:2, 141-165.
Stenning, A., Smith, A., Rochovská, A., Swiatek, D. (2010): Domesticating neo-liberalism. Spaces of economic practice and social reproduction in post-socialist cities. Wiley-Blackwell.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Alena Rochovská, PhD., doc. Mgr. Marcel Horňák, PhD.

Last change: 28.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-037/22	Environmental Assessment

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 2 hours lecture (2L) + 1 hour seminar (1S) per level/semester: 13 week

Number of credits: 4

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam discussion (contributing 100%). The course has a standardized grading system which is identified below:
A (91 – 100 %): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate). B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content. C (73 – 80 %): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72 %): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65 %): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60 %): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course covers the background and skills needed to understand and apply basic methodological approaches within the environmental decision-making. By the end of this course students should be able to:
• understand basic approaches of environmental assessment as impact predictions, evaluation of impact importance, envirnmental friendly alternatives and their comparisions,
• understand basic approaches to Natura 2000 quality evaluation within the environmental decison making processes,
• understand basic approaches to health risk assessment,
• knowning of skills, experience and preparation needed to work effectively with the emphasis of predicted methods.

Although approaches will be illustrated with case studies from around the world. Both theoretical and applied approaches will be emphasized. Moreover, seminars will be structured as a series of individual works and works in small groups. Some class meetings will include brief presentations and discussions to introduce own work of students.

Class syllabus:

1. European Union Framework for Environmental Assessment,
2. Types of Environmental Assessment,
3. Slovak Framework for Environmental Assessment,
4. Environmental Impact – definitions, types, evaluation methods, examples,
5. Mitigation Measures – definitions, types, examples,
6. Risk Assessment – types, examples,
7. Health Risk Assessment,
8. Environmental Assessment within the Natura 2000 Frameworks,
9. Evaluation of the Biotopes Quality – methods, examples,
10. Evaluation of Documentation Quality

Recommended literature:

Morris, P., Therivel, R., 2009: Methods of Environmental Impact Assessment, UCL Press, Abingdon, 560 p., WOOD C., 2003: Environmental Impact Assessment – A Comparative Review, second edition. Pearson Education Ltd. Edinburgh Gate. England. 405 p.; Methodological guidance on the provisions of Article 6(3) and 6 (4) of the Habitat Directive 92/43/EEC, november 2001, DG Environment EC.

Languages necessary to complete the course:

English

Notes:

Past grade distribution

Total number of evaluated students: 5

A	B	C	D	E	FX
80,0	20,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Katarína Pavličková, CSc., RNDr. Hubert Žarnovičan, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-028/22	Environmental Chemistry

Educational activities:
Type of activities: lecture
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 3 hours lecture (3L) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
Graduates of the "Environmental Chemistry" will understand the characteristics and attributes of the components of the environment including humans regarding current antropogenic pollution. Graduates receive theoretical skills of atmospheric, water pollution as well as now-a-days the most discussed global warming topics. History and development of environmental chemistry, specifically in USA and Europe will be discussed, too. Undergraduates become familiar with fundamentals of aquatic chemistry, basis of water pollution and water treatment and solid waste disposal, respectively. Good theoretical education and attention will be also paid to sustainable development and natural resources like water, zeolite deposits, biomass and other renewable resources, especially regarding the inland potential.

Class syllabus:
Environmental Pollution
Atmospheric (Tropospheric) Pollution
Global Warming
Acid Rain
Smog, The Ozone Hole
Water Pollution
International Standards for Drinking Water
Water Treatment Processes (Carbonization, Nitrification, Denitrification, P - Luxary Uptake)
Soil Pollution
Waste Dumping

Strategies to Control Environmental Damage
Green Chemistry in Day-2-Day Life, History of Development of Green Chemistry
Zeolites and their Environmental Applications

Recommended literature:

S.E.Manahan: Environmental Chemistry, Lewis Publishers, 2004
https://ebookcentral.proquest.com/lib/uniba-ebooks/home.action
Chmielewská, E.: History and presence of water sanitation, First edition, 49 pages, published online. Textbook of Faculty of Natural Sciences, Comenius University Bratislava 2022, ISBN 978-80-223-5371-7. https://fns.uniba.sk/fileadmin/prif/envi/kee/zamestnanci/chmielewska/water_sanitation.pdf ,
https://alis.uniba.sk:8443/lib/item?id=chamo:731240

Languages necessary to complete the course:

English

Notes:

no

Past grade distribution

Total number of evaluated students: 3

A	B	C	D	E	FX
66,67	0,0	33,33	0,0	0,0	0,0

Lecturers: prof. Ing. Eva Chmielewská, CSc.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KGCh/N-bENS-025/22	Environmental Geochemistry

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final written exam. The course has the following grading system:
A (85 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (75 – 84 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content. C (70 – 74%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (65 – 69%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 64%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
The subject explains the most significant environmental problems caused by anthropogenic activities that affect the environment, including human beings. Students successfully graduating the course will understand: 1) causes of generation of selected problems concerning the contamination of the environment; 2) their consequences on individual compartments of the environment and 3) controls on their reduction and mitigation of their environmental impacts. The subject includes an exercise, which is focused on the application of physico–chemical theories to the quantification of some bio–geochemical processes occurring in the environment and on the statistical and graphical evaluation of the measured data.

Class syllabus:
Introduction to environmental geochemistry – definition, content, history, significance for human society, environmental contamination, types of pollutants, case–studies of environmental contamination from world and Slovakia. Global cycle of carbon and its role in climate – carbon exchange among the earth reservoirs, impact of humans on carbon cycle, carbon cycle is changing, enhanced greenhouse effect and its origin, radiative forcing, feedbacks, temperature variability through the Earth geological history, climatic change, regulation of greenhouse gases.

Ozone layer over the Earth – ozone as a protector of life and its distribution in the earth atmosphere, ozone formation and break–down in the stratosphere, catalytic destruction of ozone in the stratosphere and compounds damaging the stratospheric ozone layer, ozone hole over Antarctic and Arctic, consequences for the environment, control measures for the protection of the ozone layer. Pollution of the troposphere I: Photochemical smog and classical smog – how are they formed?, sources of VOC, NOx and SOx emissions, harmful effects of smog, air pollution monitoring in Slovakia. Pollution of the troposphere II: Acid deposition and acid rain – global biogeochemical cycles of sulphur and nitrogen, precursors of acid deposition and their transformation to inorganic acids, pH of rain, impacts of acid deposition on the environment and humans, regulatory measures of acid deposition. Cultural eutrophication – causes of eutrophication, indicators of eutrophication, classification of waters according to the trophic status, algae and cyanobacteria blooms, effects of eutrophication on aquatic ecosystems, controls on eutrophication. Radioactivity in the environment – history of the radioactivity, unstable isotopes of chemical elements (radionuclides), types of radioactive transformations, units of radioactive radiation, sources of radionuclides in the environment, relationship dose–response, natural radioactivity and radon risk. Synthetic organic compounds I: Pesticides – definition and their classification according to the different criteria, examples of pesticides, effects of pesticide residues on the environment, main processes affecting the environmental fate of pesticides (volatilization, sorption, abiotic and biological transformation, bioaccumulation and biomagnification). Synthetic organic compounds II: Persistent organic pollutants – Stockholm convention, sources in the environment and global distribution, adverse effects on the environment (endocrine disruptors and other effects), their physical, chemical and biological properties. Potentially toxic elements – definition, sources in the environment, esenciality, harmful effects on humans, geochemical processes in soils and waters and their significance for transfer to food–chain. Remediation methods of environmental matrices (soils and waters) – remediation methods „in situ“ and „ex situ“ (biological methods #natural and controlled attenuation, phytoremediation, bioextraction, bioreactors, biosparging and bioslurping, composting, biostabilization and bioimmobilization#; physico–chemical methods #chemical oxidation, electrochemical remediation, leaching, solidification and stabilization, sealing barriers and incapsulation, thermal methods, adsorption, ion exchange, precipitation, coagulation, etc.).

Recommended literature:

Misra, K.C., 2012. Introduction to geochemistry. A John Wiley & Sons, Ltd., Chichester, UK, 438 p.

Ryan, P.C., 2014. Environmental and low temperature geochemistry. John Wiley & Sons, Ltd., The Atrium, Southern Gate, Chichester.

Nordstrom, D.K., Alpers, C.N., 1999. Geochemistry of acid mine waters. In: The Environmental Geochemistry of Mineral Deposits, Plumlee, G.S., Logsdon, M.J. (Eds.), Chapter 6, Rev. Econ. Geol., Vol. 6A, pp. 133–160.

Nordstrom, D.K., 2011. Mine waters: acidic to circumneutral. Elements, Vol. 7, 393–398.

Pepper, I.L., Gerba, C.P., Brusseau, M.L., 2006. Environmental and pollution science. 2nd edition. Elsevier, Amsterdam, 532 p.

Languages necessary to complete the course:

English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Edgar Hiller, PhD.

Last change: 14.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KMPLG/N-bENS-042/22	Environmental Mineralogy

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours lecture (2L) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 4.

Educational level: I.

Prerequisites:

Recommended prerequisites:
no prerequisities are necessary.

Course requirements:
Grading Policy (Assessment/Evaluation): Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
Environmental Mineralogy is a modern discipline with numerous applications for Natural Sciences: it allows to investigate and model the hazards, risks and environmental impact of natural and synthetic mineral species. The course aims to provide knowledge on the main aspects of environmental mineralogy, considering either the theoretical basis and the methodological approach. It deals with issues of great relevance for professionals and technicians of Public Administrations and private companies in charge of monitoring and safeguarding the territory as well as for the development of scientific researches in the environmental fields. The attendance in the training activities will allow the student to acquire the necessary skills of Environmental Mineralogy necessary to face studies in the field of the scientific researches in Natural Sciences.

Class syllabus:
Introduction: The nature and scope of environmental mineralogy. Analytical, experimental and computational methods in environmental mineralogy. Mineral-microbe interactions. Anthropogenic influences on mineral interactions. Minerals in contaminated environments.
Minerals and waste management. Minerals and soil development. Atmospheric aerosol particles: a mineralogical introduction. Minerals and human health. Mineralogy and cultural heritage conservation.

Recommended literature:

Vaughan D. J., Wogelius R. A., 2012: Environmental Mineralogy II. Mineralogical Society of Great Britain and Ireland.
Cotter-Howells J. D., Campbell L. S., Valsami-Jones E., Batchelder M., 2000: Environmental Mineralogy: Microbial Interactions, Anthropogenic Influences, Contaminated Land and Waste Management. Mineralogical Society of Great Britain and Ireland.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 7

A	B	C	D	E	FX
0,0	0,0	28,57	57,14	14,29	0,0

Lecturers: doc. RNDr. Peter Ružička, PhD.

Last change: 14.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-052/22	Environmental Planning and Management

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 2 hours lecture (2L) + 1 hours seminar (1S) per level/semester: 13 week

Number of credits: 3

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final written exam. The enclosure will consist from 42 points. To get A a student is to receive 39-42 points; B: 38-35 points; C: 34-31 points; D: 30-28 points; E:27-25 points. Credits does not obtain a student which will get less than 25 (60%) points.

Learning outcomes:
The aim of the course is to give an overview about areas of implementation of environmental planning. Topics are: sustainable development and its implementation in decision-making processes in EU and Slovakia; policies, plans and programmes in the area of the environment in European Union and in Slovakia; strategic environmental assessment; landscape-ecological planning; environmental impact assessment, environmental management systems, public participation. Students will have also the chance to express their own views on chosen themes.
After successfully completing the course, graduates will be able to:
- Analyse the complex and dynamic interactions between humans and their environment;
- Understand the role of governmental policy (at municipal, provincial, national, regional and global levels) in order to achieve sustainable development;
- Apply professional techniques and procedures for environmental planning;
Apply principles of environmental policymaking, environmental legislation and institutional arrangements.

Class syllabus:
1. The role of environmental planning and management within the planning of territorial development on national, regional and local level.
2. The overview of the development and trends in EU environmental planning.
3. The overview of the development and trends in Slovak environmental planning.
4. The overview of actual institutional arrangement of environmental care in EU and Slovakia.
5. Basic environmental strategies, politics, conceptions, plans and programs development.

6. The explanation of the term “sustainable development”, Agenda 21. Implementation of the Agenda 21 on national, regional and local level in Slovakia.
7. Landscape planning – methodical process of the landscape-ecological planning (LANDEP). Landscape planning and its´ relationships to territorial planning and regional development.
8. Environmental Impact Assessment (EIA) – a tool of sustainable development. The explanation of basic terms.
9. Implementation of EIA in Slovakia. The procedure of Environmental Impact Assessment (EIA) under Slovak legislation.
10. Strategic Environmental Assessment (SEA) – a tool of sustainable development.
11. Environmental Management Systems (EMS), EMAS II, audit, environmental labeling.
12. Public participation in environmental decision-making.
13. Quality of life, sustainable towns, suburnabization

Recommended literature:
Kraft Michael: Environmental Policy: New Directions for the Twenty-First Century, ed. SAGE, 2012; Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment amended by Directive 52/2014; Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention); Aarhus Convention Implementation Guide (second edition), April 2013; Diesendorf, M. : Sustainable Energy solutions for climate change, Routledge, London, 2014; Agenda 2021, UNC;1992; Agenda 2030 for sustainable development, UNC, 2015

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Katarína Pavličková, CSc., RNDr. Božena Šerá, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KBo/N-bENS-010/22	Excursion in Botany and Zoology

Educational activities:
Type of activities: practice
Number of hours:
per week: **per level/semester:** 1t
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam focused on identification of representative plant and animal species (contributing 100%). The course has a standardized grading system, which is identified below: For the grade A, there is necessary to identify at least 91% of plant and animal species, for B at least 81%, for C at least 73%, for D at least 66%, for E at least 60% of representative species. Fx: fewer than 60% of successfully identified species.

Learning outcomes:
Course objectives of this field excursion are to: 1) Provide students with diversity of plants and animals living in different kinds of habitats, 2) Provide methods of field sampling, identification, documentation and preservation of sampled specimens.

Class syllabus:
Excursion will be focused on methods of sampling, identification and preservation of animals and plants. Special emphasis will be given to relationships between habitats, ecosystems and distribution of particular species. Students will visit different types of ecosystems (forests, wetlands, urban ecosystems, and others) and they will identify plants and animals in field conditions, according to field guides.

Recommended literature:
Arnold, M., Ovenden, D. 2002: Reptiles and Amphibians of Britain and Europe. Collins Publisher.
Chinery, M. 2012: Insects of Britain and western Europe. A & C Black Publishers Ltd.
Jäger, E.J., Müller, F., Ritz, C.M., Welk, E., Wesche, K. 2013: Rothmaler – Exkursionsflora von Deutschland, Band 3. Springer Spektrum Akademischer Verlag.
Mitchel-Jones, A.J., Moutou, F., Zima, J., Haffner, P., Aulagnier, S. 2009: Mammals of Europe, North Africa and the Middle East. A & C Black Publishers Ltd.
Svensson, L., Grant, P.J. 1999: Bird guide. The complete field guide to the birds of Britain and Europe. HarperCollins Publisher.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 1

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Ing. Mgr. Eva Zahradníková, PhD., RNDr. Michal Hrabovský, PhD., doc. Mgr. Peter Mikulíček, PhD., Mgr. Dávid Selnekovič, PhD.

Last change: 13.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KGP/N-bENS-020/22	Excursion in Geology

Educational activities:
Type of activities: practice
Number of hours:
per week: **per level/semester:** 1t
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Active participation in field practice. Presentation of Field Notebook with documentation of the individual localities. Passing a written review. A (91 – 100%): Outstanding, excellent work; B (81 – 90 %): Good, competent work; C (73 – 80): Adequate, reasonably satisfactory work; D (66 – 72%): Less acceptable work; E (60 – 65%): Minimally acceptable work;. Fx (under 60%): Inadequate work;

Learning outcomes:
Practical demonstration of the most important exogene and endogene geological processes in Slovakia and their documentation. Fundamentals of field research, study and documentation of outcrops, practical identification of rocks, minerals and fossils, their investigation and sampling of data for laboratory processing.

Class syllabus:
Within the field practice, students are familiarized with the geological manifestations of endogene and exogene geological processes. With basic geological phenomenon forms, rocks, minerals and fossils. Specifically, to meet with a genetically and age different rocks and form their expression, conservation and origin as well as their fossil content and their different resistance to weathering. Presented are the attributes of geological and derived geological maps and their interpretation. At selected locations will have students the opportunity to gain practical experience with the documentation and collection of data necessary for the interpretation of the creation, operation and effects of endogene and exogene geological factors.

Recommended literature:
Plummer Ch.C., McGeary D. & Carlson D.H. 2004: Physical Geology. McGraw Hill Higher Education, Boston, 540 pp.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 14

A	B	C	D	E	FX
85,71	14,29	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Jozef Hók, CSc., Mgr. Samuel Rybár, PhD.

Last change: 29.04.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-136/22	Fachdeutsch in Naturwissenschaften 1

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Karin Rózsová Wolfová

Last change: 23.07.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-137/22	Fachdeutsch in Naturwissenschaften 2

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Karin Rózsová Wolfová

Last change: 23.07.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KAgCh/N-bENS-002/22	General and Inorganic Chemistry

Educational activities:
Type of activities: practicals / lecture / seminar
Number of hours:
per week: 2 / 4 / 2 **per level/semester:** 28 / 56 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Educational activities:
Type of activities: practicals / lecture / seminar
Number of hours:
per week: 2 / 4 / 2 per level/semester: 28 / 56 / 28
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Laboratory exercises:
The evaluation will consist of two parts: reports from laboratory experiments, 4 points each (20 points maximum). Only those students will be admitted to final examination who achieve at least 50 % of the points from laboratory work evaluation.
Seminar:
There will be two running written test examinations (maximum 30 points each) during the semester course.
Lectures:
Final exam will consist of a 30-point test and oral examination for 20 points. Credits will not be assigned to a student, who will not earn at least 50% from laboratory work, and to student, who will not earn at least 50 % from final exam.
For grade A, it is necessary to obtain at least 92 %, for grade B at least 84 %, for grade C at least 76 %, for grade D at least 68 % and for grade E at least 60 % of all points.

Learning outcomes:
This course covers the background and skills needed to understand the basic principles of chemistry. By the end of this course students should be:
• Able to understand the electronic structure of atoms, and acquires the basic knowledge on chemical bonding.
• Able to understand the molecular properties and the bulk properties of the matter. Basic principles in thermodynamics, chemical kinetics, chemical equilibrium, acid-base theories, and diverse types of chemical reactions.

• Able to understand basic properties of inorganic compounds of elements along all the groups of the periodic table.
• Skilled in basic nomenclature of inorganic compounds. Inherent to the course is training in solutions of chemical equations.
• Able to perform the basic laboratory experiments in the course of solving simple tasks related to the learned topic. Students will gain experience in basic laboratory techniques, synthesis of inorganic compounds and coordination compounds.
• Seminar covers the topics of lectures which will be practiced on various examples, exercises and tasks.

Class syllabus:

Lectures:

Composition of the matter; chemical reactions, formulae and equations; fundamental empirical laws; atomic structure; molecular structure – models of chemical bonding; Lewis theory; hybridization and valence bond theory; molecular orbital theory; bond polarity; electronegativity; oxidation number; ionic bond; hydrogen-bonding; van der Waals interactions. Principles of thermodynamics: Equation of state; state functions; internal energy; enthalpy; entropy; laws of thermodynamics; thermochemical laws; spontaneous processes; states of the matter; phase – phase transitions; disperse systems – mixtures, solutions; Raoult law – colligative properties. Solid state – structures. The principles of chemical kinetics: reaction rate and order; mechanism; catalysis; chemical equilibrium.

Electrolytic dissociation; acid-base theories; neutralization; pH; hydrolysis. Precipitation reactions; the solubility product. Photochemical and radical reactions. Oxidation and reduction.

Elements and their basic compounds: hydrogen; group 1-2 and group 13-18 elements; d-block elements; coordination bonding; basic stereochemistry; magnetic properties; organometallic compounds, basic biological functions of inorganic components.

Laboratory exercises:

Safety in a chemical laboratory. Basic laboratory glassware and operations. Laboratory experiments focused on: density, solubility, preparing solutions, crystallization, affecting chemical reactions, hydrolysis, oxidation and reduction reactions, synthesis of compounds and metals by redox reactions.

Seminar:

Nomenclature of inorganic compounds. Chemical reactions, formulae and equations. Structural formulae. Atomic structure; molecular structure. Models of chemical bonding.

Hybridization. VSEPR theory. Molecular orbital theory. Bond polarity; electronegativity; oxidation number; ionic bond; hydrogen-bonding; van der Waals interactions. Enthalpy; entropy; laws of thermodynamics; thermochemical laws. Phase – phase transitions. Solid state – structures. The principles of chemical kinetics: reaction rate and order; mechanism; catalysis. Chemical equilibrium. Electrolytic dissociation; Acid-base theories. pH – simple calculations. Hydrolysis. Precipitation reactions. Oxidation and reduction.

Discussion on elements and their basic compounds.

Recommended literature:

Duward Shriver, Peter Atkins: Inorganic Chemistry, 5th edition, 2010, Oxford University Press
Stephen Lower: Chem1 virtual textbook a reference text for General Chemistry
http://www.chem1.com/acad/webtext/virtualtextbook.html

Languages necessary to complete the course:

English

Notes:

Past grade distribution
Total number of evaluated students: 15

A	B	C	D	E	FX
6,67	6,67	6,67	20,0	20,0	40,0

Lecturers: Mgr. Peter Hrobárik, PhD., RNDr. Lukáš Krivosudský, PhD., Dr. James Richard Asher, PhD., Guru Karthikeyan Thirunavukkarasu, PhD.

Last change: 31.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KGe/N-XXXX-004/21	Genetics for everyone

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4., 6.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 729

A	B	C	D	E	FX
93,0	1,37	0,0	0,0	0,0	5,62

Lecturers: RNDr. Regina Sepšiová, PhD., doc. Mgr. Miroslava Slaninová, Dr., Mgr. Filip Červenák, PhD., doc. RNDr. Andrea Ševčovičová, PhD., doc. RNDr. Eliška Gálová, PhD., Mgr. Stanislav Kyzek, PhD.

Last change: 15.05.2021

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KGCh/N-bENS-050/22	Geochemistry of Natural Waters

Educational activities:
Type of activities: seminar
Number of hours:
per week: 3 **per level/semester:** 42
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam discussion (contributing 75%) and written evaluation of a practical task (25%). The course has a standardized grading system which is identified below:
A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course covers the background and skills needed to understand basic chemical, physico-chemical and geochemical processes influencincg the chemiccal composition of natural waters. By the end of this course students should be able to:
• To identify basic genetic types of water and understand what processes are forming their composition..
• Understand processes of rock – water and gas phase – water interactions.
• To identify origin of main antropogenic, as well as natural chemical components in natural water
• Understand the fate and transport of pollutants in natural waters
• Apply basic methods of water analyses evaluation

Class syllabus:
Introduction to the geochemistry of natural waters; Water as a chemical compound, its physical-chemical properties; The hydrological cycle; Chemical reactions in natural waters; Equilibria of chemical reactions; Acido-basic systems; Dissolution of minerals, organic compounds and gases; Oxidation-reduction reactions; Principles of oxidation and reduction; Redox diagrams;

Sequention of oxidation-reduction reactions in natural waters; Sorption and ion-exchange; Physical sorption, surface charge; Chemical sorption, inner sphere complexes; Models of sorption processes; Sorption by organic matter, hydrophobic bonds; Ion-exchange processes; Types of sorbents and ion-exchangers; Soil cover and chemical composition of natural waters; Formation and role of CO2
Overview of geochemical processes occuring within the soil cover influencing the chemical composition of the natural waters; Dissolution of carbonate minerals; The role of CO2
Closed system dissolution of carbonate minerals; Open system dissolution of carbonate minerals; Dissolution od alumosilicate minerals, mixed environments; Incongruent dissolution of alumosilicate minerals; Mixed environment, inverse models of mineral dissolution; Classification of litogenic meteoric waters of the Wester Carpathians;
Geochemistry of surface waters; Geochemistry of terrestrial surface waters
Marine geochemistry; Influence of evaporation on the chemical composition of natural waters; Systematic geochemistry of natural waters; Main components of natural waters – sources and chemical transformations; Organic compounds in natural waters – antropogenic and natural; Isotope geochemistry of natural waters; Stable isotopes of H, O, C, S and N; Radioactive isotopes in natural waters; Transport of pollutants in groundwater; Advection - dispersion transport and its components; Influence of chemical reactions on transport of pollutants in the groundwater; Field research in geochemistry of natural waters ; Water sampling methods; Sample conservation; Field measurments.

Recommended literature:

Appelo, C. A. J., Postma, D. (2005): Geochemistry, Groundwater and Pollution. CRC Press, 668 ss.
Stumm, W., Morgan, J. J., (1996): Aquatic Chemistry: Chemical Equilibria and Rates in Natural Waters, J. Wiley and Sons, 1005 pp.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
0,0	0,0	66,67	33,33	0,0	0,0

Lecturers: doc. Mgr. Tomáš Lánczos, PhD.

Last change: 02.05.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KFGGI/N-bENS-040/22	Geoecology

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam (contributing 100%). The course has a standardized grading system which is identified below:
A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content. C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
The course covers the background and skills needed to understand and apply geoecological approach in landscape assessment.
Graduates will become familiar with the theoretical base of Geoecology and will obtain information of basic and applied methods in geoecological research.
Due to independent work students will apply their theoretical knowledge of the procedures applied in the geoecological research.
The student will be able to implement basic methods of geoecological research and synthesis of the components of physical geographic sphere in a comprehensive assessment of the landscape.

Class syllabus:
• Introduction to the Study of Geoecology. Object and subject of Geography and Geoecology. Landscape sphere of the Earth, its borders. Landscape. Origin and evolution of Geoecology, its position in the system of sciences.
• Introduction to the theory of geosystems. Landscape (geographical) sphere as a system. Physical geographical complex – natural geosystem.

• Geographic dimensions I.
• Geographic dimensions II. Paradynamic complexes and catenas.
• Changes in natural terrestrial complexes in the area – patterns of spatial differentiation. Zonality.
• Changes in natural terrestrial complexes at the time – processes, development.
• Geoecological research methods. Classification methods. Basics of the physical-geographical regionalization.
• Geoecological mapping.
• Modelling in Geoecology. Geographic information. Use of GIS.
• Methodology of landscape applied research. Methodology of landscape synthesis.
11. Methodology of evaluation of landscape potential.

Recommended literature:
Farina, A.: Principles and Methods in Landscape Ecology. Dordrecht: Springer, 2006. 412 pp.
Huggett, R. J.: Geoecology. London: Routledge, 1995. 320 pp.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
0,0	66,67	0,0	33,33	0,0	0,0

Lecturers: doc. RNDr. Igor Matečný, PhD.

Last change: 02.05.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KRGRR/N-bENS-005/22	Geography

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final written test. Completion of semestral essey is obligatory before progressing to final exam.
The course has a standardized grading system which is identified below:
A (92 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate); B (84 – 91%): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content; C (76 – 83%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course; D (68 – 75%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material; E (60 – 67%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
After completion of the course, students are able to:
Identify the object and subject of geography, position of geography in the system of sciences and its breakdown, the development of geography in different historical periods, basic sources of geographic information.
Mastering basic geographical concepts and knowledge in the areas of: planetary geography, cartography, positioning on Earth, time, geology, geomorphology, hydrospere, atmosphere, pedosphere, biosphere, population, settlements, economy, regions and countries of the Earth.

Class syllabus:
Metageographical basics of the object of Geography (lithosphere, pedosphere, troposphere, hydrosphere, biosphere, relief, human geography), binding domain, place of geography in the system of sciences
• Development of geographic thinking
• Basic knowledge / concepts, theories / - Planetary geography.

• Basic knowledge / concepts, theories / - Cartography
• Basic knowledge / concepts, theories / - Geomorphology
• Basic knowledge / concepts, theories / - Hydrology, climatology
• Basic knowledge / concepts, theories / - Pedogeography, biogeography
• Basic knowledge / concepts, theories / - Population and settlements
• Basic knowledge / concepts, theories / - Economy
• Basic knowledge / concepts, theories / - Regions and countries of the Earth

Recommended literature:

JAMES, E. P.: All possible worlds. The Bobbs-Meril co. New York, 1972.
ALLABY, M. et all 2008. The Encyclopedia of Earth, Weldon Owen Pty Ltd, Sydney2008

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 14

A	B	C	D	E	FX
50,0	14,29	14,29	0,0	7,14	14,29

Lecturers: prof. RNDr. Ladislav Tolmáči, PhD., Mgr. Gabriel Zubriczký, PhD.

Last change: 11.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KRGRR/N-XXXX-001/21	Geography of the World in the 21.st century

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4., 6.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 56

A	B	C	D	E	FX
78,57	7,14	5,36	1,79	1,79	5,36

Lecturers: Mgr. Rastislav Cákoci, PhD., RNDr. Katarína Danielová, PhD., doc. RNDr. Daniel Gurňák, PhD., doc. RNDr. František Križan, PhD., doc. RNDr. Eva Rajčáková, CSc., Mgr. Michala Sládeková Madajová, PhD., RNDr. Angelika Švecová, PhD., Mgr. Martin Šveda, PhD., prof. RNDr. Ladislav Tolmáči, PhD., RNDr. Mgr. Anna Tolmáči, PhD., Mgr. Gabriel Zubriczký, PhD.

Last change: 15.05.2021

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KIHG/N-bENS-044/22	Geohazard Mitigation

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam discussion (contributing 100%). The course has a standardized grading system which is identified below:
In the course of semester is continous compouding in the form of test (contributing 5%, exercises (contributing 30%), final test (contributing 65%).
A (92 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (84 – 91 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.C (76 – 83%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (68 – 75%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 67%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
The aim of the course is to provide a concentrated knowledge on socio-economic significance of geohazards. The most frequent geohazards and their consequences. Factors, identification and prediction of geohazards, remedial measures. Landslide hazard maps.

Class syllabus:
Socio-economic significance of geohazards, terminology. The most frequent geohazards and their classification. Recent tectonics and earthquakes, earthquake forecasting, risk mitigation. Volcanic activity, prediction of volcanic activity, risk mitigation. Slope movements and the causes of their generation. Landslide prevention and remedial measures. River and wind erosion, floods, river and erosion control. Piping, liquefaction, dissolution of rocks, prevention and remediation. Coastal processes (abrasion) and coastal protection. Volume changes in expansive soils, collapse in loess, remediation and corrective measures.. Ground subsidence and roof collapse of cavities, remedial

measures. Evaluation and interpretation of geohazards in various hazard maps, GIS tools in hazard mapping.

Recommended literature:
F.G. Bell, 2007: Basic Environmental and Engineering Geology (selected chapters) Whitles Publishing Limited.
T. R. West, A. Shakoor, 2018: Geology applied to engineering. 2nd edition. (selected chapters) Waveland Press, Inc., Long Grove, Illinois, 576 p.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
33,33	0,0	33,33	33,33	0,0	0,0

Lecturers: doc. RNDr. Renáta Adamcová, PhD., Mgr. Rudolf Tornyai, PhD.

Last change: 27.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KFGGI/N-bENS-051/22	Geoinformatics and GIS

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
4 homeworks during the term, 1 practical exam and 1 test in the exam time.
Evaluation in %: A – 100 to 93, B – 92 to 85, C – 84 to 77, D – 76 to 69, E – 68 to 60. Fx – under 60.

Learning outcomes:
The aim of the course is to introduce students into issues of Geographic Information Systems (GIS). Students become familiar with the basic concepts of GIS and they'll obtain also the practical skills in collecting, processing, analyzing and publishing of geographic data. Excersises and homeworks are implemented using free and open source software.

Class syllabus:
1. GIS in the system of landscape management.
2. Collecting and preprocessing of GIS data.
3. Integration of data in GIS database.
4. Analytical methods in GIS.
5. Distribution of geographic information in GIS.
6. Raster data model in GIS.
7. GIS analyses with raster data.
8. Vector data model in GIS.
9. Implementation levels of vector data model in GIS.
10. Cartographic aspects of GIS.
11. GIS and Global Navigation Satellite Systems.
12. GEOweb for interoperability of geographic information on the internet.
13. GIS and tools for distribution and intergrated processing of geographic data.

Recommended literature:
The NCGIA Core Curriculum in GIScience. Available at: <http://www.ncgia.ucsb.edu/giscc/>
DE SMITH, M. LONGLEY, P., GOODCHILD, M.: Geospatial Analysis – A comprehensive guide [online]. 4th Edition. 2007. Available at: <http://www.spatialanalysisonline.com/HTML/index.html>
FU, P., SUN, J. Web GIS: Principles and Applications. ESRI Press. Redlands, CA, 2010.

CHANG, K. Introduction to Geographic Information Systems. 7th Edition. McGraw Hill, 2013.
WISE, S. GIS Basics. Taylor and Francis. London, 2002.
MIČIETOVÁ, E., KOŽUCH, M.: Specialized Information Technologies in Natural Science research: Geoinformation technologies. Elita, Bratislava, 2008.
QGIS User Guide [online]. Available at: <http://www.qgis.org/en/docs/user_manual/index.html>
QGIS Training Manual [online]. Available at: <http://www.qgis.org/en/docs/training_manual/index.html>

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 8

A	B	C	D	E	FX
75,0	0,0	12,5	0,0	0,0	12,5

Lecturers: doc. RNDr. Eva Mičietová, CSc., Mgr. Filip Moravčík

Last change: 28.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KGP/N-bENS-003/22	Geology 1

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam discussion (contributing 100%). The course has a standardized grading system which is identified below:
A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content. C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
Essential knowledge of Earth as a planet, geospheres, crust, lithosphere. Energy and mass transpost in geological processes, minerals, rocks and processes of their formation. Magmatism, volcanism, sedimentation and metamorphism. Time and historical context in geology. Exogenous processes - weathering, soil mass transpostation on slopes.

Class syllabus:
Introduction to Physical Geology. Earth in Space. The Earths Interior. Energy of geological processes. Chemical and mineralogical composition of the earth crust. Magmatism. Volcanism and extrusive rocks. Sedimentation – origin of sediments. Metamorphism. Time and Geology. Weathering, soils and morphology. Landscapes.

Recommended literature:
Plummer Ch.C., McGeary D. & Carlson D.H. 2004: Physical Geology. McGraw Hill Higher Education, Boston, 540 pp.

Languages necessary to complete the course:

English

Notes:

Past grade distribution
Total number of evaluated students: 12

A	B	C	D	E	FX
16,67	33,33	8,33	16,67	25,0	0,0

Lecturers: Mgr. Samuel Rybár, PhD., doc. RNDr. Jozef Hók, CSc.

Last change: 29.04.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KGP/N-bENS-007/22	Geology 2

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam discussion (contributing 100%). The course has a standardized grading system which is identified below:
A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content. C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
Exogene processes - geological activity of water and wind. Rock deformation and deformation structures. Earthquakes and tectonics of lithospheric plates.

Class syllabus:
Precipitation and morphology. Ground water. Karst Geology. Rivers. Lakes. Waves, Beaches and Coasts. Glaciers and glaciation. Deserts and wind action. Geological structures. Earthquakes. Plate tectonics. Orogenesis and Mountains belts.

Recommended literature:
Plummer Ch.C., McGeary D. & Carlson D.H. 2004: Physical Geology. McGraw Hill Higher Education, Boston, 540 pp.

Languages necessary to complete the course:
English

Notes:

Past grade distribution Total number of evaluated students: 6					
A	B	C	D	E	FX
66,67	16,67	0,0	0,0	16,67	0,0
Lecturers: Mgr. Samuel Rybár, PhD., doc. RNDr. Jozef Hók, CSc.					
Last change: 29.04.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KMPLG/N-XXXX-007/21	Geology in Nutshell

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4., 6.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 28

A	B	C	D	E	FX
82,14	0,0	0,0	0,0	14,29	3,57

Lecturers: prof. RNDr. Roman Aubrecht, Dr., doc. Mgr. Natália Hlavatá Hudáčková, PhD., doc. RNDr. Jozef Hók, CSc., prof. RNDr. Michal Kováč, DrSc., RNDr. Alexander Lačný, PhD., doc. RNDr. Jana Fridrichová, PhD., RNDr. Ondrej Nemec, PhD.

Last change: 20.01.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KPl/N-XXXX-009/21	Global Environmental Issues

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4., 6.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 297

A	B	C	D	E	FX
94,95	0,0	0,67	0,0	0,0	4,38

Lecturers: doc. RNDr. Katarína Pavličková, CSc., prof. RNDr. Pavel Dlapa, PhD., RNDr. Martina Zvaríková, PhD., doc. RNDr. Ľubomír Jurkovič, PhD.

Last change: 09.11.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-003/22	Global Environmental Problems

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 2 hours lecture (2L) + 1 hour seminar (1S) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the project presentation (necessary non-evaluated part to be admitted to the final exam) and final exam test (contributing 100%). The course has a standardized grading system which is identified below: A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content. C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course covers the background and skills needed to understand current global environmental issues. By the end of this course students should be able to:
· understand how global warming is in progress in present and evaluate the natural and human impact to increasing climate change according to new observations of science
· know main sources of soil, water, and air contamination
· deal with contaminated sites and know how apply the suitable remediation technique understand principal issues on monitoring and control of environmental contamination

Class syllabus:
The main topics of this course include:

• general global environmental issues
• non-renewable and renewable energy sources
• global warming and climate change (general circulation of the atmosphere, three cell model, ocean currents, termohaline circulation, greenhouse effect, methane gas, melting of arctic and antarctic ice, etc.)
• environmental contamination with organic and inorganic compounds (persistent organic pollutants, PAH, PCB, pesticides, radionuclides, heavy metals etc.)
• soil and land degradation including desertification, soil erosion, mining activities
• solutions of environmental contamination, suitable remediation and bioremediation technologies applied to contaminated sites
• loss of biodiversity
• deforestation and reforestation
• sustainable crop production and increasing human population (including GMO)
• renewable energy, biofuels, environmental impact of coal combustion
• eutrophication, habitat destruction, invasive species, soda lake, intensive farming
• urbanization
• waste production
• contamination and health, environmental health (air quality, asthma, radiation, Sick Building Syndrome, cancer etc.)

Recommended literature:

Lectures will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites.
Morgan, R.P.C., 2005: Soil Erosion and Conservation. Blackwell Publishing, 316 pp.
Rengel, Z., 2003: Handbook of Soil Acidity. Marcel Dekker, 512 pp.
Hawksworth, D.L., Bull., 2007: Biodiversity and Conservation in Europe, Springer, 439 pp.
Mousdale, D.M., 2008: Biofuels. Biotechnology, Chemistry and Sustainable Development. CRC Press, 404 pp. (available at internet)
Pepper, I.L., Gerba, C.P., Brusseau, M.L., 2006: Environmental and Pollution Science, Elsevier, 532 pp. (available due IP address of Faculty at https://ebookcentral.proquest.com/lib/uniba-ebooks/detail.action?docID=297063&query=Environmental+and+Pollution+Science)
Harris, F., 2012: Global Environmental Issues. Wiley & Sons.
Houghton, J., 2004: Global Warming. The Complete Briefing, Cambridge University Press, 351 pp. (available at: http://www.gci.org.uk/Documents/Global-Warming-the-Complete-Briefing.pdf)
Fletcher, C., 2013: Climate Change: What the Science Tells Us, Wiley & Sons

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 17

A	B	C	D	E	FX
47,06	29,41	5,88	0,0	5,88	11,76

Lecturers: Mgr. Slavomír Čerňanský, PhD., doc. RNDr. Marianna Molnárová, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bXXX-001/19	Green University 1

Educational activities:
Type of activities: practicals / seminar
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 2.., 3., 4.., 5., 6..

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 71

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Jaroslav Bella, doc. Mgr. Miroslava Slaninová, Dr., RNDr. Hubert Žarnovičan, PhD., Mgr. Martin Šebesta, PhD.

Last change: 11.02.2020

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bXXX-002/19	Green University 2

Educational activities:
Type of activities: practicals / seminar
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 2.., 3., 4.., 5., 6..

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 21

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Jaroslav Bella, doc. Mgr. Miroslava Slaninová, Dr., Mgr. Martin Šebesta, PhD., RNDr. Hubert Žarnovičan, PhD.

Last change: 11.02.2020

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KIHG/N-bENS-018/22	Hydrogeology

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
.

Number of credits: 4

Recommended semester: 3.

Educational level: I.

Prerequisites:

Recommended prerequisites:
.

Course requirements:
Grades will be based on the excercises (30 points) and the final test (70 points). The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 65 – 60%. Achieving less than 60% of one or both parts of the evaluation means a summary evaluation of Fx and the student will not be credited.
Scale of assessment (preliminary/final): .

Learning outcomes:
By graduating here, the student will gain a basic knowledge of the water cycle in nature, the forms of water occurrence in the different components of the hydrological cycle, how they are measured and evaluated. Acquire basic competence in the calculation, interpretation and graphical evaluation of the basic components of the hydrological cycle. The student will also acquire basic knowledge of the frequency, movement, quantities and chemical composition of groundwater, hydrogeological structures and sources, surface water and groundwater interactions, basic hydrogeological calculations and work with a hydrogeological map.

Class syllabus:
Introduction to hydrogeology, classification of water in the rock environment. Properties of the rock environment in contact with groundwater, groundwater flow. Hydrogeological structures, their classifications, outflow areas of groundwater, groundwater bodies. Determination of spring discharge. Discharge measurement of the water stream. Estimation of groundwater runoff. Chemical composition of groundwater, processes of its formation. Physical and chemical properties of groundwater. Basic information about mineral water. Methods of hydrogeological research (hydrological, statistical evaluation of parameters, geophysical methods, remote sensing methods, modelling). Hydrogeological and hydrogeochemical maps. Regional characterization of hydrogeological units based on type of environment, permeability type, groundwater amounts,

hydrogeochemical characterization, groundwater quality, sources of pollution) Although topics will be illustrated with case studies and calculations special emphasis will be given to the wealth of examples in Central Europe. Both theoretical and applied approaches will be emphasized.

Recommended literature:

Nonner, J.C., 2002: Introduction to hydrogeology. IHE Delft Note Serie. Balkema Publishers, Lisse, 248 p. Domenico, P.A., Schwarz, F.W., 1998: Physical and Chemical Hydrogeology. 2nd ed. John Wiley&Sons, New York. 506 p. Drever, J.I., 1997: The Geochemistry of Natural Waters.

Languages necessary to complete the course:

English

Notes:

.

Past grade distribution

Total number of evaluated students: 8

A	B	C	D	E	FX
12,5	75,0	12,5	0,0	0,0	0,0

Lecturers: doc. RNDr. Dávid Krčmář, PhD., RNDr. Ivana Ondrejková, PhD., RNDr. Kamila Hodasová, PhD.

Last change: 27.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KAlCh/N-bBCH-036/22	Introduction to Bioanalysis

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Number of contact hours:
per week: 1 /1 per level/semester: 13 / 13
on-site learning, on-line learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Seminar – a maximum of 40 points, for elaboration and presentation of a seminar paper. Lecture – a maximum of 60 points, for the final test. The final grade will consist of evaluation of seminar and the final test from lecture, for a maximum of 100 points. For grade A it is necessary to obtain at least 92 points, for grade B at least 84 points, for grade C at least 76 points, for grade D at least 68 points and for grade E at least 60 points. The evaluation is the same for on-line learning.

Learning outcomes:
Students will get acquainted with the current state of bioanalytical chemistry and with sampling techniques and methods of processing biological samples. The course is also suitable for students of biochemistry or biology who are interested in analytical techniques aimed at investigation of wide range of biomolecules, e.g., hormones, amino acids, peptides, proteins, nucleic acids, carbohydrates, etc. The topic of this course supports interdisciplinary character of bioanalysis through education in electrophoresis, liquid chromatography, biosensors, bioassays, DNA and proteins sequencing, combination of PCR and analytical methods. The content of the objective is complementary to the knowledge that is usually not involved in common textbooks on analytical chemistry. Students will co-solve the problems of case studies in the field of biochemistry, biotechnology, and the other natural sciences.

Class syllabus:
• Definition of field of interest, problems, strategies, procedures, methods, applications and the state-of-the-art of bioanalysis in the science system of analytical chemistry.
• Biologically distinct molecules and the need for their determination in biological samples.
• Specific properties and characteristics of biological samples (microbiological, biotechnological, plant, animal, food), sample stability and source of errors, sampling rules, storage, processing, and pretreatment before measurement.
• Clinical samples – blood, serum, plasma, urine, saliva, cerebrospinal fluid, tissues.

• Diagnostic and clinical analysis. Use of biochemical and biological principles for the purpose of chemical analysis of selected substances (e. g., measurement of pH of body fluids, cytometry, cell sorting).
• Specific requirements for bioanalysis instrumentation.
• Solid phase extraction in bioanalysis, biochromatography, denaturing chromatography, electroseparation methods. Specific requirements due to the nature of the biological samples and the limitations of their analysis.
• Bioanalysis in genomics. Relationship between bioseparation methods and PCR.
• Bioanalysis in proteomics. Protein sequencing. Problems of validation in bioanalysis of biomacromolecules.
• Chemical analysis of metabolites - metabolomics, metabolonomics. Criteria for data processing and results interpretation in bioanalysis. Biological samples variability.
• Trends in development of analytical instrumentation and equipment. Biocompatibility of materials used in instrumentation.

Recommended literature:

A. Manz, N. Pamme, D. Iossifidi, Bioanalytical Chemistry, Imperial College Press, 2004.
G. Evans (ed.) A Handbook of Bioanalysis and Drug Metabolism, CRC Press 2004.
K. Mitchelson, New High Throughput Technologies for DNA Sequencing and Genomics, Elsevier, 2007.
R. F. Venn, Principles and Practice of Bioanalysis, CRC Press, 2003.
Scientific journals - Analytical and Bioanalytical Chemistry, Journal of Bioanalysis and Biomedicine, Bioseparation, Journal Chromatography B, Journal of Separation Science, Electrophoresis, etc.

Languages necessary to complete the course:
English

Notes:
The course is provided only in the winter semester. If less than 3 students enroll, the course will be provided in individual form.

Past grade distribution
Total number of evaluated students: 4

A	B	C	D	E	FX
25,0	75,0	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Marian Masár, PhD., Ing. Roman Szücs, PhD., Mgr. Jasna Hradski, PhD.

Last change: 28.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJCh/N-bBCH-041/21	Introduction to Radiobiology

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4., 6.

Educational level: I.

Prerequisites:

Course requirements:
The applicant successful graduation of the course is to obtain minimally 50 % of points of the final examination: seminar work (50%) + examination (50%). For the grade A (excellent) it is necessary to obtain at least 92–100%, to obtain the grade B (very good) at least 84–91%, for the grade C (good) at least 76–83%, for the grade D (satisfactory) at least 68– 75% and for E rating (adequate) at least 60–67%. A rating below 60% is rated as FX (insufficient).

Learning outcomes:
Course covers the physical and chemical basics of radiobiology, cell- organism interaction with radiation and radiation damage repair, the applications of ionizing and non-ionizing radiation in medicine. Within the frame of the course is the visit of workplace focused on radiobiology. Students who enroll in this course can benefit from the following: physical basics of radiobiology, mechanisms of effects of ionizing radiation on living organisms and cell repair mechanisms, radiation-caused diseases and therapy, radiation syndromes, protection of the organisms against radiation damage, the usage of ionizing and non-ionizing radiation in medicine, the effects of solar UV radiation and protection.

Class syllabus:
1. The subject and historical overview of radiobiology, radiation sensitivity of biological species. 2. Physical basics of radiobiology, quantities and terminology. 3. DNA- and cell damage produced by ionizing radiation, biological effect vs. dose curves. 4. Modification of cell damage by radiation, radioprotectors and radiation sensitivity. 5. Repair of cell damage induced by radiation. 6. Molecular radiation biology and biochemistry, the effect of ionizing radiation on metabolism. 7. Radiation syndroms (sickness) and their modulation: bone marrow syndrom, gastrointestinal syndrom, central nervous system syndrom. 8. Radiation sicknesses: acute and chronic cases, their classification, development, diagnosis, therapy. 9. Radiation induced tissue damage, radiation effect on embryo and fetus. 10. Radiation application and incorporated radionuclides in medicíne. Radiotherapy - external and internal. 11. Theoretical conception of mechanisms involved in ionizing radiation systemic effects. 12. After-effects of ionizing radiation: somatic and genetic, limit doses, ALARA, radiation-induced cancer, risk factors, dose response.

Recommended literature:

•Podgorsak E.B.: Radiation Oncology Physics: A Handbook for Teachers and Students. Vienna, IAEA Publication, 2005. ISBN: 92-0-107304-6. •Pöschl, M., Nollet, L.: Radionuclide Concentrations in Food and the Environment. Boca Raton - London - New York : CRC Press, Taylor & Francis Group, 2007. ISBN 0-8493-3594-9. •Bailey D.L., Humm J.L., Todd-Pokropek A., van Aswegen A.: Radiation Medicine Physics: A Handbook for Teachers and Students. Vienna, IAEA Publication, 2014. ISBN: 978-92-0-143810-2.

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 4

A	B	C	D	E	FX
75,0	0,0	0,0	0,0	0,0	25,0

Lecturers: Ing. Darina Tóthová, CSc.

Last change: 30.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJCh/N-bBCH-040/21	Introduction to Radiochemistry

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3., 5.

Educational level: I.

Prerequisites:

Course requirements:
The applicant successful graduation of the course is to obtain minimally 60 % of points of the final examination: seminar work (50%) + examination (50%). For the grade A (excellent) it is necessary to obtain at least 92–100%, to obtain the grade B (very good) at least 84–91%, for the grade C (good) at least 76–83%, for the grade D (satisfactory) at least 68– 75% and for E rating (adequate) at least 60–67%. A rating below 60% is rated as FX (insufficient).

Learning outcomes:
Radiochemistry or nuclear chemistry is the study of radiation from an atomic and molecular perspective, including elemental transformation and reaction effects, as well as physical, health and medical properties. Based on this students how to use radioactivity as a tool for chemically related research and related fields (for example material science, biochemistry, and medicine). The course teaches students fundamental radiochemical methods for qualitative and quantitative analysis of radionuclides in various media. The principles for the detection of radioactive radiation and material will be thoroughly covered.

Class syllabus:
1.-2. Nuclear chemistry fundamentals: nuclear decay, nuclear properties, and kinetics of nuclear decay. 3. Interaction with matter. 4.-5. Production of radionuclides. 6. Nuclear reactions and nuclear fission. 7. Nuclear Analytical Techniques. 8. Detection of radiation and measurement techniques. 9. Radiation therapy. 10. Radiotracers. 11. Radiochemical separation techniques. 12.-13. Nuclear energy – nuclear power plants, nuclear fuel cycle, nuclear wastes.

Recommended literature:
•Walter D. Loveland, David J. Morrissey, Glenn T. Seaborg (2006). Modern Nuclear Chemistry. John Wiley & Sons, Inc. ISBN:9780471115328. •József Kónya, Noémi M. Nagy (2012). Nuclear and Radiochemistry. ELSEVIER. ISBN 978-0-12-391430-9. DOI https://doi.org/10.1016/C2011-0-06943-0 •Gregory Choppin (2013) Radiochemistry and Nuclear Chemistry. Elsevier Books. EAN: 9780124058972.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 6

A	B	C	D	E	FX
83,33	16,67	0,0	0,0	0,0	0,0

Lecturers: Ing. Helena Švajdlenková, PhD.

Last change: 13.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJCh/N-bENS-053/21	Introduction to Radioecology

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2., 4., 6.

Educational level: I.

Prerequisites:

Course requirements:
The applicant successful graduation of the course is to obtain minimally 60 % of points of the final examination: seminar work (50%) + examination (50%). For the grade A (excellent) it is necessary to obtain at least 92–100%, to obtain the grade B (very good) at least 84–91%, for the grade C (good) at least 76–83%, for the grade D (satisfactory) at least 68– 75% and for E rating (adequate) at least 60–67%. A rating below 60% is rated as FX (insufficient).

Learning outcomes:
The student will acquire the knowledge about the origin and sources of ecologically important radionuclides, which are found in various segments of the environment. Radionuclides migration between individual segments, as well as their elimination. A general view about population radiation exposure the from primordial radionuclides to the nuclear facilities operation and events at facilities. The output is also a basic overview of the minimum legal literacy in the field of peaceful use of nuclear energy.

Class syllabus:
1. Radiation. 2. Human and environment. 3.-4. Radionuclides and their chemistry 5. Dosimetry. 6.7. Distribution of radioactive substances in environment. 8. Effects of radiation and population dosage. 9. Nuclear industry and environment. 10. Processing, disposal, and storage of radioactive waste from an environmental point of view. 11. Nuclear facilities accidents. 12. Radiation accidents, nuclear bombing, and nuclear weapons tests. 13. Radiation protection.

Recommended literature:
•Sparks, L. D., Environmental Soil Chemistry, ACADEMIC PRESS, Delaware, 2003, ISBN: 0-12-656446-9. •Holm, E. Radioecology. LUND UNIVERSITY, Lund, Sweden, 1994, ISBN: 978-981-4534-28-4. • IAEA., The Atom, Environment and Sustainable Development •IAEA., Country nuclear power profiles-Slovakia. •IAEA [online publications] https://www.iaea.org/publications.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Eva Viglašová, PhD.

Last change: 13.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-053/22	Invasive Botany in the Landscape

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours lecture (2L) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Evaluation requirements for successful course graduation are based on the final exam (contributing 60 %) and the report of seminar project (contributing 40 %). Evaluation requirements for successful course graduation:
A (91–100 %): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyse, synthesize and evaluate.
B (81–90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.
C (73–80 %): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyse, satisfies the minimum requirements of the course.
D (66–72 %): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyse or synthesize course material.
E (60–65 %): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course.
Fx (under 60 %): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
Invasive botany is a relatively young and rapidly developing field of landscape ecology that works with non-native species in the context of their real (or potential) invasive behaviour. Students will gain an overview of the most important alien, invasive, and non-native botanical taxa, which are considered problematic (prospectively invasive) in the landscape. Students should be able to define basic terminology and to know about knowledge and current problematics concerning on alien plants in Europe at the end of this course. Students will understand the principle of plant life strategies, learn about the ways of spreading in the landscape and learn about basic landscape

management. To consolidate the acquired knowledge and skills, the course will include practical exercises and one field trip.

Class syllabus:

The course includes the following topics:
1. Introduction to the terminology of invasions, the specifics of invasive botany, the principle of Black and Gray lists
2. European and world research, Black and Gray lists, databases
3. Strategies of invasive species with respect to botanical taxa
4. Significant invasive and non-native annual species in the landscape context
5. Significant invasive and non-native perennial herbaceous species in a landscape context
6. Significant invasive and non-native tree species in the landscape context
7. Specifics of urban space in terms of botanical invasions
8. Linear elements in the landscape: roads, railways, rivers
9. Management in the landscape: theory and practice
10. Presentation of students
11. Field excursions
12. Exam, feedback, course evaluation

Recommended literature:

· BLACKBURN, T. M., ESSL, F., EVANS, T., HULME, P. E., JESCHKE, J. M., KÜHN, I., KUMSCHICK, S., MARKOVÁ, Z., MRUGALA, A., NENTWIG, W., PERGL, J., PYŠEK, P., RABITSCH, W., RICCIARDI, A., RICHARDSON, D. M., SENDEK, A., VILÁ, M., WILSON, J. R. U., WINTER, M., GENOVESI, P., BACHER, S. (2014): A unified classification of alien species based on the magnitude of their environmental impacts. PLoS Biology, 12: e1001850.
· BLACKBURN, T. M., PYŠEK, P., BACHER, S., CARLTON, J. T., DUNCAN, R. P., JAROŠÍK, V., WILSON, J. R. U., RICHARDSON, D. M. (2011): A proposed unified framework for biological invasions. Trends in Ecology & Evolution, 26: 333–339.
· CAFFREY, J. M., JOE, M., BAARS, J-R., BARBOUR, J. H., BOETS, P., BOON, P., DAVENPORT, K., DICK, J. T. A., EARLY, J., EDSMAN, L., GALLAGHER, C., GROSS, J., HEINIMAA, P., HORRILL, C., HUDIN, S., HULME, P. E., HYNES, S., MACISAAC, H. J., MCLOONE, P., MILLANE, M., MOEN, T. L., MOORE, N., NEWMAN, J., O´CONCHUIR, R., O´FARRELL, M., O´FLYNN, C., OIDTMANN, B., RENALS, T., RICCIARDI, A., ROY, H., SHAW, R., WEYL, O., WILLIAMS, F., LUCY, F. E. (2014): Tackling invasive alien species in Europe: the Top 20 issues. Management of Biological Invasions, 5: 1–20.
· CARLTON, J. T. (1996): Biological invasions and cryptogenic species. Ecology, 77: 1653–1655.
· CVACHOVÁ, A., GOJDIČOVÁ, E.: Úvod do problematiky invázií a inváznych organizmov. Bratislava: Univerzita Komenského, 2003, 62 s.
· JEHLÍK, V. (1998): Cizí a expanzivní plevele České republiky a Slovenské republiky. Praha, Academia.
· MLÍKOVSKÝ, J., STÝBLO, P. (eds.) (2006): Nepůvodní druhy fauny a flóry ČR. Praha: ČSOP, Praha, 496 s.
· PERGL, J. (2008): Co víme o vlivu zavlečených rostlinných druhů? Zprávy České botanické společnosti 43, Mater. 23: 183–192
· PYŠEK, P., DANIHELKA, J., SÁDLO, J., CHRTEK, J. Jr., CHYTRÝ, M., JAROŠÍK, V., KAPLAN, Z., KRAHULEC, F., MORAVCOVÁ, L., PERGL, J., ŠTAJEROVÁ, K., TICHÝ, L. (2012a): Catalogue of alien plants of the Czech Republic (2nd edition): checklist update, taxonomic diversity and invasion patterns. Preslia, 84: 155–255.

· PYŠEK, P., RICHARDSON, D. M., REJMÁNEK, M., WEBSTER, G., WILLIAMSON, M., KIRSCHNER, J. (2004): Alien plants in checklists and floras: towards better communication between taxonomists and ecologists. Taxon, 53: 131–143.
· RICHARDSON, D. M., PYŠEK, P., REJMÁNEK, M., BARBOUR, M. G., PANETTA, F. D., WEST, C. J. (2000): Naturalization and invasion of alien plants: concepts and definitions. Diversity and Distributions, 6: 93–107.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 5

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Božena Šerá, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KPl/N-bENS-032/22	Land Degradation and Restoration

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
The course provides basic knowledge about the processes of land degradation and the measures that support restoration of environmental quality or prevent its further decline. Students will learn about hydrological aspects of land degradation, intense urbanization, contamination, erosion, soil compaction, salinization, and their effect on land quality. Participants will get familiar with the techniques, that are used for restoration of degraded landscapes and ecosystems.

Class syllabus:
Definition of land quality from environmental viewpoint. Desertification and climate related land degradation. Quality and availability of water in ecosystems. Agricultural practices and associated degradation processes. Effects of urbanization on land quality. Land degradation at sites affected by mining and associated remediation strategies. Waste production, management, and disposal as a factor affecting land quality. Case studies and practical examples of land restoration from different parts of the world.

Recommended literature:
Chabay, I., Frick, M., Helgeson, J., (eds.) 2015. Land Restoration: Reclaiming Landscapes for a Sustainable Future. Elsevier, 572 p.
Bech, J., Bini, C., Pashkevich, M.A., (eds.) 2017. Assessment, Restoration and Reclamation of Mining Influenced Soils. Elsevier, 497 p.
Monteith, J.L., Unsworth, M.H., 2013. Principles of Environmental Physics Plants, Animals, and the Atmosphere Fourth Edition. Elsevier, 401 p.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
44,44	55,56	0,0	0,0	0,0	0,0

Lecturers: doc. Mgr. Ivan Šimkovic, PhD.

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KMPLG/N-bENS-041/22	Landuse Planning Management

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based oon the final exam discussion (contributing 100%). The course has a standardized grading system which is identified below:
A (92 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (84 – 91 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.C (76 – 83%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (68 – 75%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 67%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter

Learning outcomes:
The aim of the course is to provide a concentrated knowledge on land use planning management in relation to sustainable development of the area. Rational use of mineral resources incl. groundwater. Impacts of economic activity on land development, monitoring of anthropogeneous geological processes and reduction of their negative action on the environment.

Class syllabus:
Land use vs. commercial reality. Principles of landuse planning process in Slovakia. Mineral resources management. Economic minerals. Construction resources. Water resources occurrence, evaluation and management. Threats for groundwater quantity and quality. Basic principles of groundwater protection. Mapping for planning development. Thematic maps. Geohazards and risk maps.GIS derived maps for planning purposes. Waste management. Maps for waste disposal site location. Water site investigation and site operation. Sludge, mine tailing, ash –fly repositories, radioactive waste. Environmental monitoring (rocks and soils). Environmental monitoring (water, agricultural soil). Environmental Impact Assessment (EIA).

Recommended literature:
F.G. Bell: Basic Environmental and Engineering Geology (selected chapters). Whitles Publishing Limited,
J.F. Artiola, I.L.Pepper, M. Brusseau: Environmental Monitoring and Characterization. Publ. Elsevier

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 4

A	B	C	D	E	FX
0,0	75,0	0,0	0,0	25,0	0,0

Lecturers: doc. Mgr. Peter Uhlík, PhD., prof. RNDr. Otília Lintnerová, CSc., doc. RNDr. Renáta Adamcová, PhD., doc. Mgr. Peter Šottník, PhD.

Last change: 29.04.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-138/22	Latinčina

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 2..

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 132

A	B	C	D	E	FX
61,36	12,88	4,55	6,06	3,03	12,12

Lecturers: Mgr. Ivan Lábaj, PhD., RNDr. Tatiana Slováková, PhD.

Last change: 07.11.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJCh/N-bBCH-042/22	Legislation and Ethics

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
0/100
Course will be evaluated by a written test in the exam period. For the grade A (excellent) it is necessary to obtain at least 92–100%, to obtain the grade B (very good) at least 84–91%, for the grade C (good) at least 76–83%, for the grade D (satisfactory) at least 68– 75% and for E rating (adequate) at least 60–67%. A rating below 60% is rated as FX (insufficient).

Learning outcomes:
Students become aware of legislative and normative aspects of chemistry with emphases of European legislation and international standards. After completing of course, they should know the legal regulations concerning the handling of hazardous chemicals, health and environmental risks of toxic and radioactive substances, genetically modified organisms. They should know the quality management systems of laboratory activities, systems assurance and quality control of chemicals, pharmaceuticals, and food.

Class syllabus:
· European legislation and international standards.
· Chemical safety and biosafety – chemical safety assessment, EU laws on chemicals (REACH and CLP regulations), chemical safety cards, the Cartagena Protocol on biosafety
· Intellectual property rights in life sciences.
· Toxicology – routes of entry of chemicals into the body, mechanism of action of toxic and very toxic substances on the body, the causes and symptoms of poisoning, biotransformation and excretion from the body
· Basic rules for working with genetically modified organisms (GMO). Requirements for equipment to work with GMOs I. and II. category
· Ethical issues in genetics.
· Radiation and safety – sources of radiation, biological effects of ionizing radiation, principles of radiation protection, application of the basic safety standards
· Principles of good practice (GLP) – definitions of terms, Quality Assurance and GLP, Compliance of Laboratory Suppliers with GLP principles, the application of the GLP principles to non-clinical studies

· Application of radioisotopes in biology, biochemistry and medicine
· Threat of terrorism – chemical, biological and nuclear weapons

Recommended literature:

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 2

A	B	C	D	E	FX
0,0	50,0	50,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Oľga Rosskopfová, PhD., doc. RNDr. Stanislav Stuchlík, PhD., prof. RNDr. Anton Horváth, CSc., doc. Mgr. Miroslava Slaninová, Dr.

Last change: 13.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEGD/N-bENS-045/22	Local Development, Urban Economics and Public Finance

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final written test (60%), completion of one obligatory essay (20%) and one reading report (20%). For details contact teacher at the beginning of the term. The course has a standardized grading system which is identified below: A (92-100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate); B (84 – 91%): Good, competent work; laudable performance with evidence of some original thinking, good problem solving ability, exhibiting a serious, responsible engagement with the course content; C (75 – 83%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course; D (68 – 74%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material; E (60 – 67%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course offers introduction into interlinked disciplines of local development, urban economics and public finance. It covers the background and skills needed to understand and analyse nature of local development processes, its economic aspects in urban environment, possibilities of its financing, with special attention to local public finance. Students should be able to understand factors of local development, local labour market functioning, be familiar with main approaches to local economic development planning. They should be able to analyze basic location decisions concerning various activities in urban setting (e.g. housing, administrative activities, retailing). It the field of development finance they will be familiar with basic actors, techniques and sources of financing and evaluation methods in urban investments. As far as public finances are concerned, students will be prepared to work within the system of public budgeting, local finance planning and local finance analysis. Besides general methods and procedures in strategic planning of urban development, students will be familiar with basic approaches to city marketing. Student also will discuss the latest conceptual shifts in urban development.

Class syllabus:

This course will focus on following topics:

Introduction to local development and urban economics, the economic substance of cities' existence;

The economics of – residential location, production activities' location; services and administrative activities location;

The economics of current urban transformation processes; selected – deindustrialization, outsourcing, urban shrinkage, gentrification, selected sectors – financial sector, retailing and consumption;

The real estate and local labour markets – property market functioning and its role, segmentation, role of central state, local labour market delimitation, employment density, selected theories, interventions on labour market

The processes of investment and urban development financing – market framework, actors, conditions, developers, procedures, regulations, partnerships;

Local economic development – goals, actors, principles, roles of the local government, central state, business partners;

Strategic urban economic development planning and programming – goals, processes, structure, implementation and financing

City marketing and marketing planning – social context, cities as a product, marketing as planning, market segmentation, city image;

Economic aspects of sustainable urban development – concepts and policy framework, compact city, improvements and measures in urban sustainability, urban agriculture, green spaces, transport and construction, climate change impact and measures;

Public finance principles, local finance and local budgeting – structure, fiscal federalism, economic geography of local finance, revenues and expenditures, usual local powers, local budgets, budgetary process, selected – issues investment/capital budgets, borrowing;

Conceptual progress and urban development policies – central state urban development policies, EU urban development framework, new actors and interests, economic, technological and environmental aspects – smart cities domains, creative cities, digital cities, knowledge cities etc.

Besides introduction into studied topics, students will analyse selected case studies in urban development, location decisions and local finance processes. They will work with additional scientific papers on selected issues.

Recommended literature:

Arnott, R. J., McMillen, D. P. 2008. A Companion to Urban Economics. Malden: Blackwell.

Batty, M. 2017. The new science of cities. Cambridge: MIT Press.

Blakely, E. J., Leigh, N. G. 2013. Planning local economic development. Thousand Oaks: Sage.

Fioretti, C., Pertoldi, M., Busti, M., Van Heerden, S. 2020. Handbook of Sustainable Urban Development Strategies (No. JRC118841). European Commission, Joint Research Centre, Luxembourg: Publications Office of the European Union.

Glaeser, E., 2012. Triumph of the City. Penguin Books.

Kotler, P., Haider, D. H., Rein, I. 1993. Marketing Places. New York: The Free Press.

O'Flaherty, B. 2005. City Economics. Cambridge: Harvard University Press.

O'Sullivan, A. 2007. Urban Economics. New York: McGraw-Hill.

Pola, G. et al. 2015. Principles and Practices of Fiscal Autonomy: Experiences, Debates and Prospects. Farnham: Ashgate/Routledge.

Languages necessary to complete the course:

English

Notes:

Past grade distribution
Total number of evaluated students: 2

A	B	C	D	E	FX
0,0	50,0	0,0	0,0	50,0	0,0

Lecturers: prof. RNDr. Ján Buček, CSc., RNDr. Martin Plešivčák, PhD.

Last change: 23.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-057/22	Man and Biodiversity

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours lecture (2L) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on final seminar work with oral presentation. The course´s grading system is identified below: A: Outstanding, excellent work 100 – 91% (exceptional performance with strong evidence of originality). B: Good, competent work 90 – 81%; laudable performance with evidence of some original thinking. C: Adequate, reasonably satisfactory work 80 – 73%; fair performance but infrequent evidence of original thinking. D: Less acceptable work 72– 66%; relatively weak performance with little evidence of original thinking. E: Minimally acceptable work showing inadequate grasp of some basic elements of the course 65 – 60%. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter

Learning outcomes:
At the end of the course, the absolvents are able to understand the role of nature and biodiveristy in human´s life. Students are given the complex overview on the mutual influence of nature and human society. The aim of this course is to provide the complex understanding of what must not be underestimated in terms of sustainability and environmental practice.

Class syllabus:
The course provide an overview of various topics concerning nature in human life and vice versa. From world´s biodiveristy analysis, through biodiversity drivers induced by humans, the course fluently continues with benefits of biodiveristy for our lives (pollination, medicine, biotechnology) but explains also the negative impact of nature to humans (vectors of diseases, agricultural pests). Students are given the historical background of this relationship too to understand the role of nature in our lives in the most complex way possible.

Recommended literature:
Wilson, E.O. 1992. The diversity of life. Harvard University Press, 424 pp.

Alves, R. R. N., & Albuquerque, U. P. (Eds.). (2017). Ethnozoology: Animals in our lives. Academic Press.
Govorushko, S. 2018. Human-Insect interactions. Taylor& Francis Inc., 428 pp.
Navjot, S. S., Ehrlich, P. R. (eds.) 2010. Conservation Biology for All. Oxford University Press, New York, 344 pp.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 5

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Martina Zvaríková, PhD., RNDr. Rudolf Masarovič, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KPl/N-XXXX-008/21	Man as a part of the nature

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3., 5.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 580

A	B	C	D	E	FX
90,0	0,0	0,0	0,0	0,17	9,83

Lecturers: RNDr. Martina Zvaríková, PhD., prof. RNDr. Pavel Dlapa, PhD., RNDr. Malvína Čierniková, PhD., prof. RNDr. Elena Masarovičová, DrSc., prof. PaedDr. Pavol Prokop, DrSc., prof. RNDr. Peter Fedor, DrSc., prof. Ing. Eva Chmielewská, CSc., RNDr. Martin Labuda, PhD., doc. RNDr. Eva Pauditšová, PhD., RNDr. Hubert Žarnovičan, PhD., doc. RNDr. Stanislav Rapant, DrSc., doc. RNDr. Ľubomír Jurkovič, PhD., doc. Mgr. Tomáš Lánczos, PhD., doc. RNDr. Katarína Pavličková, CSc.

Last change: 09.11.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KIHG/N-bENS-033/22	Monitoring of Natural and Sewage Waters Quality

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the seminar paper (30 points) and the final test (70 points). The course has a standardized grading system, as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 65 – 60%. Achieving less than 60% of one or both parts of the evaluation means a summary evaluation of Fx and the credits will not be assigned to a student.

Learning outcomes:
The goal is to define and describe the monitoring systems and sampling of water, bring basic information about natural and wastewater monitoring, methods for the assessment of chemical composition and quality of the various types of natural waters. Student receives information about the possibilities of practical use of data and information for quality assessment of natural and wastewaters with concrete examples.

Class syllabus:
Environmental situation and the method of assessment. Nationwide, regional, and local monitoring networks. Monitoring systems, water sampling and evaluation of the quality of natural waters. Geochemical Atlas of Slovakia. Air quality monitoring. Precipitation monitoring (liquid precipitation and snow). Surface water monitoring. Groundwater monitoring of Slovak Republic. Groundwater monitoring of Rye Island (Žitný ostrov) area. Groundwater and surface water monitoring under the Water Framework Directive. Monitoring of environmental burdens in Slovakia. Monitoring of landfill leachate. Wastewater monitoring. Excursion to Slovak Hydrometeorological Institute (SHMI), Bratislava and Water Research Institute (WRI), Bratislava.

Recommended literature:
Nielsen, D.M., 1991: Practical Handbook of Ground Water Monitoring: Lewis Publishers, Inc.; Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water (Environment Agency, 2003); Geochemical Atlas of Slovakia (Ministry of environment of the Slovak Rebublic, Geological survey of Slovak Republic); Slovak Republic Air Protection Strategy (Ministry of Environment of the Slovak Republic); Air pollution in the Slovak Republic (SHMI).

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 3

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Renáta Fľaková, PhD., RNDr. Ivana Ondrejková, PhD.

Last change: 27.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KFGGI/N-bENS-039/22	Natural Hazards and Risks

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time study
Number of contact hours: 3
per week: 2 hour lecture and 1 hour practice per level/semester: 36

Number of credits: 4

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final written test (80% of evaluation) and completion of semestral work (20% of evaluation).
The course has a standardized grading system which is identified below:
A (90 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyse, synthesize and evaluate); B (80 – 89%): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content; C (73 – 79%): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyse, satisfies the minimum requirements of the course; D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyse or synthesize course material; E (65 – 60%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
The course offers an introduction into problems of natural hazards and risks influencing human activities in the landscape and their evaluation. It covers the background and skills needed to understand and analyse nature of natural processes threatening to humans. Students will master simple algorithms of space natural hazards evaluation.

Class syllabus:
This course will focus on following topics:
Definition of basic terminology (disaster, hazard, risk, susceptibility, vulnerability). Overview of types of hazards and risks. Natural disasters in the Earth history.

Volcanic hazard and its evaluation.
Seismic hazard and its evaluation.
Windstorms and wind erosion and their evaluation.
Hazard of water soil erosion and its evaluation.
Hazard of landslide and its evaluation.
Hazard of flooding and its evaluation.
Hazard of snow avalanche and its evaluation.
Past global disasters and temporary climatic change.
Whirlwinds and risks of human activities in threatened regions.
Multihazards and risks in Slovakia

Recommended literature:

HYNDMAN, D., HYNDMAN, D.: Natural Hazards and Disasters. 2nd edition. Belmont: Brooks/Cole Cengage Learning, 2009. ISBN-13: 978-0-495-31667-1. McGUIRE, B., BURTON, P., KILBURN, Ch., WILLETTS, O.: World Atlas of Natural Hazards. London: Arnold, 2004. ISBN 0-340-76405-8. TREMBOŠ, P., MINÁR, J., MACHOVÁ, Z.: Identification of selected natural hazards from the standpoint of evaluation of environmental limits. In: Acta fac. rer. natur. Univ. Comen., Geographica No. 34. Bratislava: Univerzita Komenského, 1994, p. 135-152. ISBN 80-223-0827-7.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 4

A	B	C	D	E	FX
0,0	0,0	25,0	50,0	0,0	25,0

Lecturers: prof. RNDr. Jozef Minár, CSc., doc. Ing. Peter Pišút, PhD.

Last change: 13.09.2022

Approved by:

STATE EXAM DESCRIPTION

Academic year: 2022/2023	
University: Comenius University Bratislava	
Faculty: Faculty of Natural Sciences	
Course ID: PriF.KEM/N-bOBH-101/22	**Course title:** Obhajoba bakalárskej práce
Number of credits: 8	
Educational level: I.	
Course requirements: State Exam	
Learning outcomes: Defence of Bachelor Thesis is an integral part of the Bachelor program to prove skills and abilities for independent research. The primary task is to defend own Bachelor thesis which will be discussed and reviewed.	
Class syllabus: For this type of activity (course), based on defence and discussion, there is no specific syllabus.	
State exam syllabus:	
Recommended literature: Irrelevant	
Languages necessary to complete the course: English	
Last change: 24.03.2023	
Approved by:	

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KOrCh/N-bENS-009/22	Organic Chemistry

Educational activities:
Type of activities: practicals / lecture / seminar
Number of hours:
per week: 2 / 2 / 2 **per level/semester:** 28 / 28 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: lecture and practical
Number of contact hours: 4 h of lectures and 5 h of practical
per week: 9 per level/semester: 117

Number of credits: 6

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Course will be evaluated by a written test (60% value) and evaluation of practicals (40% value). For grade A, it is necessary to obtain at least 92 %, for grade B at least 84 %, for grade C at least 76 %, for grade D at least 68 % and for grade E at least 60 % of all points. Credits will not be assigned to a student, who will not earn at least 60% overall from final exam.

Learning outcomes:
This course covers the basics organic chemistry. By the end of this course students should be able to: • Understand properties of all major classes of organic compounds. • Understand mechanisms of principal organic reactions. • To solve new problems based on knowledge from lecture and training from seminars • To perform fundamental experimental techniques, analyze results, purify and identify compounds.

Class syllabus:
1. Introduction to organic chemistry (nomenclature of organic compounds, bonding in organic compounds, basic principles of stereochemistry, electronic effects, acido-basic properties of organic compounds) 2. Properties and reactivity of major classes of organic compounds • alkanes, alkenes, alkynes and dienes • aromatic hydrocarbons • organic halogen derivatives • organometallic compounds • alcohols, tiols and phenols, ethers, epoxides and sulfides • nitrogen containing compounds – nitrocompounds and amines • carbonyl compounds – aldehydes, ketones, saccharides •
carboxylic acids and their functional derivatives, such as acyl halogenides, esters, amides, anhydrides • amino acids, peptides, proteins, lipids • heterocyclic compounds, nucleic acids. 3. Experimental work shall focus on safety in the organic chemistry laboratory, basic operations for isolation and purification of organic compounds (crystallization, distillation, extraction, adsorption chromatography - TLC). Simple syntheses of organic compounds will be trained based on functional

group transformations, isolation of organic compounds from natural sources, indentification of functional groups by chemical analysis and structure determination based on 1H NMR spectra.

Recommended literature:
J. McMurry, Organic Chemistry, Cengage Learning, 2009. J. Clayden, N. Greeves, S. Warren, Organic
Chemistry, Oxford University Press, 2012.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
11,11	11,11	22,22	11,11	11,11	33,33

Lecturers: RNDr. Pavol Tisovský, PhD., Mgr. Iveta Kmentová, PhD.

Last change: 30.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJCh/N-XXXX-011/21	Perspectives in Chemistry

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3., 5.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 22

A	B	C	D	E	FX
22,73	45,45	18,18	4,55	0,0	9,09

Lecturers: RNDr. Marek Cigáň, PhD., doc. RNDr. Martin Putala, CSc., prof. Ing. Dušan Velič, DrSc., prof. RNDr. Ivan Černušák, DrSc., doc. RNDr. Erik Rakovský, PhD., Mgr. Peter Hrobárik, PhD., doc. RNDr. Oľga Rosskopfová, PhD.

Last change: 07.11.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KBCh/N-XXXX-010/22	Perspectives of Biochemistry

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4., 6.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 17

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marek Mentel, PhD., Mgr. Filip Brázdovič, PhD., Mgr. Andrea Cillingová, PhD., prof. RNDr. Anton Horváth, CSc., Mgr. Stanislav Huszár, PhD., Mgr. Petra Chovančíková, PhD., prof. RNDr. Marta Kollárová, DrSc., doc. RNDr. Jana Korduláková, PhD., prof. RNDr. Katarína Mikušová, DrSc., Ing. Martina Neboháčová, PhD., doc. Mgr. Peter Polčic, PhD., RNDr. Ingrid Sveráková, PhD., doc. RNDr. Igor Zeman, PhD., Mgr. Júlia Zemanová, PhD.

Last change: 19.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-101/22	Physical Education 1

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 365

A	B	C	D	E	FX
92,05	1,64	0,27	0,0	0,0	6,03

Lecturers: Mgr. Kristína Vanýsková, PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Ján Krošlák, Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, PaedDr. Vladimír Pajkoš, Mgr. Dana Széllová, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-102/22	Physical Education 2

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 153

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Kristína Vanýsková, PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Ján Krošlák, Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, PaedDr. Vladimír Pajkoš, Mgr. Dana Széllová, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-103/22	Physical Education 3

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 211

A	B	C	D	E	FX
95,26	0,47	0,95	0,0	0,0	3,32

Lecturers: Mgr. Kristína Vanýsková, PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Ján Krošlák, Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, PaedDr. Vladimír Pajkoš, Mgr. Dana Széllová, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-104/22	Physical Education 4

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 178

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Kristína Vanýsková, PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Ján Krošlák, Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, PaedDr. Vladimír Pajkoš, Mgr. Dana Széllová, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-105/22	Physical Education 5

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 154

A	B	C	D	E	FX
96,1	1,3	0,0	0,0	0,0	2,6

Lecturers: Mgr. Kristína Vanýsková, PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Ján Krošlák, Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, PaedDr. Vladimír Pajkoš, Mgr. Dana Széllová, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-106/22	Physical Education 6

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 123

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Kristína Vanýsková, PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Ján Krošlák, Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, PaedDr. Vladimír Pajkoš, Mgr. Dana Széllová, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KBo/N-XXXX-003/21	Plants known and unknown

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3., 5.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 460

A	B	C	D	E	FX
70,43	21,96	3,7	0,0	0,0	3,91

Lecturers: Ing. Mgr. Eva Zahradníková, PhD., doc. Mgr. Katarína Mišíková, PhD., doc. RNDr. Jana Ščevková, PhD.

Last change: 30.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KRGRR/N-XXXX-002/21	Practical Geography for Natural Scientists

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3., 5.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 43

A	B	C	D	E	FX
83,72	0,0	0,0	0,0	0,0	16,28

Lecturers: Mgr. Rastislav Cákoci, PhD., RNDr. Katarína Danielová, PhD., doc. RNDr. Daniel Gurňák, PhD., doc. RNDr. František Križan, PhD., doc. RNDr. Eva Rajčáková, CSc., Mgr. Michala Sládeková Madajová, PhD., RNDr. Angelika Švecová, PhD., Mgr. Martin Šveda, PhD., prof. RNDr. Ladislav Tolmáči, PhD., RNDr. Mgr. Anna Tolmáči, PhD., Mgr. Gabriel Zubriczký, PhD.

Last change: 15.05.2021

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KIHG/N-XXXX-012/21	Practical Geology for Everyone

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1., 3., 5.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 35

A	B	C	D	E	FX
65,71	11,43	8,57	5,71	0,0	8,57

Lecturers: doc. RNDr. Renáta Fľaková, PhD., doc. RNDr. Renáta Adamcová, PhD., prof. RNDr. Roman Pašteka, PhD., prof. RNDr. Martin Bednarik, PhD., doc. RNDr. Dávid Krčmář, PhD., doc. RNDr. Andrej Mojzeš, PhD., RNDr. Ivana Ondrejková, PhD., doc. Mgr. Vladimír Greif, PhD., Mgr. Rudolf Tornyai, PhD., RNDr. Tatiana Durmeková, PhD., Mgr. Martin Zatlakovič, PhD., doc. RNDr. Milan Seman, CSc.

Last change: 18.09.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-056/22	Practical Skills in MS Office

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours practice (2P) per level/semester: 13 weeks

Number of credits: 2

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Examination from this course will be in two part – preparation of presentation (50%) and absolving of final written test (50%). During the semester, students will prepare short presentation in PowerPoint software that will be presented and reviewed in front of other students of the course. At the end of the semester students obtain final written test consist of tasks from Word and Excel. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
This course increase abilities of students in the following MS Office software: PowerPoint, Word and Excel that will be useful for preparing scientific text (e.g. article, or Bachelor Thesis), presentation or how to make and calculate different kind of graphs and results.

Class syllabus:
Students increase their knowledge into the formatting text, including insertion of pictures, figures, how to make content, header, footer, page number in the text or other necessary utilities helpful for their scientific skills in the bachelor's study.

Recommended literature:
Lectures and tasks will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites.
Next optional relevant literature (available at internet, or ask the teacher):
Guerrero, H. (2019): Excel Data Analysis. Modeling and Simulation. Crawley: Springer Nature Switzerland AG, Switzerland, 358 p.
Tutorials and Tips on YouTube for Microsoft PowerPoint, Word, and Excel that are freely available on internet.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-055/22	Practical Training

Educational activities:
Type of activities: practice
Number of hours:
per week: **per level/semester:** 5d
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 40 hours (5 days of practical lessons)
per week: per level/semester: 1 week

Number of credits: 3

Recommended semester: 4.

Educational level: I.

Prerequisites:

Course requirements:
Completion of professional practical internship to a specified extent at University or in a selected institution in Slovak Republic approved in advance by the teacher following then with writing of Report of the internship. In the case of an external internship supervisor/consultant outside the Faculty, a written evaluation of the supervisor/consultant is a necessary part, who will comment on the student's work and propose a mark in this subject.
Rating according to the scheme: A (excellent reporting level, active participation: 91-100%), B (protocol development level exceeds the average level, active participation: 81-90%), C (average reporting level, active participation: 73-80%), D (average level of reporting, participation: 66-72%), E (reporting, participation: 60-65%), Fx (non-participation and/or non-reporting).

Learning outcomes:
The aim of the subject is to gain new knowledge and practical experience of the student. This internship belongs to active forms of education. During the practical lessons, the student will master a wide range of professional skills, activities and at the same time gain valuable contacts, which student will be able to use not only in further study, but also in finding a job.

Class syllabus:
The student completes a professional internship in a selected organization that deals with environmental issues. During the internship the student increase their knowledge, experience and practical skills in the field of research and protection of selected components of the environment which may differ depending on the professional focus of the chosen workplace/institution in which the internship is completed (e.g. field work, mapping, inventory, implementation of management measures, testing of various methodological procedures, preparation of research records, analysis of samples, laboratory work, processing and interpretation of obtained data, involvement in the preparation of projects, evaluation reports, expert opinions and others).

Recommended literature:
According to the instructions of the supervisor/consultant from the institution within which the student will complete the internship.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 1

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD., Mgr. Blanka Lehotská, PhD., prof. RNDr. Ján Buček, CSc., doc. RNDr. Michal Šujan, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-127/22	Professional English for Environmental Studies

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours seminar (2S) per level/semester: 13 weeks
Blended learning

Number of credits: 3

Recommended semester: 1.

Educational level: I.

Prerequisites:

Course requirements:
The course has a standardized grading system which is identified below:
A (92–100%): Outstanding, excellent work; exceptional performance B (84–91%): Good, competent work; laudable performance. C (76–83%): Adequate, reasonably satisfactory work; fair performance. D (68–75%): Less acceptable work; relatively weak performance. E (60–67%): Minimally acceptable work; very weak performance. Fx (under 60%): Inadequate work; poor performance.

Learning outcomes:
Aims and objectives:
This course covers improvement of Academic English reading, listening, speaking, and especially presentation skills. It also aims at equipping students with the specialist language they need to study environmental science. By the end of this course students should:
1. have improved reading and listening skills based on a variety of selected environment-focused articles and recordings.
2. be able to deliver a well-organized presentation.
3. have improved their discussion skills and have enlarged range of technical vocabulary.

Class syllabus:
Syllabus/Indicative Content:
This course will be focused on further development of Academic English skills – reading, listening, speaking and particularly presenting and discussion skills. There is also a focus throughout on the key environmental science vocabulary that students will need for their further studies. The aim of the course is to improve students´ abilities to understand the conflicts between humans and the natural world more deeply, to develop critical thinking skills, such as identifying the writer´s stance, to express opinions and support them with evidence.

The topics cover the biggest environmental challenges facing our planet, such as: climate change, the continuing loss of biological diversity and extinction crisis, the degradation of ecosystem services, water scarcity, food and hunger, renewable sources of energies, waste, air pollution and plastic pollution, danger of overtourism.

Recommended literature:
Richard Lee: English for Environmental Science
Jarmila Cihová: English for Environmental Studies
Environmental news, opinion and analysis from Guardian
EEA - The European Environment Agency
Environmental news, opinion and analysis from Guardian
Ted Talks
BBC Science and Environment News
Lessons will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 13

A	B	C	D	E	FX
61,54	7,69	15,38	0,0	15,38	0,0

Lecturers: PhDr. Jarmila Cihová, PhD., Mgr. Simona Tomášková, PhD.

Last change: 29.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KJ/N-bXCJ-139/22	Professional English for Environmental Studies 2

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Grading policy (Assessment/Evaluation):
The course has a standardized grading system which is identified below:
A (91–100%): Outstanding, excellent work; exceptional performance B (81–90%): Good, competent work; laudable performance. C (73–80%): Adequate, reasonably satisfactory work; fair performance. D (66–72%): Less acceptable work; relatively weak performance. E (60–65%): Minimally acceptable work; very weak performance. Fx (under 60%): Inadequate work; poor performance.

Learning outcomes:
Aims and objectives:
This course covers improvement of Academic English reading, listening, speaking, and especially presentation skills. It also aims at equipping students with the specialist language they need to study environmental science. By the end of this course students should:
1. have improved reading and listening skills based on a variety of selected environment-focused articles and recordings.
2. be able to deliver a well-organized presentation.
3. have improved their discussion skills and have enlarged range of technical vocabulary.

Class syllabus:
Syllabus/Indicative Content:
This course will be focused on further development of Academic English skills – reading, listening, speaking and particularly presenting and discussion skills. There is also a focus throughout on the key environmental science vocabulary that students will need for their further studies. The aim of the course is to improve students´ abilities to understand the conflicts between humans and the natural world more deeply, to develop critical thinking skills, such as identifying the writer´s stance, to express opinions and support them with evidence.
The topics cover the biggest environmental challenges facing our planet, such as: climate change, the continuing loss of biological diversity and extinction crisis, the degradation of ecosystem services, water scarcity, food and hunger, renewable sources of energies, waste,

air pollution and plastic pollution, danger of overtourism.

Recommended literature:
Suggested readings:
Richard Lee: English for Environmental Science
Jarmila Cihová: English for Environmental Studies
Environmental news, opinion and analysis from Guardian
EEA - The European Environment Agency
Environmental news, opinion and analysis from Guardian Ted Talks BBC Science and Environment News Lessons will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites.

Languages necessary to complete the course:
Language of Instruction:
English

Notes:

Past grade distribution
Total number of evaluated students: 7

A	B	C	D	E	FX
57,14	28,57	0,0	0,0	0,0	14,29

Lecturers: PhDr. Jarmila Cihová, PhD., Mgr. Simona Tomášková, PhD.

Last change: 29.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KPl/N-bENS-033/22	Quality and Availability of Water in 21st Century

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
The course provides information about the processes that affect quality and availability of water for ecosystems, agriculture, and society. Students will learn about hydrological cycle, its modification during recent years, and about the strategies for water resources management. Participants will get familiar with selected hydrological processes, technical aspects of water quality and availability, as well as with possible solutions of current challenges.

Class syllabus:
Processes of water cycle. Extreme hydrological events. Quality and availability of water in different parts of the world. Water demands for ecosystems, agriculture, and industry. Hydrological consequences of land use. Availability and quality of soil water. Water retention in landscape. Strategies for dealing with water scarcity. Fundamentals of irrigation and drainage engineering. Deterioration of water quality, emerging contaminants, and water treatment.

Recommended literature:
Brutsaert, W., 2005. Hydrology: An Introduction. Cambridge, 618 p.
Fath, B.D., Jorgensen, S.E., 2020. Managing Water Resources and Hydrological Systems. CRC press, 759 p.
Wood, P.J., Hannah, D.M., Sadler, J.P., (eds.) 2007. Hydroecology and Ecohydrology: Past, Present and Future. John Wiley & Sons, 436 p.
Waller, P., Yitayew, M., 2016. Irrigation and Drainage Engineering. Springer, 742 p.

Languages necessary to complete the course:
English

Notes:

Past grade distribution Total number of evaluated students: 7					
A	B	C	D	E	FX
42,86	57,14	0,0	0,0	0,0	0,0
Lecturers: doc. Mgr. Ivan Šimkovic, PhD.					
Last change: 01.08.2022					
Approved by:					

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-034/22	Renewable Energy Sources

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 39 hours
per week: 2 hours lecture (2L) + 1 hour seminar (1S) per level/semester: 13 weeks

Number of credits: 3

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
At the end of the semester, students will prepare short presentation on the issue of renewable resources, which will be an extension of what was taken over in the course. This presentation will be not evaluated but will be a condition for admission to the final exam. Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
This course covers the knowledge on potential and present-state-of-art of renewable energy sources utilization around the world and in Slovakia. By the end of this course students should be able to:
• Articulate a general understanding on classification of renewable energy sources
• Understand advantages and disadvantages of respective renewable energy sources utilization
• Assess risk of different energy sources utilization.
• Be acquainted with the present legislation on utilization of renewable energy sources.

Class syllabus:
Introduction, basic terms, energy sources. Renewable energy sources and their importance in energy politics of Slovakia and the European Union. Legislative framework of renewable energy sources utilization. National action plans for energy from renewable energy sources for electricity production, direct use (heat production) and their use in transportation. Characteristics, potential evaluation, and present state-of-art of utilization of solar energy (thermodynamics, heat engines and heat pumps), wind energy, hydropower (including of tidal and wave energy), geothermal energy and biomass energy including all products of biomass processing. Integrating renewable energy and renewable energy futures including of hydrogen power will be mentioned, too. Topics will be illustrated with case studies from around the world, include of Europe.

Recommended literature:

Lectures will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites.
Directive (EU) 2018/2001 of the EP and of the Council of 11 December 2018 on promotion of the use of energy from renewable sources (https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32018L2001),
National Renewable Energy Action Plans (https://ec.europa.eu/energy/topics/renewable-energy/directive-targets-and-rules/national-renewable-energy-action-plans-2020_en)
Peake, S. (2017): Renewable Energy: Power for a Sustainable Future. 4th Edition. Oxford University Press, 680 s. Eurobarometer on energy (https://ec.europa.eu/energy/data-analysis/eurobarometer-energy_en) European Parliament Eurobarometers in different renewable energy sources (https://ec.europa.eu/energy/sites/default/files/documents/20110131_eurobarometer_energy.pdf) EurObserver Barometers (https://www.eurobserv-er.org/)

Languages necessary to complete the course:
English

Notes:
no

Past grade distribution
Total number of evaluated students: 4

A	B	C	D	E	FX
0,0	100,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD., prof. Ing. Eva Chmielewská, CSc.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-110/22	River rafting

Educational activities:
Type of activities: other
Number of hours:
per week: **per level/semester:** 3d
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 6

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, Mgr. Kristína Vanýsková, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023	
University: Comenius University Bratislava	
Faculty: Faculty of Natural Sciences	
Course ID: PriF.KEM/N-bENS-059/22	**Course title:** Seminar on Basic Ecotoxicology
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 28 **Form of the course:** on-site learning	
Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie Form of Study: full-time and/or distance learning Number of contact hours: 26 hours per week: 2 hours seminar (2S) per level/semester: 13 weeks	
Number of credits: 3	
Recommended semester: 6.	
Educational level: I.	
Prerequisites:	
Course requirements: Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.	
Learning outcomes: This course enlarges the knowledge of Basic Ecotoxicology course and students will be able to deeply understand the possible ways of toxicants, how and why they are dangerous, which factors are relevant and can increase or decrease their toxicity, where they can find relevant information about toxicity of chemicals (material safety data sheet, MSDS), or how to measure and calculate toxicity of chemicals.	
Class syllabus: Students will take lessons about categories of toxicants and ways by they are entry into the organism, how they are metabolized and excluded from the cell/organisms, factors affecting toxicity (e.g. pH, temperature, salinity, reciprocal interactions), kinetics, what is and how to measure and calculate IC50, etc. including presentations of case studies connected with toxicity of some chemicals in the world.	
Recommended literature: Lectures will be available to students in the form of PDF files in the e-learning environment Moodle (https://moodle.uniba.sk/?lang=en_us). At the same time, they will have access to other (including voluntary) literature, articles, videos, and interesting websites. vanLoon, G.W., Duffy, S.J. (2005): Environmental Chemistry. A Global Perspective. 2nd ed. Oxford University Press, 515 p. Wright, D.A., Welbourn, P. (2002): Environmental Toxicology. Cambridge environmental chemistry series 11, Cambridge University Press, 630 p. (available by remote access for students	

of Faculty at: ProQuest Ebook Central, https://ebookcentral.proquest.com/lib/uniba-ebooks/detail.action?docID=221116, 20.1.2022)
Duffus, J.H., Worth, H.G.J. (2006): Fundamental Toxicology. Royal Society of Chemistry, 490 p. (available by remote access for students of Faculty at: ProQuest Ebook Central, https://ebookcentral.proquest.com/lib/uniba-ebooks/detail.action?docID=1185552, 20.1.2022).

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Marianna Molnárová, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KMPLG/N-bENS-043/22	Seminar on Environmental Mineralogy

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 26 hours
per week: 2 hours seminar (2S) per level/semester: 13 weeks

Number of credits: 2

Recommended semester: 4.

Educational level: I.

Prerequisites:

Recommended prerequisites:
no prerequisities are necessary.

Course requirements:
Grading Policy (Assessment/Evaluation): Grades will be based on the final exam in the form of written seminar work. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 65 – 60%, Fx: 59% and less.

Learning outcomes:
Aims and Objectives:
In particular, the student will be able to:
• know the main classes and mineralogical species of environmental interest;
• apply the theoretical and practical knowledge and skills acquired to specific case studies;
• examine samples of rocks, soils and sediments to identify the relevant minerals from an environmental point of view;
• critically evaluate the data to develop a scientific or professional study;
• write and argue scientific and/or professional reports. Effectively read and critically review scientific literature.

Class syllabus:
The course will introduce the fundamental concepts of the mineralogy and their relationship with environmental and anthropogenic processes. Students will select a topic of interest. Each student will prepare seminar work reviewing that topic. Several case-studies will illustrate the complexity of the environmental mineralogy. Learn the basics about minerals and environment, identify the most suitable techniques to analyse real case studies. Discussion of real case studies. Understand the processes that control mineral reactivity and stability under environmentally-relevant conditions.

Recommended literature:

Practical examples of bibliographic research.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 1

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Peter Ružička, PhD.

Last change: 14.10.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KOrCh/N-bENS-012/22	Seminar on Organic Chemistry

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: seminar
Number of contact hours: 2 h of seminars
per week: 2 per level/semester: 26

Number of credits: 2

Recommended semester: 2.

Educational level: I.

Prerequisites:

Course requirements:
Course will be evaluated by a written test. For grade A, it is necessary to obtain at least 92 %, for grade B at least 84 %, for grade C at least 76 %, for grade D at least 68 % and for grade E at least 60 % of all points. Credits will not be assigned to a student, who will not earn at least 60 % of points in the test.

Learning outcomes:
This course aims to improve understanding of basics organic chemistry via individual students work on the seminars, were assignements on topic from the organic chemistry lecture will be discussed. By the end of this course students should be able to understand properties of all major classes of organic compounds, understand mechanisms of typical organic reactions, to solve new problems based on knowledge from lecture and training from seminars.

Class syllabus:
Introduction to organic chemistry - nomenclature of organic compounds, bonding in organic compounds, basic principles of stereochemistry, electronic effects, acido-basic properties of organic compounds). Properties and and typical reactions (both syntheses of specific compounds as well as their reactions) of major classes of organic compounds: alkanes, alkenes, alkynes and dienes; aromatic hydrocarbons; organic halogen derivatives; organometallic compounds; alcohols, tiols and phenols, ethers, epoxides and sulfides; nitrogen containing compounds – nitrocompounds and amines; carbonyl compounds – aldehydes, ketones, saccharides; carboxylic acids and their functional derivatives, such as acyl halogenides, esters, amides, anhydrides; amino acids, peptides, proteins, lipids; heterocyclic compounds, nucleic acids. Basics of multistep organic synthesis will practiced on seminars too. Attention will be also devoted to basic applications of spectroscopy techniques, mainly 1H NMR.

Recommended literature:

J. McMurry, Organic Chemistry, Cengage Learning, 2009. J. Clayden, N. Greeves, S. Warren, Organic
Chemistry, Oxford University Press, 2012.

Languages necessary to complete the course:
english language

Notes:

Past grade distribution
Total number of evaluated students: 6

A	B	C	D	E	FX
33,33	33,33	0,0	16,67	0,0	16,67

Lecturers: RNDr. Pavol Tisovský, PhD., Mgr. Andrea Martinická, PhD.

Last change: 30.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KAlCh/N-bBCH-014/22	Separation Methods

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Number of contact hours:
per week: 2 / 1 per level/semester: 26 / 13
on-site learning, online learning

Number of credits: 4

Recommended semester: 5.

Educational level: I.

Prerequisites:

Course requirements:
Seminar – a maximum of 40 points, for elaboration and presentation of a seminar paper. Lecture – a maximum of 60 points, for the final test. The final grade will consist of evaluation of seminar and the final test from lecture, for a maximum of 100 points. For grade A it is necessary to obtain at least 92 points, for grade B at least 84 points, for grade C at least 76 points, for grade D at least 68 points and for grade E at least 60 points. The evaluation is the same for on-line learning.

Learning outcomes:
Students will get acquainted with the position of separation methods within the system of scientific cognition of material reality and their essential need in generation of interpretable analytical signal. Objective is taught through a unified approach based on the concept of transport and distribution phenomena, which are applied in many modern separation methods. Separation methods are often the basis of chemical analysis methods. They are also base for qualitative evidence and quantitative measurement of characteristics or determination of chemical substances utilized in various human activities and related control, e.g., technological product analysis, bioanalysis, environmental analysis, clinical analysis, and diagnostics, etc. Students will gain information about the classification of analytical, preparative, and industrial separation processes and methods. The course also includes calculations in the field of separation sciences and solving case studies from social practice, which are discussed in the media.

Class syllabus:
• Characteristics of separation methods, their function and significance in analytical, preparative, and industrial processes.
• General terms and parameters characterizing the scope of separation; terminology; distribution ratio, distribution constant, Nernst distribution law, chemical equilibrium in separation process. Interactions in separation systems. Calculations, thermodynamic and kinetic aspects of separation methods.

• One-stage separation methods, principle, technique, and application; separation of components by precipitation and co-precipitation. Sublimation, lyophilization. Electroprecipitation, electrolytic precipitation. Extraction separation in the system solid-liquid, liquid-liquid. Cloud point extraction – micellar systems. Membrane extraction. Simple distillation. Zone melting.
• Multistage separation methods and introduction to chromatographic methods. Multistage extraction, principle of continuous extraction. Multistage distillation. Chromatographic separations, classification according to various criteria. Theory of chromatographic phenomena, qualitative and quantitative chromatographic analysis.
• High-performance gas chromatography. Instrumentation. Separation mechanisms. Optimization of separation. Advanced techniques. Reaction chromatography, precolumn derivatization, vacant chromatography. Computer simulations and calculations.
• High performance liquid chromatography. Instrumentation, column vs planar techniques. Chromatographic phase systems. Advanced techniques. Computer simulations and calculations. Separation mechanisms. Pre-column and post-column derivatization (physical, chemical, and biological). Typical applications of chromatographic methods.
• Electroseparation methods. Principles, classification, parameters characterizing electroseparation. Concept of electrophoretic mobility, separation mechanisms, column vs. planar techniques, column coupling technique and detection. Zone electrophoresis. Separations in the free solution of carrier electrolyte. Separations in micelle-forming solutions, micellar electrokinetic chromatography. Electroosmotic flow. Instrumentation and practical use of computer simulation technique.
• Capillary isotachophoresis and isoelectric focusing. Basic principles, instrumentation and computer simulation technique. Separation, and analysis of proteins.
• Chip-based electroseparations. Miniaturization of separation columns and channels. Instrumentation and novel approaches to electroseparations. Advances and applications of chip-based electroseparations.
• Membrane separations. Principles, classification. Dialysis and electrodialysis, principle, instrumentation, and application. Ultrafiltration – application in analytical procedures. Validation of analytical methods with focus on separation methods.
• Solution of case studies from various areas of social and production practice. Typical application of separation methods in analytical procedures, preparative, and industrial procedures. Future trends in the development of separation methods.

Recommended literature:

D.A. Skoog, F.J. West, F.J. Holler, S.R. Crouch: Analytical Chemistry. An Introduction, Saunders Coll. Publ., 2000.
G. Schwedt: The Essential Guide to Analytical Chemistry, Wiley, New York, 1997.
R. Kellner, J.M. Mermet, M. Otto, Analytical Chemistry, John Wiley & Sons Australia, 2013.

Languages necessary to complete the course:

English

Notes:

The course is provided only in the winter semester. If less than 3 students enroll, the course will be provided in individual form.

Past grade distribution

Total number of evaluated students: 5

A	B	C	D	E	FX
20,0	60,0	20,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Marian Masár, PhD., Ing. Roman Szücs, PhD., Mgr. Jasna Hradski, PhD.

Last change: 28.03.2023
Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KPl/N-bENS-013/22	Soil Biology

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam discussion (contributing 100%). The course has a standardized grading system which is identified below: A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
This course covers the background needed to understand complex linkages between soil organisms and soils. By the end of this course students should:
• Understand importance of the soil as a natural environment of organisms,
• understand the role of organisms in processes of soil organic matter transformations,
• understand the influence of specific groups of organisms in soil formation process and soil structure formation,
• understand participation of microorganisms in nutrient cycles in the soil environment,
• understand advanced scientific methods used nowadays in soil research to characterize properties of the soil microbiocenosis.

Class syllabus:
This course will reveal importance of the soil environment for organisms which use the soil as a habitat. We will focus on solid, liquid and gas faze of the soils, enlighten effects of primary and secondary ecological factors on soil organisms. We will have a closer look at prokaryotes and eukaryotes species in soils (algae, cyanobacteria, fungi, bacteria and other soil micro, mezo and

macro organisms) where we will emphasis species in European soil environments. We will discuss the role of primary producers, consumers and decomposers in formation of the soil organic matter and processes carried out by microorganisms taking part in nutrient cycles. We will also focus on actual research activities and methods dealing with soil species identification and quantitative and qualitative evaluation of microbiocenosis.

Recommended literature:

Institute for Environment and Sustainability JRC, 2010: European Atlas of Soil Biodiversity. Catalogue Number: LB-NA-24375-EN-C, ISBN: 978-92-79-15806-3, ISSN: 1018-5593.
Madigan, M.T., Martinko, J.M., Bender, K.S., Buckley, D.H., Stahl, D.A.,2010: Brock Biology of Microorganisms, 13/E. Cloth, p. 1152.

Languages necessary to complete the course:

English

Notes:

Past grade distribution

Total number of evaluated students: 7

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Alexandra Šimonovičová, CSc., Mgr. Peter Hanajík, PhD.

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KPl/N-bENS-020/22	Soil Science

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Grades will be based on the final exam in the form of written test. The course has a standardized grading system which is as follows: A: 100 – 91%, B: 90 – 81%, C: 80 – 73%, D: 72 – 66%, E: 60 – 65%, Fx: 59% and less.

Learning outcomes:
The course will introduce basic knowledge in soil properties and processes. Students will learn soil profile features and characteristics, identification of soil horizons, soil profile description, soil classification, and distribution of major soils. Participants will receive skill in understanding of soil processes and principles of soil classification.

Class syllabus:
Introduction to Soil Science. Basic features and characteristics of soils. Soil chemical properties and processes. Soil physical properties and processes. Soil biota and microbiological processes. Basic morphological features and properties. Soil horizons and soil profile descriptions. Soil forming processes in relation to environmental factors. World reference base for soil resources (WRB). Soil - landscape relationships.

Recommended literature:
P.M. Huang, Y. Li, and M.E. Sumner (eds.), 2011: Handbook of Soil Sciences: Properties and Processes, 2nd ed. CRC Press, Boca Raton, FL, 1442 pp.
P.M. Huang, Y. Li, and M.E. Sumner (eds.), 2011: Handbook of Soil Sciences: Resource Management and Environmental Impacts, 2nd ed. CRC Press, Boca Raton, FL, 830 pp.
IUSS Working Group WRB. 2006: World reference base for soil resources 2006. World Soil Resources Reports No. 103. FAO, Rome, 128 pp.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 9

A	B	C	D	E	FX
44,44	55,56	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Pavel Dlapa, PhD., doc. Mgr. Ivan Šimkovic, PhD.

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-108/22	Summer Physical-Education Training

Educational activities:
Type of activities: training session
Number of hours:
per week: **per level/semester:** 5d
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, Mgr. Kristína Vanýsková, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KZ/N-XXXX-006/21	Theory of species

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4., 6.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 82

A	B	C	D	E	FX
75,61	14,63	2,44	0,0	0,0	7,32

Lecturers: doc. Mgr. Peter Vďačný, Dr.rer.nat

Last change: 07.11.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KEM/N-bENS-060/22	Transdisciplinary Challenges in Landscape Ecology

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Druh, rozsah, metódy a pracovná záťaž študenta - doplňujúce informácie
Form of Study: full-time and/or distance learning
Number of contact hours: 52 hours
per week: 2 hours lecture (2L) + 2 hours practice (2P) per level/semester: 13 weeks

Number of credits: 4

Recommended semester: 3.

Educational level: I.

Prerequisites:

Course requirements:
Evaluation requirements for successful course graduation are based on the final exam (contributing 60 %) and the report of seminar project (contributing 40 %). Evaluation requirements for successful course graduation:
A (91–100 %): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyse, synthesize and evaluate.
B (81–90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.
C (73–80 %): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyse, satisfies the minimum requirements of the course.
D (66–72 %): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyse or synthesize course material.
E (60–65 %): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course.
Fx (under 60 %): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
Students should be able to define basic terminology and to know about knowledge and current problematics concerning of landscape at the end of this course. A lot of topics will be illustrated with case studies from around the world and also from countries of Central Europe. Both theoretical and applied approaches will be emphasized and also at individually work of students in the frame of practical part of the course. So, students gain knowledge from concrete examples and from their own practice of the course.

Class syllabus:

The course includes the following topics:
1. Introduction to the spatial pattern and ecological processes in the landscape.
2. Landscape evaluation (changes in the time; abiotic and biotic characteristics; natural, rural and urban characteristics)
3. Classification of landscape – natural and cultural landscape
4. Spatial arrangements of habitat patches and corridors
5. Ecological and urban lines in the landscape (rivers and roads; floods; landscape fragmentation; tree alley in the countryside; biodiversity)
6. Introduction to the landscape urbanisation (historical development; villages and towns; big cities)
7. Cultural landscapes (history of the changes; importance for biodiversity; cultural heritage)
8. Invasive organisms change the landscape (reasons of the plants and animals moving; examples of invasive organisms; importance of international cooperation; monitoring and management in the landscape)
9. Historical maps in the landscape ecology and evaluation, importance for ecological network planning
10. Climate change and landscape (scenarios; adaptation plans and politics; integrated drought management)
11. In practice: case studies on regional level

Recommended literature:

Sargolini M. 2013: Urban landscapes. Springer-Verlag, Italy.
Turner M., Gardner R. H. and O'neill R.V. 2001: Landscape Ecology in Theory and Practice. Springer, USA.
Forman R.T.T. et al. 2002: Road Ecology: Science and Solutions. Island Press, USA.
Spellerberg I.F. 2002: Ecological Effect of roads. Land Reconstruction and Management. Science Publishers, Ireland.
Palang H. and Fry G. 2003: Landscape Interfaces. Cultural Heritage in Changing Landscapes. Springer.
Meyer B.C. and Rannow S. 2012: Regional Environmental Change. Springer. ISSN: 1436-3798
Sixth Assessment Report cycle IPCC, online: http://ipcc.ch/index.htm

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 8

A	B	C	D	E	FX
62,5	37,5	0,0	0,0	0,0	0,0

Lecturers: RNDr. Martin Labuda, PhD., RNDr. Božena Šerá, PhD.

Last change: 24.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-107/22	Winter Physical-Education Training

Educational activities:
Type of activities: training session
Number of hours:
per week: **per level/semester:** 5d
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3., 5.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 140

A	B	C	D	E	FX
59,29	0,0	0,0	0,0	0,0	40,71

Lecturers: PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, Mgr. Kristína Vanýsková

Last change: 01.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KZ/N-bENS-006/22	Zoology

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 4 **per level/semester:** 28 / 56
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: I.

Prerequisites:

Recommended prerequisites:
The course is an introduction into Zoology. Its main gaols is to show diversity of animals and their life forms, to introduce their body organization and organization grades as well as to characterize natural units of animals in the frame of evolutionary systematics. Stress is put on evolution from unicellular organisms through protistan colonies to organisms with epithelial structure, which ended up in formation of multicellular animals with true epithelia and organs. Attention is paid to characterize large phylogenetic lineages and their supposed evolutionary interrelationships. The main goal of practicum is to show morphology and anatomy on an example of representative species of individual animal groups.

Course requirements:
Scale of assessment (preliminary/final): A (91 – 100%): Outstanding, excellent work (exceptional performance with strong evidence of original thinking and obvious capacity to analyze, synthesize and evaluate. B (81 – 90 %): Good, competent work; laudable performance with evidence of some original thinking, good problem-solving ability, exhibiting a serious, responsible engagement with the course content.C (73 – 80): Adequate, reasonably satisfactory work; fair performance but infrequent evidence of original thinking or the capacity to analyze, satisfies the minimum requirements of the course. D (66 – 72%): Less acceptable work; relatively weak performance with little evidence of original thinking or ability to analyze or synthesize course material. E (60 – 65%): Minimally acceptable work; very weak performance with little evidence of original thinking, showing inadequate grasp of some basic elements of the course. Fx (under 60%): Inadequate work; poor performance that indicates a lack of understanding or misunderstanding of essential subject matter.

Learning outcomes:
The course is an introduction into Zoology. Its main gaols is to show diversity of animals and their life forms, to introduce their body organization and organization grades as well as to characterize natural units of animals in the frame of evolutionary systematics. Stress is put on evolution from unicellular organisms through protistan colonies to organisms with epithelial structure, which ended up in formation of multicellular animals with true epithelia and organs. Attention is paid to characterize large phylogenetic lineages and their supposed evolutionary interrelationships. The

main goal of practicum is to show morphology and anatomy on an example of representative species of individual animal groups.

Class syllabus:

Topic 1: Basic terms in Zoology, Study object of Zoology, International Code of Zoological Nomenclature, Overview of methods used in classification of organisms. Division into two organization and functional grades formed during evolution: unicellular versus multicellular body organization. Topic 2: Protista - general characteristics, importance. Overview of the main evolutionary lineages Amorphea, Excavata, Diaphoretickes. Brief review and characteristics of Opisthokonta, Amoebozoa, Excavata, SAR, and Archaeplastida, with special focus on economically and medically important groups and species. Evolutionary relationships among Opisthokonta - main phylogenetic lineages (Choanozoa, Ministeria, Ichtyosporea) leading to Metazoa. Topic 3: Origin of multicellular animals - basic possibilities of formation of multicellularity. Histological, embryonic and microanatomical levels of organization. Evolutionary grades Parazoa, Placozoa and Mesozoa - general characteristics and classification. Diploblastic Eumetazoa (Coelenterata: Cnidaria, Ctenophora). True epithelia, diploblastic body organization, origin of digestive tract, evolution of nerve and muscle tissue, first sense cells and sense organs, development of skeletal structures, overview on ontogenesis. Topic 4: Tripoblastic Eumetazoa, Bilateralia. Way of life and ongoing cephalisation processes, movement and body symmetry. Protostomia and Deuterostomia, tripoblastic body organization, basic types of nervous system. Digestive system and nutrition modes. Basic types of body cavities, circulatory system, types of excretory organs a reproductive system. Topic 5: Spiralia: uniform mode of spiral cleavage, evidence for phylogenetic relatedness. The Platyzoa Group: Platyhelmintes, Gnathostomulida, Gastrotricha, Micrognathozoa, Rotifera - body organization, reproduction, ontogenesis and supposed phylogenetic relationships. Topic 6: Trochozoa: Entoprocta, Mollusca, Annelida, Phoronida, Brachiopoda, Nemertea: body organization, reproduction, ontogenesis, trochophora larva, epigamy and schizogamy, supposed phylogenetic relationships. Topic 7: Ecdysozoa: Nemathelmintes - characteristics, systematics and hypotheses about phylogenetic relationships among Gastrotricha, Nematoda, Nematomorpha, Kinorhyncha, Priapulida, Loricifera. Arthropoda: characteristic autapomorphies, body organization and systematics. Position and peculiarities of Onychophora and Tardigrada. Euarthropoda: characteristic features, segmentation of body and limbs, homologisation of body segments among individual groups, ontogenesis and phylogeny of Chelicerata, Mandibulata (Crustacea), and Antennata (Chilopoda a Progoneata). Topic 8: Insecta (Hexapoda) - the most numerous animal group, reasons of evolutionary success. Body organization, characteristic autapomorphies, origin of wings, reproduction, embryonic and postembryonic development, economical importance. Characteristics and classification of Entognatha, Ectognatha a Dicondylia. Topic 9: Phylogenetic lineage Notoneuralia – ontogenetic development, dipleurula larva, formation of coelom and notochord. Phylogenetic relationships among the main taxonomical groups Hemichordata, Echinodermata, and Chordata. Evolutionary significance of pharyngotremy and gill arch structures in vertebrates. Cephalochordata, Urochordata. Topic 10: Craniata – their characteristics and phylogeny, skull structure and evolution. Anatomy and phylogeny of Cyclostomata. Gnathostomata and origin of jaws and paired limbs. Osteichthyes, Actinopterygii, Sarcopterygii and their most important phylogenetic lineages. Topic 11: Origin of terrestrial vertebrates and major evolutionary changes accompanying the movement of vertebrates to land (breathing, pectoral and pelvic girdles, evolution of gill arches, hyoideum). Amphibia – their characteristics and phylogeny, neoteny and pedomorphosis. Amniota – origin of extraembryonic membranes. Reptilia – thermoregulation and endothermy, skull evolution and phylogenetically important lineages. Topic 12: Aves – their origin and anatomy, adaptations to flight, phylogenetic relationships among main lineages, ecological and behavioural peculiarities of birds. Topic 13:

Mammalia – their origin and anatomy, origin of the secondary palate, phylogenetic relationships among main lineages, ecological and behavioural peculiarities of mammals.

Recommended literature:

Brusca, R.C. & Brusca, G.J. 2003. Invertebrates. Sinauer, Sunderland (MA), 936 pp.
Giribet, G. 2008. Assembling the lophotrochozoan (=spiralian) tree of life. Philosophical Transactions of the Royal Society B 363: 1513-1522.
Kardong, K.V. 2012. Vertebrates. Comparative Anatomy, Function, Evolution. 6th edition, McGraw-Hill Companies, New York.
Pough, F.H., Janis, C.M., Heiser, J.B. 2012. Vertebrate Life. 9th edition, Benjamin Cummings Publisher.
Telford, M.J.; Bourlat, S.J.; Economou, A., Papillon, D. & Rota-Stabelli, O. 2008. The Evolution of the Ecdysozoa. Philosophical Transactions of the Royal Society B 363: 1529-1537.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Dávid Selnekovič, PhD., doc. Mgr. Peter Mikulíček, PhD.

Last change: 27.03.2023

Approved by:

COURSE DESCRIPTION

Academic year: 2022/2023

University: Comenius University Bratislava

Faculty: Faculty of Natural Sciences

Course ID:	**Course title:**
PriF.KTV/N-bXTV-109/22	Ďumbier mountain hiking

Educational activities:
Type of activities: other
Number of hours:
per week: **per level/semester:** 3d
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1., 3., 5.

Educational level: I.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 155

A	B	C	D	E	FX
64,52	0,0	0,0	0,0	0,0	35,48

Lecturers: PaedDr. Vladimír Hubka, Mgr. Miriam Kirchmayerová, PhD., Mgr. Martin Mokošák, PhD., Mgr. Igor Remák, PhD., PaedDr. Mgr. Lenka Vandáková, Mgr. Kristína Vanýsková, Mgr. Denisa Šeďová

Last change: 01.08.2022

Approved by: